

## SECTION 05400 - COLD FORMED METAL FRAMING

## PART 1 GENERAL

## 1.1 SUMMARY

## A. Section Includes:

1. Load bearing formed steel stud exterior and interior framing 20 gage and heavier.

## B. Related Requirements:

1. Section 05090 - Post-installed Concrete and Masonry Anchors: Mechanical and adhesive anchors drilled into concrete or masonry.
2. Section 06100 - Rough Carpentry: Wood furring strips, plywood, and blocking.
3. Section 07210 - Building Insulation: Thermal insulation installed in exterior framing.
4. Section 09250 - Gypsum Board: Non-load bearing steel stud partition framing lighter than 20 gage.

## 1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.

## B. American Iron and Steel Institute (AISI):

1. North American Specification for the Design of Cold-Formed Steel Structural Members.
2. Standard for Cold-Formed Steel Framing

## C. ASTM International (ASTM):

1. ASTM A 36 - Carbon Structural Steel.
2. ASTM A 123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM A 1003 - Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members
4. ASTM C 1007 - Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.
5. ASTM C 1513 - Steel Tapping Screws for Cold-Formed Steel Framing Connections.

## D. American Welding Society (AWS):

1. AWS D1.1 - Structural Welding Code - Steel.
2. AWS D1.3 - Structural Welding Code - Steel Sheet.

## E. Gypsum Association (GA):

1. GA-216 - Application and Finishing of Gypsum Board.

## F. Steel Structures Painting Council (SSPC):

1. SSPC-Paint 20 Type I - Zinc Rich Primers - Inorganic.

## G. Steel Framing Industry Association (SFIA):

1. Member listing.

## H. Steel Stud Manufacturers Association (SSMA):

1. SSMA Product Technical Information.

## I. Certified Steel Stud Association (CSSA):

1. Member listing.

### 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in the installation of cold formed metal framing components with minimum five years documented experience.
- B. Qualifications for Welding Work: Qualify welding operators in accordance with Standard Qualification Procedures as required by AWS D1.1.

### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Transport, handle, store, and protect products in compliance with the requirements of Section 01600.
- B. Protect metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
- C. Store and protect metal framing products with waterproof covering; ventilate to avoid condensation.
- D. Where framing is stored outdoors, stack materials off ground, supported on level platform, fully protected from weather.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Comply with AISI North American Specification for the Design of Cold-Formed Steel Structural Members and ANSI Standard for Cold-Formed Steel Framing.
- B. Steel Sheet: ASTM A 1003, Structural Grade, Type H, metallic coated, Grade: ST33H (33 ksi) unless otherwise indicated, Coating G60.
- C. Material Thickness: Gage shown on the drawings shall have the following minimum base metal thickness.
  - 1. 20 gage: 33 mils
  - 2. 18 gage: 43 mils
  - 3. 16 gage: 53 mils

### 2.2 FRAMING AND ACCESSORIES

- A. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
  - 1. ClarkDietrich Building Systems, West Chester, OH (513) 870-1100.
  - 2. The Steel Network, Durham, NC (888) 474-4876.
  - 3. Cemco Steel, Ft. Worth, TX (817) 568-1525.
  - 4. Telling Industries, LLC Willoughby, OH (866) 372-6384.
  - 5. Marino/WARE, South Plainfield, NJ (800) 627-4661.
  - 6. Other manufacturers listed as members of CSSA, SSMA, or SFIA.
- B. Interior and Exterior Load-Bearing Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, depth, flange width, and gage as indicated on Drawings.
- C. Interior and Exterior Load-Bearing Steel Joists: Manufacturer's standard C-shaped steel joists, of web depths indicated, with stiffened flanges.
- D. Partition Floor Tracks and Runners: Galvanized sheet steel, C-shaped; same depth and gage as studs; tight fit; solid web.
- E. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and same minimum base-metal thickness as steel studs.

- F. Load-Bearing Wall Furring and Partition Bracing: Galvanized sheet steel.
  - 1. Cold-Formed Channels: 3/4 inch x 1/2 inch and 1-1/2 inch x 17/32 inch or as shown on the drawings.
  - 2. Clip Angles: 2 inches x 2 inches x 16 gage x 1/4 inch less than stud width or
    - a. Bridge Clip by The Steel Network.
    - b. EasyClip U-Series Clip Angles 1-1/2" x 1-1/2" x 16 gage x 1/4 inch less than stud width by ClarkDietrich.
  - 3. Contractor's Option: In lieu of cold-formed channels and clip angles for horizontal bridging, provide one of the following:
    - a. Bridge Bar by the Steel Network.
    - b. TradeReady Spazzer 5400 and spacing bar by ClarkDietrich.
- G. Steel Shapes and Clips: ASTM A 36, zinc coated by hot-dip process according to ASTM A 123.
- H. Framing Attachment Angles: Galvanized sheet steel, size, shape and configuration as indicated on Drawings, 14 gage, unless indicated otherwise on Drawings.
  - 1. Contractor's Option: Contact ClarkDietrich Clip Express (866) 638-1908 for alternative selections.
- I. Ceiling Joists and Runners: Galvanized sheet steel, C-shaped.
- J. Flat Metal Straps and Plates: Galvanized sheet steel, gage, shape, and configuration as indicated on Drawings.
  - 1. Contractor's Option: In lieu of 2-inch continuous metal strap at capture tracks, Contractor may provide one of the following:
    - a. Bridge Bar by The Steel Network.
    - b. TradeReady Spazzer 5400 bridging and spacing bar by ClarkDietrich.

## 2.3 FASTENERS

- A. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load.
- B. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
- C. Framing to Framing: ASTM C 1513; 5/8 inch Type S-12 low-profile head corrosion-resistant self-drilling self-tapping steel screws.
- D. Framing to Attachment Angle Fasteners: #12 diameter pan head corrosion-resistant self-drilling self-tapping steel screws.
- E. Wall Floor Track Anchorage Device: Carbon steel wedge type expansion anchor; minimum 3/8 inch diameter x minimum 1-1/2 inch embedment unless noted otherwise on the Drawings. Refer to Section 05090 for approved anchors.
- F. Wall Furring to Concrete or Masonry Wall Fasteners: Hex head screw anchors; minimum 1/4 inch diameter x minimum 1-1/8 inch embedment unless otherwise noted on the Drawings. Refer to Section 05090 for approved anchors.
- G. Furring Channel to Masonry or Concrete Surface Fasteners: Low velocity powder-actuated drive pins of size to suit application.
- H. Welding Materials: AWS D1.3.
- I. Wood Furring, Blocking, and Plywood, Attached to Framing Fasteners: Specified in Section 06100.

## 2.4 FINISHES

- A. Galvanizing: G60 coating class.

- B. Galvanizing Repair Paint: SSPC-Paint 20, Type II - organic.

## 2.5 SUBSTITUTIONS

- A. Comply with the requirements of Section 01600.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine existing conditions and adjacent areas where products will be installed and verify that conditions conform to product manufacturer's requirements. Verify that building framing components are ready to receive work. Verify that rough-in utilities are in-place and located where required. Do not proceed until unsatisfactory conditions have been corrected.
- B. Beginning of erection indicates acceptance of existing conditions.

### 3.2 INSTALLATION - GENERAL

- A. Install cold-formed metal framing in accordance with AISI North America Standard for Cold-Formed Steel Framing and to manufacturer's written instructions unless more stringent requirements are shown or specified.
- B. Install system to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
- C. Install system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
- D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
- E. Install framing members in one-piece lengths.
- F. Perform field welding in accordance with AWS D1.3.

### 3.3 INSTALLATION - STUD FRAMING

- A. Install studs and fasteners in accordance with manufacturer's published instructions and, where gypsum board is attached to studs, install studs in accordance with GA-216 and ASTM C 1007.
- B. Metal Stud Spacing: 16 inches on center, maximum, unless otherwise shown on the drawings.
- C. Align stud web openings horizontally.
- D. Construct corners using minimum three studs.
- E. Place studs as indicated on Drawings, minimum 2 inches from abutting walls.
- F. Erect studs one piece full length. Splicing of studs not permitted.
- G. Erect studs, brace, and reinforce to develop full strength to meet design requirements.
- H. Install headers at partition openings using load-bearing C-shaped joists.
- I. Install framing between studs for attachment of mechanical and electrical items.

- J. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- K. Install intermediate studs above and below openings to match wall stud spacing.
- L. Fasten studs adjacent to door and window frames, partition intersections, and corners to top and bottom runner flanges in double-stud fashion with metal lock fastener tools.
  1. Securely fasten studs to jamb and head anchor clips of door and borrowed-light frames.
  2. Place horizontally a cut-to-length section of runner with web-flange bent at each end, fasten with minimum one screw per flange.
  3. Position a cut-to-length stud (extending to top runner) at vertical panel joints over door frame header.
- M. Install bridging for stud partitions over 8 feet high at mid-height with 1-1/2 inch rolled channels through studs and screw attach in place using clip angles. Lap channels by nesting one inside the other to a length of at least 8 inches and wire tie together.
- N. Blocking: Screw attach wood blocking between studs. Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, and hardware.
- O. Where optional framing products by the named manufacturers are specified in Part 2 above in lieu of conventional components specified, install in accordance with manufacturers recommendations.
- P. Touch up field welds and damaged galvanized surfaces with galvanizing repair paint.
- Q. Fastening: Fasten framing in accordance with manufacturer's published instructions and schedule below unless indicated otherwise on Drawings.

FASTENERS	MINIMUM CONNECTION
Floor Track to Concrete	1 Anchor at 36 inches on center.
Partition Stud to Floor Track	1 Screw each side at flange.
Stud Web to Stud Web	2 Screws.
Plates and Straps to Studs	2 Screws.
Lateral Bracing to Partition Stud Using clip Angles	2 Screws to stud and 2 Screws to cold rolled channel.
Runner to Header	1 Screw at 16 inches on center, maximum 6 inches from each end.
Welded Connections	Indicated on Drawings.

### 3.4 INSTALLATION - JOIST FRAMING

- A. Install joists and fasteners in accordance with manufacturer's published instructions.
- B. Make provisions for erection stresses. Provide temporary alignment and bracing.
- C. Place joists at locations and spacing as indicated on Drawings.
- D. Touch-up field welds and damaged galvanized surfaces with galvanizing repair paint.
- E. Fastening: Indicated on Drawings.

### 3.5 INSTALLATION - CEILING JOISTS

- A. Install joists and fasteners in accordance with manufacturer's published instructions and, where gypsum board is attached to joists, install joists in accordance with ASTM C 1007 and GA-216.
- B. Ceiling Joist Spacing: 16 inches on center beginning from center of room unless otherwise shown on the drawings.

- C. Install joists in direction of shortest span, parallel and level, with lateral bracing and bridging.
- D. Install joists in one piece full length. Splicing of joists not permitted.
- E. Install perimeter joist runner track sized to match joists. Attach joist runner track to wall framing with minimum 2 screws per stud and at corners and ends.
- F. Attach joist ends to joist runner tracks with minimum 1 screw each side at each flange.
- G. Install bridging at 48 inches on center beginning from center of room with 1-1/2 inch rolled channels screw attached to joists.
  - 1. Stagger bridging at light fixture locations as required.

### 3.6 INSTALLATION - FURRING

- A. Furring Channels: Attach vertically spaced at maximum 16 inches on center, unless otherwise shown on the drawings, to masonry and concrete surfaces with specified powder driven fasteners staggered 24 inches on center on opposite flanges.
- B. Wall Furring:
  - 1. Secure top and bottom runners to structure.
  - 2. Space metal furring at maximum 16 inches on center unless otherwise shown on the drawings.

### 3.7 INTERFACE WITH OTHER WORK

- A. Coordinate erection of studs with hollow metal door frames and overhead coiling door frames.
- B. Coordinate installation of anchors, supports, and blocking for mechanical, electrical, and building accessory items installed within framing.

### 3.8 FIELD QUALITY CONTROL

- A. Field quality control shall be the responsibility of the Contractor in accordance with Section 01452. Except as specified as mandatory, field quality control testing and inspection shall be at the discretion of the Contractor as necessary to assure compliance with Contract requirements.

END OF SECTION