



# City of Laredo

## Building Development Services



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## BUILDING BULLETIN 2020-006

**Date:** October 23, 2020

**To:** Building Development Services Customers

**From:** Mr. Arturo Garcia, Building Development Services Director  
Mr. Gerry Pinzon, PE, Building Official

**Subject:** Anchor Bolts for Residential Foundations

### Purpose:

This information bulletin provides information for the requirement to use the appropriate anchor bolts as required by the International Code Council (IRC) Section R403.1.6. Wood sole plates at all exterior walls on monolithic slabs, wood sole plates of braced wall panels at building interiors on monolithic slabs and all wood sill plates shall be anchored to the foundation and for the purpose of providing updated guidance for the foundation and framing inspection process.

### Scope:

The International Residential Code requires anchorage to the foundation as a critical part of the load path to resist lateral and uplift forces acting on the framing system of the building. The IRC prescribes that foundation plates or sills shall be bolted or anchored to the foundation with not less than ½-inch-diameter (12.7 mm) steel bolts or approved anchored to provide equivalent anchorage as the steel bolts.

### Process:

Beginning December 1, 2020, all residential homes will require the use the appropriate anchor bolts to brace the foundation as specified in the IRC Section R403.1.6. The foundation plan shall include the size, type, location and spacing of all anchor bolts with the required depth of embedment, edge and end distance, the location and size of all shear walls and all columns for braced frames or moment frames, the referenced details for the connection of shear walls, braced frames or moment-resisting frames to their footing, and referenced sections for any grade beams and footings (IRC Section R406.3.1). *Other methods, such as foundation straps, may be used if installed according to the manufacturer's instruction and in a way to provide equivalent anchorage. However, it is important that foundation straps will require closer spacing than for embedded anchor bolts.*

**The placement of the anchor bolts may be placed prior to the pouring of the concrete by securing in place or imbedded during the pouring of the concrete. Nonetheless, the appropriate anchor bolts must be at site during the foundation inspection. During the framing inspections, a verification to ensure bolts are spaced a maximum of 6 feet (1829 mm) on center to provide equivalent anchorage to ½ in diameter (12.7mm) anchor bolts. Bolts shall be embedded a**

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**minimum of 7 inches into concrete or grouted cells of concrete masonry units. The bolts shall be located in the middle third of the width of the plate. A nut and washer shall be tightened on each anchor bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundation that are not part of a braced wall panel shall be positively anchored with approved fasteners as listed in both the IRC and the IBC (IRC R406.3.1 & IBC 2308.3.1).**

Exceptions:

1. Walls 24 inches (610 mm) total length or shorter connecting offset braced wall panels shall be anchored to the foundation with a minimum of one anchor bolt located in the center third of the plate section.
2. Connection of walls 12 inches (305 mm) total length or shorter connecting offset braced wall panels to the foundation without anchor bolts shall be permitted.

The anchor bolts used to connect light-framed floor, ceiling and roof systems to concrete walls in accordance shall have heads, or shall be rods with threads on both ends with a hex or square nut on the end embedded in the concrete. Bolts and threaded rods shall comply with Section R608.5.2.2. A sketch showing the dimensions is shown below. The overall length (l) of the bolt is measured from the top of the bolt to the inside of the hook, as shown in figure 1 below.

A request was made to the ICC staff for an opinion on the interpretation provide above and their response was as follows:

- 2015 IRC Section R403.1.6 Foundation Anchorage: In the sentence *"Bolts shall extend not less than 7 inches into concrete or grouted cells of concrete masonry units"*, the 7-inch dimension refers to the J-bolt embedment depth, which does not include the hook of the J-hook.
- This is clarified in the Commentary to the IRC Section R403.1.6 which references the commentary Figure R403.1.6 which has a label to the anchor bolts which states *"min. ... anchor bolt with 7 in. depth ..."*

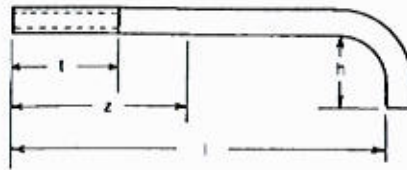
The ASTM F1554 specification covers anchor bolts designed to anchor structural supports to concrete foundations. F1554 anchor bolts can take the form of either headed bolts, straight rods, or bent anchor bolts. The three grades 36, 55, and 105 designate the minimum yield strength (ksi) of the anchor bolt. The bolts can be either cut or roll threaded and a weldable grade 55 can be substituted for grade 36 at the supplier's option. Color coding on the end – 36 blue, 55 yellow, and 105 red – helps facilitate easy identification in the field. Permanent manufacturer and grade marking is allowed under the S2 supplementary requirements.

Figure below shows the framing details.

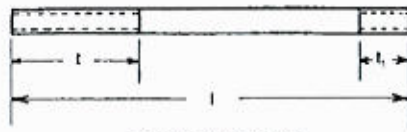
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### Anchor Bolt Measurement/Dimensions



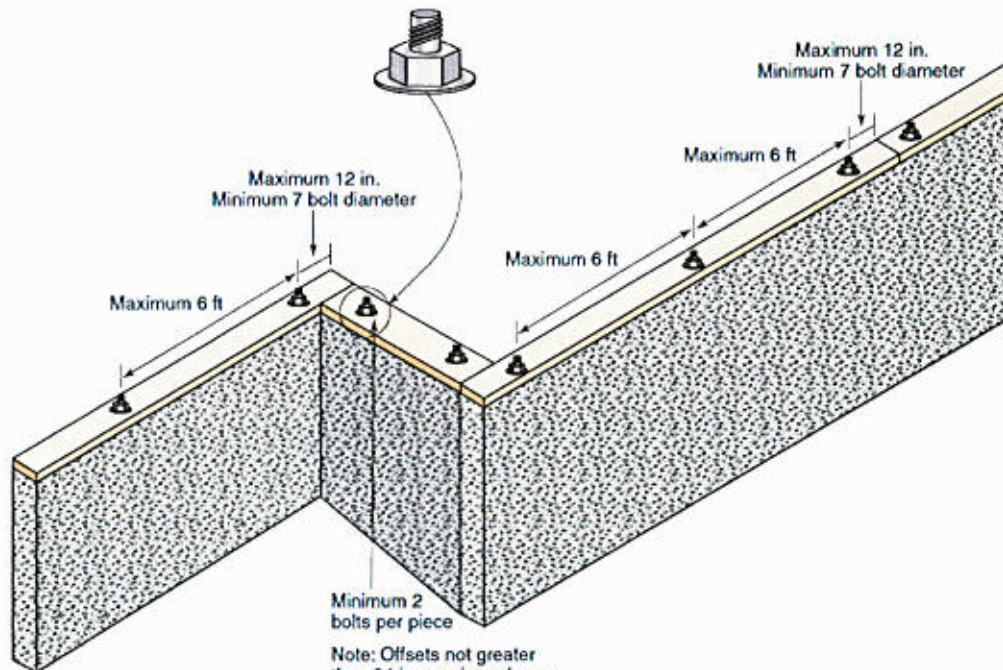
Anchor Bolt with Hook



Straight Anchor Bolt

- h = length of hook
- l = length of bolt
- t = length of threads (exposed end)
- t<sub>e</sub> = length of threads (encased end), when required
- z = length of zinc coating, min, when partial zinc coating is required

FIG. 1 Anchor Bolt Dimensions

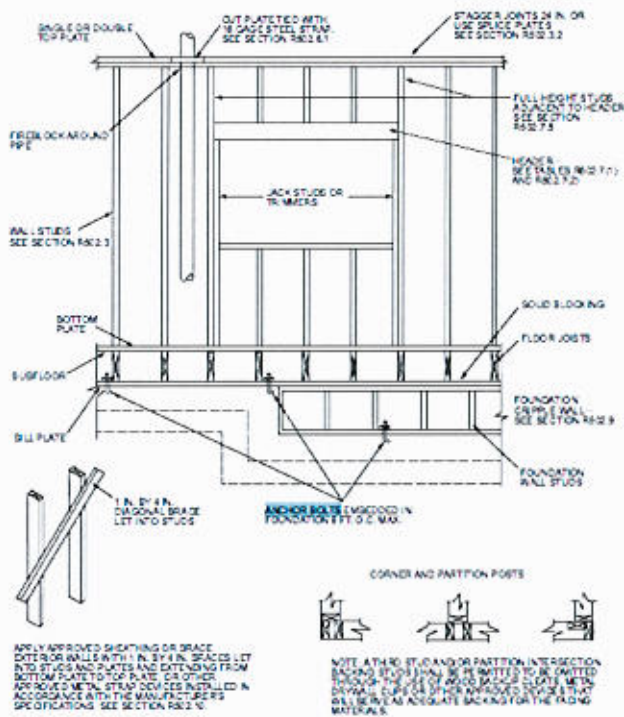


Minimum 2 bolts per piece

Note: Offsets not greater than 24 in. require only one anchor bolt in center third of plate.

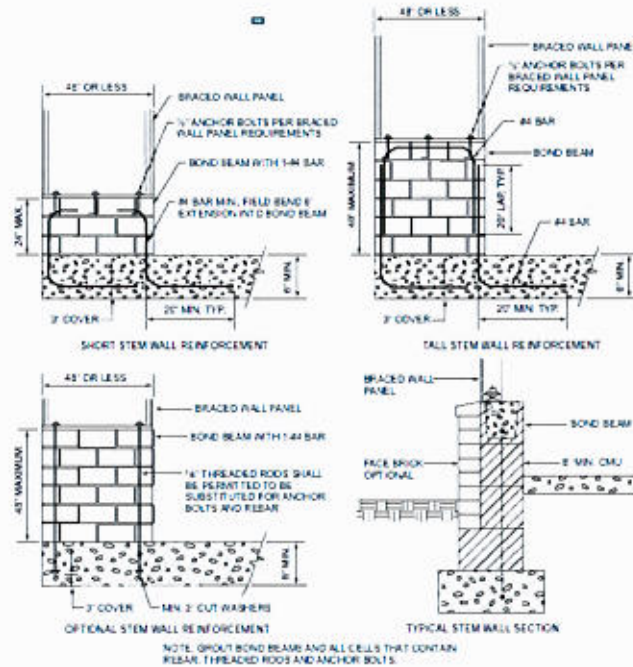
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1/2" x 1/4" = 25.4 mm, 1/2" = 32.4 mm

FIGURE R902.3(2) FRAMING DETAILS



1/2" x 1/4" = 25.4 mm

FIGURE R902.10.9 MASONRY STEM WALLS SUPPORTING BRACED WALL PANELS