

SECTION 05400

[LOAD BEARING WALL SYSTEMS]

COLD-FORMED METAL FRAMING

GENERAL NOTES TO SPECIFIER:

THIS SPECIFICATION SECTION HAS BEEN PREPARED TO ASSIST DESIGN PROFESSIONALS IN THE PREPARATION OF PROJECT OR OFFICE MASTER SPECIFICATIONS. IT FOLLOWS GUIDELINES ESTABLISHED BY THE CONSTRUCTION SPECIFICATIONS INSTITUTE, AND THEREFORE MAY BE USED WITH MOST MASTER SPECIFICATION SYSTEMS WITH MINOR EDITING.

EDIT CAREFULLY TO SUIT PROJECT REQUIREMENTS. MODIFY AS NECESSARY AND DELETE ITEMS THAT ARE NOT APPLICABLE. VERIFY THAT REFERENCED SECTION NUMBERS AND TITLES ARE CORRECT. (NUMBERS AND TITLES REFERENCED ARE BASED ON *MASTERFORMAT*, 1995 EDITION).

THIS SECTION ASSUMES THE PROJECT MANUAL WILL CONTAIN COMPLETE DIVISION 1 DOCUMENTS INCLUDING SECTIONS 01330–SUBMITTAL PROCEDURES, 01620–PRODUCT OPTIONS, 01630–PRODUCT SUBSTITUTION PROCEDURES, 01660–PRODUCT STORAGE AND HANDLING REQUIREMENTS, 01740–CLEANING, 01770–CLOSEOUT PROCEDURES, AND 01780–CLOSEOUT SUBMITTALS. CLOSE COORDINATION WITH DIVISION 1 SECTIONS IS REQUIRED. IF THE PROJECT MANUAL DOES NOT CONTAIN THESE SECTIONS, ADDITIONAL INFORMATION SHOULD BE INCLUDED UNDER THE APPROPRIATE ARTICLES.

NOTES TO THE SPECIFIER ARE CONTAINED IN BOXES AND SHOULD BE DELETED FROM FINAL COPY.

OPTIONAL ITEMS REQUIRING SELECTION BY THE SPECIFIER ARE ENCLOSED WITHIN BRACKETS, E.G: [35] [40] [45]. MAKE APPROPRIATE SELECTIONS AND DELETE OTHERS.

ITEMS REQUIRING ADDITIONAL INFORMATION ARE UNDERLINED BLANK SPACES, E.G: _____ .

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Structural engineering services provided by the cold-formed metal framing fabricator.
2. [Exterior] [and] [interior] load-bearing stud framed walls.
3. [Exterior] [and] [interior] nonload-bearing stud framed walls and curtainwalls.
4. Steel [joists] [and] [rafters].
5. Steel trusses.

B. Products Supplied But Not Installed Under This Section:

COORDINATE WITH CONCRETE OR STEEL FRAMING AND/OR DECK SECTIONS TO VERIFY THOSE SECTIONS INCLUDE INSTALLATION OF ANCHOR BOLTS AND STUDS.

1. Anchor Bolts.

C. Products Installed But Not Supplied Under This Section:

1. Insulation in inaccessible framing spaces.

D. Related Sections:

1. _____ : Structural building frame.
2. _____ : Masonry veneer.
3. 07214–Foamed-In-Place Insulation
4. APA Rated Plywood Sheathing
5. 9110–Non-Load-Bearing Wall Framing.

6. 09250–Gypsum Board

1.02 SYSTEM REQUIREMENTS

A. Design Requirements:

1. Structural Design: Prepare complete structural design calculations for framing members and accessories.
2. Design system to accommodate [1/2 inch (13 mm)] [3/4 inch (19 mm)] [___ inch (___ mm) vertical deflection of structural building frame, live loading, seasonal and day/night temperature ranges, and construction tolerances.

B. Performance Requirements:

1. Size components to withstand design loads as shown on Drawings, and following deflection limits:
 - a. Exterior Load-Bearing Walls: horizontal deflection of [1/240] [1/360] [1/600] [1/_____] of wall height.
 - b. Interior Load-Bearing Walls: horizontal deflection of [1/240] [1/360] of wall height.
 - c. Exterior Non-Load-Bearing Curtainwall: horizontal deflection of [1/240] [1/360] [1/600] [1/720] [1/_____] of wall height.
 - d. Floor Joists or Trusses: Vertical deflection of [1/240] [1/360] of joist span.
 - e. Roof Trusses: Vertical deflection of [1/240] [1/360] of joist span.

1.03 SUBMITTALS

A. Reference Section 01330–Submittal Procedures; submit following items:

1. Product Data.
2. Shop Drawings: Show wall sections coordinated with Drawings showing framing, accessories, anchorage, and connection details.
3. Quality Assurance/Control Submittals:
 - a. Qualifications: Proof of manufacturer, installer, and welder qualifications.
 - b. Structural Design Calculations.
 - c. Certificates:
 - 1) Mill certificates signed by framing member/accessory manufacturer certifying compliance with material requirements.
 - 2) Welder certificates.
 - d. Manufacturer’s Installation Instructions for framing members and framing accessories.

B. Closeout Submittals: Reference Section 01780–Closeout Submittals; submit following items:

1. Record Drawings.

1.04 QUALITY ASSURANCE

A. Overall Standards:

1. Calculate structural properties of cold-formed metal framing and accessories in accordance with AISI “Specification for the Design of Cold-Formed Steel Structural Members.”
2. Provide structural design calculations sealed and signed by a Professional Engineer licensed in the state where the Project is located.

3. Welding Standards: Comply with AWS D1.1 “Structural Welding Code–Steel,” and AWS D1.3 “Structural Welding Code–Sheet Steel.”
- B. Qualifications:
1. Manufacturers’ Qualifications: Minimum five years experience in producing products of the type specified.
 2. Installer Qualifications: Minimum three years experience in installation of the type of products specified.
 3. Welder Qualifications: Current AWS Certificates for welding processes required.
- C. Mock-Ups: Comply with requirements of Section 01450–Quality Control.

INCLUDE THIS PARAGRAPH ONLY IF FULL SIZED MOCKUP IS DESIRED. VERIFY SECTION 01450 INCLUDES FULL MOCKUP REQUIREMENTS AND COORDINATE WITH OTHER SECTIONS TO PROVIDE RESPECTIVE PRODUCTS IN THE MOCKUP ASSEMBLY. COMPLETE SUBPARAGRAPH 1. BELOW TO INCLUDE ALL FEATURES DESIRED IN THE MOCKUP.

1. Provide mockup of exterior wall framing including _____.
 2. Minimum mockup size: ____ feet high by ____ feet wide (____ m high by ____ m wide).
 3. Construct mockup [within building structural frame] [at a location on site separate from the building structural frame].
- D. Pre-Installation Meeting:
1. Convene meeting at project site within one week of scheduled start of installation with representatives of the following in attendance: Owner, Architect, General Contractor, and metal framing Sub-Contractor.
 2. Review substrate conditions, requirements of related work, installation instructions, storage and handling procedures, and protection measures.
 3. Keep minutes of meeting including responsibilities of various parties and deviations from specifications and installation instructions. Distribute minutes to attendees within 72 hours.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Reference Section 01660–Product Storage and Handling Requirements.
- B. Follow manufacturer’s instructions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Studs, Tracks: Any manufacturer complying with requirements specified herein.
- B. Framing Accessories: The STEEL Network, Inc.(TSN), Raleigh NC, (888) 474-4876; e-mail: tsn@steelnetwork.com; website: www.steelnetwork.com.
- C. Substitutions: None allowed.

2.02 FRAMING MEMBERS

- A. Studs: ASTM A 653/653 M steel, [G60 (Z180)] [G90 (Z275)] galvanized , channel shaped with lipped flanges, punched web, size as shown on Drawings, thickness and grade as required by structural design calculations.

- B. Tracks: ASTM A 653/653 M steel, same designation, coating, and thickness as studs except as otherwise noted, channel shaped, solid web, depth compatible with studs, size, thickness and grade as required by structural design calculations.

2.03 FRAMING ACCESSORIES

DIFFERENT TYPES OF INFORMATION ARE REQUIRED TO BE SHOWN ON THE DRAWINGS FOR THE FOLLOWING ACCESSORIES DEPENDING ON THE PARTICULAR ACCESSORIES SELECTED. VERIFY THAT DRAWINGS SHOW ALL INFORMATION REQUIRED AND THAT CLIPS ARE SELECTED IN ACCORDANCE WITH TSN PUBLISHED ALLOWABLE DESIGN LOADS.

- A. Material: ASTM A 653 (653M) steel; SS Grade 50 (340), Class 1, 50 ksi (340 MPa) minimum yield strength, 65 ksi (450 MPa) minimum tensile strength, G60 (Z180) hot-dipped galvanized coating, except as otherwise noted.
- B. Stamp manufacturer's name on each accessory item.
- C. Provide screws with accessories designated for screw attachment.
- D. Connector Devices:
 - 1. Vertical Deflection Clips: VertiClip®, including step bushings. Rigid attachment to structure and screw attachment to stud web using step-bushings to permit frictionless vertical movement. 68 mils (1.72 mm) minimum thickness, size as required by structural design calculations.
 - 2. Drift System Clips: DriftClip™, including step bushings. 68 mils (1.72 mm) minimum thickness, size as required by structural design calculations.
 - a. Screw attachment to stud web using step-bushings to permit frictionless vertical movement.
 - b. Screw attachment to structure using step-bushings to permit frictionless movement in the plane of the wall.
 - 3. Rigid Clip Angles: StiffClip™. Rigid attachment to structure and stud web.
 - 4. Floor Ties: Floor to floor strap ties, 2 inches (50 mm) by 54 mils (1.37 mm) thick. Screw attachment to stud flanges. Length as required by structural design calculations.
 - 5. Hip Angle–135 degree: Rigid attachment to webs of hip framing members. Length and thickness as required by structural design calculations.
 - 6. Roof Ties: Fabricate for screw attachment to joist web and top track/stud flanges. Size and thickness as required by structural design calculations.
- E. Bridging:
 - 1. Cold rolled Channel: 1-1/2 by 1/2 inch by 56 mil thick (38 by 13 by 1.42 mm).
 - a. Bridging Clip: BridgeClip®. Provide attachment through stud punch-out clamping onto stud web and wrapping around bridging channel. Provide holes for screw attachment to stud web and channel.
 - 2. Flat Strap. Width and thickness as required by structural design calculations. Rigid attachment to stud flange.
 - 3. Solid Bridging: Channel shaped bridging with lipped flanges and integral formed clips. Screw attachment to stud. 33 mils (0.84 mm) minimum thickness, size as required by structural design calculations.
 - 4. Cross Bridging: Fabricate members for specific joist depth and spacing with one screw to each joist flange and one to each joist web. Provide bridging sized to joist depth and spacing, 36 mils (0.91 mm) minimum thickness, as required by structural design calculations.

2.04 FASTENERS

- A. Screws: Corrosion resistant coated, self-drilling, pan or hex washer head. Provide screw type and size as required by structural design calculations, or as recommended by The STEEL Network for the specific condition and thickness of materials being joined.
- B. Anchor Bolts and Studs: ASTM A 307, Grade A, carbon steel, with hex-head carbon steel nuts and flat steel washers. Hot-dip zinc coated in accordance with ASTM A 153. Provide bolt or stud type and size as required by structural design calculations.
- C. Expansion Anchors: Federal Specification FF-S-325, Group II, Type 4, Class 1. Provide bolts listed or approved by one or more of the following and of diameter and length as required by structural design calculations.
 - 1. Underwriters Laboratory.
 - 2. Factory Mutual.
 - 3. International Conference of Building Officials.
 - 4. Southern Building Code Congress.
 - 5. City of Los Angeles.
 - 6. Metro-Dade County Florida.
- D. Powder Actuated Fasteners: Federal Specification FF-P-395b. Manufacturer from AISI 1062 or 1065 steel, austempered to a minimum core hardness of 50 to 54 HRC and zinc plated in accordance with ASTM B 633. Provide fasteners listed or approved by one or more of the following and of type, diameter and length as required by structural design calculations:
 - 1. Underwriters Laboratory.
 - 2. Factory Mutual.
 - 3. International Conference of Building Officials.
 - 4. Southern Building Code Congress.

2.05 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Compound: SSPC-Paint 20, spray-can applicator.

2.06 FABRICATION

- A. Shop Assembly: Fabricate assemblies to size and configuration required; fitted and connected to meet design requirements.
 - 1. Assemble in largest practical sections for delivery to site.
 - 2. Reinforce and brace assemblies to withstand handling stresses.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates upon which work will be installed.
- B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.
- C. Commencement of work by installer is acceptance of substrate.

3.02 GENERAL INSTALLATION

ARTICLES IN PART-3 MAKE REFERENCE TO, AND RELY ON, THE DRAWINGS FOR INSTALLATION INFORMATION THAT IS OFTEN COVERED IN BOTH SPECIFICATIONS AND DRAWINGS. REVIEW CAREFULLY AND VERIFY THAT ALL NECESSARY INFORMATION IS INCLUDED IN THE DRAWINGS.

- A. Install cold-formed metal framing plumb, square, true to line and securely fastened as required by structural design calculations.
- B. Following manufacturer's installation instructions. If installation instructions conflict with these specifications or Drawings, adhere to specifications or Drawings.
- C. Cut members by shearing or sawing.
- D. Install members in single piece lengths except that tracks may be spliced, butt-welded, or each length anchored to a common building frame element.
- E. Install insulation in framing spaces of insulated assemblies made inaccessible after erection.
- F. Repairs and Touch-Up: Clean damaged surfaces and coatings. Touch-up field welds and damaged galvanized surfaces with galvanizing repair compound.
- G. Tolerances:
 - 1. Variation from plumb, level, and true to line: 1/8 inch in 10 feet (1:960).
 - 2. Member Spacing: Not more than 1/8 inch (3 mm) plus or minus from spacing indicated.

3.03 FRAMING MEMBER INSTALLATION

- A. Studs:
 - 1. Secure bottom and top tracks in place as required by structural design calculations.
 - 2. Install studs at spacing as [shown on Drawings] [required by structural design calculations], at each side of openings, and not more than 2 inches (50 mm) from abutting walls.
 - a. Frame corners with three studs.
 - b. Frame wall openings wider than stud spacing with double stud at each jamb.
 - 3. Install supplementary framing or blocking to support work attached to framing. Where type of support is not shown, comply with industry standards.

3.04 FRAMING ACCESSORY INSTALLATION

- A. Install accessories as required by structural design calculations. Provide appropriate fasteners in all predrilled holes backed by another framing member.

SELECT FIRST SUBPARAGRAPH BELOW FOR NON-LOAD-BEARING CONDITIONS. SELECT THE SECOND SUBPARAGRAPH FOR LOAD-BEARING CONDITIONS.

- 1. Bridging Clip for Cold Rolled Channel Bridging: Secure to stud web by inserting tabs through web slots. Secure to channel with one screw.
- 2. Bridging Clip for Cold Rolled Channel Bridging: Secure to stud web by inserting tabs through web slots and with 2 screws. Secure to channel with one screw.

3.05 FIELD QUALITY CONTROL

- A. Inspection: [Structural Engineer of Record] [Project Inspector] [_____] will inspect Work of this section and execute the "Cold-Formed Metal Framing Inspection Report" following this section.

- B. Testing: Field and shop welds are subject to testing by an independent testing agency in accordance with Section 01450–Quality Control.

3.06 CLEANING

- A. Reference Section 01740–Cleaning.

END OF SECTION¹

COLD-FORMED METAL FRAMING INSPECTION REPORT

¹ This specification was prepared by Architectural Specification Consultants and The STEEL Network, Inc. Comments or suggestions for improvement should be addressed to: TSN; 3215 Wellington Court, Raleigh, NC 27615 (919) 845-1025 (fax 1028).

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