Frequently Asked Questions Regarding Cold-Formed Steel

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The Wei-Wen Yu Center for Cold-Formed Steel Structures (CCFSS) was established on the campus of the University of Missouri - Rolla in May 1990 under an initial grant received from the American Iron and Steel Institute. CCFSS provides an integrated approach for handling research, teaching, engineering education, technical services, and professional activity. The Center brings together the technical resources of interested parties, i.e., university researchers, steel producers, product manufacturers, consultants, building officials, government agencies, and others with a common goal of continued improvement of cold-formed steel design and construction. A paramount function of CCFSS is to address design questions pertinent to cold-formed steel. This article presents some of the frequently asked questions that have been submitted by the users of cold-formed steel members and connections.

FAQ

What is the justification for the AISI Specification stipulating a minimum delivered thickness of 95% of the design thickness?

Historically, sheet steel has been ordered by nominal thickness, with a plus or minus tolerance in the range of 5 percent. Thus, it would be unreasonable to expect the delivered minimum thickness of the cold-formed steel product to always equal or exceed the design thickness. Accordingly, 95 percent of the design thickness has been established as the minimum delivered thickness for a cold-formed steel product.

FAQ

If we perform a tensile test on a coupon cut from a coil, I know I should not expect the results to exactly match the Material Test Report provided by the steel supplier. How much of a variance is acceptable?

ASTM A6 *Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling* has a discussion pertaining to light plate coils on this topic in its Appendix A1. The same phenomenon occurs in sheet coils. The inner portions of the coil cool slowly and have slightly lower tensile and yield strengths. There is no documented acceptable variance on the tensile and yield strengths in an ASTM or in the AISI Specification.

Ford Field, home of the Detroit Lions. Courtesy of Ruby + Associates.

FAQ

When is a wall stud out-of-plumb?

Plumbness is not defined by the AISI Standards for Cold-Formed Steel Framing. However, the AIA MasterSpec 05400 on *Cold-Formed Metal Framing* states in Section 3.3 Installation, General subsection J on Erection Tolerances: "install cold-formed metal faming level, plumb, and true to line to a maximum allowable tolerance variation of ⅛ inch in 10 feet (1:960)."

FAQ

What ASTM specification should be specified for cold-formed steel studs?

The 2004 AISI Standard for Cold-Formed Steel Framing – General Provisions references ASTM A1003. The IBC 2003 references A653, A792, and A875. The General Notes on our drawings reference ASTM A446.

Regarding ASTM specifications, ASTM A446 was replaced by ASTM A653. The relatively new ASTM A1003 was developed specifically for cold-formed steel framing, and provides a common standard for A653, A792, A875 and other materials as a means to simplify the process for the specifier and supplier. Therefore, the appropriate reference for framing members is ASTM A1003; however, materials furnished to A653, A792, and A875 would meet the requirements of the new A1003 standard. Note that the correct reference for steel deck and other coated non-framing member applications is ASTM A653.

FAQ

How do I decide whether G-60 or G-90 galvanized finish is appropriate when using cold-formed steel framing in a commercial application?

The AISI *Standard for Cold-Formed Steel Framing – General Provisions* requires a minimum metallic coating complying with the requirements of ASTM A1003, which in turn stipulates a minimum G-60 for structural and G-40 for non-structural framing members. The General Provisions further stipulates, "Unless additional corrosion protection is provided, framing members shall be located within the building envelope and adequately shielded from direct contact with moisture from the ground or the outdoor climate." There is no further specification document that provides guidance. However, as long as the framing is located within the building envelope and the building is not located less than 300 feet from a shoreline (3000 feet in the case of framing located in a ventilated attic or crawl space), the standard G-60 coating should be adequate. For additional information, the CFSEI has developed a Tech Note on this subject.

FAQ

ASTM A653 Grade 50 is not a listed steel in AWS D1.3 as an approved weldable steel. Why not?

ASTM A653 SS Grade 50 is not in the AWS D1.3 list of approved steels because the phosphorus content for Classes 1, 2, and 4 is 0.20%. The AWS Committee tends to limit phosphorus in prequalified steel grades to 0.05%. Rather than designate only ASTM A653 SS Grade 50 Class 3 as acceptable, the AWS Committee did not list Grade 50 steels. Class 3 material would be weldable, but would require qualification on the part of the user.

FAQ

I am reviewing an insurance study for a manufacturing facility that has a standing seam roof. The study recommends that the building owners provide a significant number of purlin braces. This is based on the assumption that the standing seam roof clips provide no lateral support to the purlin compression flange. The clips are mechanically fastened at 15 inches on center along the 25-foot long purlin. Other than testing, are there any guidelines for determining the lateral support provided by the standing seam clip?

The only way to determine the potential for purlin lateral stability provided by the panel is by performing a full-scale test. The AISI Specification in Section *C3.1.4 Beams Having One Flange Fastened to a Standing Seam Roof System* stipulates that tests must be performed. The test protocol, AISI TS-8-02, is defined in Part VIII of the AISI *Cold-Formed Steel Design Manual*.▪

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