INSPECTION GUIDELINES:
STEEL STUD FRAMING

INSPECTION CODE: 302

SCOPE: RESIDENTIAL & COMMERCIAL

CODES ENFORCED: 2016 CBC, CRC, CPC, CMC, CEC, CALGreen, CEnC, and PAMC

The information provided in this document is general and intended as a guide only. Each project is unique and additional requirements may be enforced as deemed appropriate.

APPLICATION
☐ The design and installation of structural and nonstructural steel stud framing shall be in accordance with American Iron and Steel Institute (AISI). (CBC 2211.1)

☐ For more information, including illustrations, visit the Steel Stud Manufacturers Association.

☐ Steel studs supporting mechanical equipment or appliances shall be designed for seismic loads. (CBC 2210.2)

INSPECTION
IDENTIFICATION
☐ All framing members shall have a legible label, stencil, stamp or embossment with the following information (CRC R505.2.4):
  o Manufacturer’s identification
  o Minimum base steel thickness in inches
  o Minimum coating designation
  o Minimum yield strength, in kips per square inch (ksi)

<table>
<thead>
<tr>
<th>Mils</th>
<th>Gage</th>
</tr>
</thead>
<tbody>
<tr>
<td>33</td>
<td>20</td>
</tr>
<tr>
<td>43</td>
<td>18</td>
</tr>
<tr>
<td>54</td>
<td>16</td>
</tr>
<tr>
<td>68</td>
<td>14</td>
</tr>
<tr>
<td>97</td>
<td>12</td>
</tr>
<tr>
<td>118</td>
<td>10</td>
</tr>
</tbody>
</table>

Table CPA 013 – Mils to Gage Conversion Table
CORROSION PROTECTION
☐ Load bearing steel framing shall have a metallic coating complying with ASTM A103 and one of the following (CRC R505.2.2):
  ○ A minimum of G 60 (ASTM A653); for indoor applications where environments are relatively dry.
  ○ A minimum of AZ 50 (ASTM A792); for applications where there is a potential for dampness from condensation.

MATERIAL CONDITION
☐ Field cuts or notches through the flanges or lips of any structural member are not allowed. Damaged members such as cracking in the steel at the bend radius location, and members with scaling of protective coating are not allowed. (CRC R505.3.5, CRC R603.3.4)

☐ Damaged structural members, connectors, hold-downs and mechanical fasteners shall be replaced or repaired in accordance with an approved design or as specified by a registered design professional. (AISI S240).

WEB HOLES
☐ Holes in webs of framing members shall be in conformance with AISI S100, the approved construction documents, and shall conform to the following conditions (AISI S240, CRC R505.2.6):
  ○ Conform to Figure R505.2.6.1 and R603.2.6.1
  ○ Holes are permitted along the centerline of the web of the framing member
  ○ Have a center-to-center spacing of not more than 24”
  ○ Have a width not greater than 0.5 times the member depth, or 2-1/2”
  ○ Have a length not exceeding 4-1/2”
  ○ Have a minimum distance between the edge of the bearing surface and the edge of the web hole of not less than 10”

☐ Framing members not conforming to the aforementioned requirements shall be reinforced or patched in accordance with an approved design as specified by a registered design professional or as follows. (AISI S240, CRC R505.2.6.2, CRC R603.2.6.3)
  ○ Reinforcement of web holes is permitted in horizontal members if the hole is located fully within the center 40% of the span and the depth and length of the hole does not exceed 65% of the flat width of the web.
  ○ Reinforcement of web holes is permitted in vertical members if the hole, measured across the web, exceeds 70% of the flat width of the web, and the length of the hole measured along the web exceeds 10” or the depth of the web, whichever is greater.
  ○ The reinforcement shall be a steel plate or C-shape section; the reinforcement shall be the same thickness as the receiving member and shall extend not less than 1” beyond all edges of the hole. The reinforcement shall be fastened to the web of the receiving member with No. 8 screws spaced not more than 1” center-to-center along the edges of the patch with minimum edge distance of 1/2”.
  ○ See Figures R505.2.6.1, R603.2.6.1, R505.2.6.3, and R603.2.6.3.
FIGURE R505.2.6.1
FLOOR JOIST WEB HOLES

For SI: 1 inch = 25.4 mm.

FIGURE R603.2.6.1
WALL STUD WEB HOLES

For SI: 1 inch = 25.4 mm.

FIGURE R505.2.6.3
FLOOR JOIST WEB HOLE PATCH

For SI: 1 inch = 25.4 mm.

FIGURE R603.2.6.3
WALL STUD WEB HOLE PATCH
CUTTING AND PATCHING

☐ All cutting of framing members shall be done by sawing, abrasive cutting, shearing, plasma cutting or other approved methods acceptable to the registered design professional. (AISI S240)

☐ Cutting or notching of structural members, including flanges and lips of joists, studs, headers, rafters, and ceiling joists, shall be permitted with an approved design or as specified by a registered design professional. (AISI S240)

☐ Patching of cuts and notches shall be permitted with an approved design or as specified by a registered design professional. (AISI S240)

WELDING

☐ Welding of steel members is not permitted unless it is special inspected by an approved agency for welding and re-coating. Observation of welding operations and visual inspection of in-process and completed welds shall be the primary method to confirm that the materials, procedures and workmanship are in conformance with the construction documents and AWS D1.3. (AISI S240)

SPLICING

☐ Joists and other structural members shall not be spliced unless it is specified by an approved design or by a registered design professional (AISI S240, CRC R505.3.7, CRC R603.3.5). Splicing of tracks shall conform to Figure R505.3.7 (for joists) and Figure R603.3.5 (for studs).
FASTENING

☐ Screws for steel-to-steel connections shall be installed with a minimum edge distance and center-to-center spacing of 1/2”, shall be self-drilling tapping, and conform to ASTM C1513. (CRC R505.2.5)

☐ Sheathing attached to steel stud framing shall be minimum No. 8 self-drilling tapping screws that conform to ASTM C1513. (CRC R505.2.5)

☐ Gypsum board attached to steel stud framing shall be minimum No. 6 screws with a bugle head that conform to ASTM C954 or ASTM C1513 with a bugle head style. (CRC R505.2.5)

☐ All fasteners shall extend through the steel a minimum of three exposed threads. (CRC R505.2.5)

<table>
<thead>
<tr>
<th>Description of Building Element</th>
<th>Number and Size of Fasteners</th>
<th>Spacing of Fasteners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor joist to track of load-bearing walls</td>
<td>(2) No. 8 Screws</td>
<td>Each Joist</td>
</tr>
<tr>
<td>Wall stud to top of track</td>
<td>(2) No. 8 Screws</td>
<td>Each end of stud, one per flange</td>
</tr>
<tr>
<td>Structural sheathing to wall studs</td>
<td>No. 8 Screws</td>
<td>6” O.C. on edges; 12” O.C. at intermediate supports</td>
</tr>
</tbody>
</table>

Table CPA 014 – Wall Fastening Schedule

PNEUMATICALLY DRIVEN PINS

☐ Verify that pin size and spacing complies with approved plans (check head markings and values). Proprietary fasteners must be designed and installed in accordance with the manufacturers’ requirements. (AISI S240).

☐ Verify that pins are fully driven and have a minimum penetration of 1/4” through the last material joined.

☐ Confirm that pins have protective coating per approved plans.
FOUNDATION/SILL PLATE

☐ The foundation shall be level and free from defects beneath structural walls. (AISI S240)

☐ Sill plate connections shall be in accordance to Figures R603.3.1(2) and Figures R603.3.1(3) when those conditions apply, or shall be in accordance with AIS-WSD and approved plan specifications.
WALL FRAMING

☐ Review the plans and verify if the stud wall system is either “in-line” or a “wall top plate distributor system” and that loads are properly transferred as appropriate to the system used. (CRC R505.1.2)
  
  o “In-line framing”: Where roof trusses, rafter, and floor joist are aligned over a bearing stud, the tolerance for alignment is 3/4” between center of bearing and center of horizontal framing member (because of thin member limitations, it is critical for load transfer that walls align vertically); see Figure R505.12.
  
  o “Wall to top plate distributor system”: Verify top track is properly framed per approved plans.

![Diagram of wall framing components](image)

**FIGURE R505.1.2**
In-Line Framing
STUD BRACING/BLOCKING

☐ For floor joists, the top flanges shall be laterally braced by floor sheathing fastened to the joists. For joists that exceed 12’, the bottom flanges shall be braced laterally with one of the following (CRC R505.3.3):
  o Gypsum board with No. 6 screws
  o Continuous steel straps (see Figure R505.3.3.2(1)) that are spaced 12” on center, at least 1-1/2” wide, and 33 mils in thickness. The straps shall be strapped to the bottom flange with one No. 8 screw, fastened to blocking two No. 8 screws, and fastened at each end (of strap) with two No. 8 screws.

☐ Verify that blocking is provided at joist ends and at each support when not otherwise restrained from rotation. (CRC R505.3.4)

☐ For studs, the flanges shall be laterally braced in accordance with one of the following:
  o Gypsum board (with No. 6 screws) on both sides, structural sheathing on both sides, or gypsum board (with No. 6 screws) on one side and structural sheathing on the other side of load-bearing walls.
  o Horizontal steel straps fastened in accordance with Figure R603.3.3(1) at mid-height for 8’ walls and at one-third points for 9’ and 10’ walls.
  o Sheathing on one side and strapping on the other side in accordance with Figure R603.3.3(2).

☐ For ceiling joists, the top flanges shall be laterally braced with one of the following (CRC R804.3.1.3):
  o Minimum 33-mil C-shaped member, track, or hat section
  o Minimum 54-mil 1-1/2” channel section
  o Minimum 33-mil 1-1/2” steel strap
Figure R506.3.3.2(2)
Joist blocking (strap)

Figure R603.3.3(1)
Stud bracing with strapping only
FIGURE R603.3.3(2)
STUD BRACING WITH STRAPPING AND SHEATHING MATERIAL

FIGURE R804.3.1.3(1)
CEILING JOIST TOP FLANGE BRACING WITH C-SHAPED, TRACK OR COLD-ROLLED CHANNEL
ANCHORAGE AT END IS REQUIRED.

STRAP BRACING, INSTALL TAUT, USE 1 NO. 8 SCREW TO EACH JOIST.

SHORT SEGMENT OF STUD OR TRACK USED AS BLOCKING: AT STRAP SPLICE LOCATIONS, AT ENDS, AND AT MAX. 12 FT O.C.

FIGURE R804.3.1.3(2)
CEILING JOIST TOP FLANGE BRACING WITH CONTINUOUS STEEL STRAP AND BLOCKING
JOISTS/CEILINGS

- Hard metal ceilings in commercial buildings: Verify access opening, light, and catwalk as required for maintenance of all equipment including signs. (CMC 304.3)

- Joists shall be located directly over bearing studs, or a load distribution member shall be provided at the top of the bearing wall (see Figure R505.3.1(7)). (CRC R505.3.1)

- Web stiffeners and compression blocking shall be provided at reaction points and/or at points of concentrated loads (see Figure R505.4(2)). (CRC R505.3.4)
FIGURE R505.3.4(2)
BEARING STIFFENER