

Technical Q & A

Cold-Formed Steel Restraint & Bracing

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Important details about the properties of hat or furring channel.



Photo 1.

Question

What material is commonly used for the restraint and bracing of cold-formed steel trusses?

Answer

A material known as hat (aka “furring”) channel is most commonly used for restraining and bracing cold-formed steel (CFS) trusses. Hat channel used for these applications is typically 1-½" 20 gauge (33 mil). The term “mil” is the designation that specifies the base metal thickness in thousandths of an inch, so 33 mil is .033 inches thick, or 33 one-thousandths of an inch.

Hat channel is commonly supplied by the component manufacturer for use as temporary or permanent restraint/bracing of chords and web members as well as with the connection of a piggyback assembly. Photo 1 illustrates the attachment of hat channel to the bottom chord of the trusses.

Question

What are the differences between structural and non-structural grade hat channel?

Answer

The terms “structural” and “non-structural” are used by the roll-forming industry to differentiate between a 33 mil (structural) and 30 mil or less (non-structural) product. It’s important to note that a non-structural product still has structural capacity (there is an ASTM standard C645 that sets the minimum standards). Ask any drywall installer for a piece of hat channel and he/she will most likely give you a piece of non-structural “drywall” or furring channel; this is the readily available type that most suppliers keep in stock. Drywall channel is often referred to as “non-structural” and should not be used as structural restraint and bracing for trusses unless designed by an engineer.

One of the most common sizes of “structural” furring channel used to restrain and brace CFS trusses is designated as 150F125-33. The Steel Stud Manufacturers Association (SSMA) identifies this designation as follows:

at a glance

- ❑ SBCA’s Cold-Formed Steel BCSI booklet recommends using material that is a minimum of 33 mil for permanent restraint/bracing applications.
- ❑ Framers should verify that they are getting structural grade hat channel (150F125-33) to be in conformance with the industry governing documents.
- ❑ If the preference is to use non-structural hat channel, the truss design engineer should evaluate the structural capabilities of the material.

150F125-33

1.50 in.

Furring Channel

1.25 in.
Flange Width

Base Metal Thickness in mils



Another major difference between non-structural and structural is the non-structural is typically G40 galvanized, where structural is typically G60. The significance to this is that the cold-formed steel truss specifications will typically require all materials used in structural framing, including trusses, clips, bracing, framing accessories, etc. be G60 galvanized.

Industry documents such as the *Field Installation Guide for Cold-Formed Steel Trusses* (published by the Cold-Formed Steel Engineers Institute – CFSEI) and the newly published CFSCBCSI – *Guide to Good Practice for Handling, Installing, Restraining & Bracing of Cold-Formed Steel Trusses*, recommend that restraint and bracing be a minimum 33 mil material. Additionally, the 2006 International Residential Code® (IRC) requires any load-bearing cold-formed steel roofing member (of which restraint and bracing would most certainly apply) to have a minimum uncoated thickness of 0.033 inches (33 mil).

The following language is taken from CFSBCSI regarding restraint/bracing material and connections:

The minimum size of a steel section used as Lateral Restraint and Diagonal Bracing is 33 mil 1-1/2" furring (hat) channel (150F125-33) or 33 mil 2-1/2" stud section (250S162-33) unless specified by the Building Designer.

Taken from CFSBCSI, Figure 1 illustrates that the hat channel can be installed on either the top or bottom edge of the chord and can be “nested” or “overlapped.”

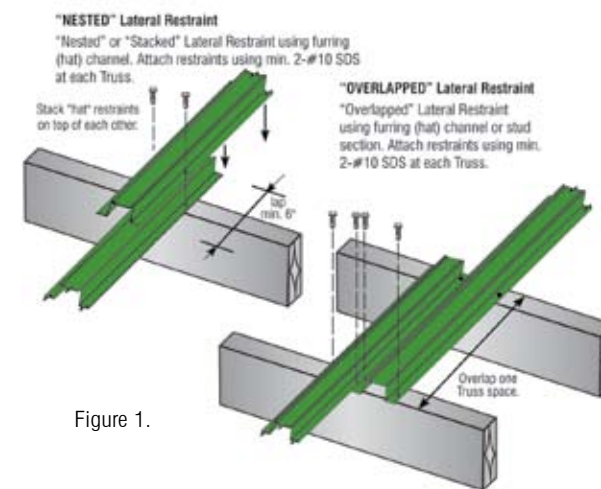


Figure 1.

As previously mentioned, most drywall contractors and supply yards have no reason to stock or supply 33 mil hat channel. If you are in the business of designing or supplying cold-formed steel trusses, and are going to recommend restraint and bracing per the guidelines provided in CFSCBCSI or any other prescriptive method, you should verify that you are getting structural grade hat channel (150F125-33) so that you are in conformance with the industry governing documents.

If a component manufacturer is going to provide the permanent truss bracing designs, it will be necessary to indicate to the engineer performing this design the preferred type of bracing material. As discussed above, non-structural hat channel still has structural properties, though obviously less than those of the structural grade. If the component manufacturer’s preference is to use non-structural hat channel in a permanent restraint/bracing application, the engineer performing the designs needs to evaluate the structural capabilities of this material and design to those capabilities. This could result in additional restraint and bracing being required. The cold-formed steel specifications should also be checked to ensure that the galvanization requirements are met.

Likewise, CFS truss installers should determine the grade of hat channel purchased. If there is a major discrepancy in price, it could be because the lower priced product is non-structural.

Remember that inadequate, improper or lack of restraint and bracing is one of the most common causes of truss failure. It is very important to make sure that the required grade of restraint and bracing is specified and supplied. **SBC**

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