

THIS PAST APRIL, ASTM International published a new material standard for the production of hollow structural sections (HSS).

The specification, ASTM A1085-13, is the culmination of six-plus years of work by the AISC HSS Marketing Committee, and the impetus for its creation was a list of desired improvements to the requirements in ASTM A500—e.g., designers have long asked for an elimination of the wall thickness reduction factor required for ASTM A500 to allow for simpler design calculations, as well as suitability for use in fatigue applications and better control of F_y and F_u for seismic overstrength. ASTM A1085 delivers on these wishes and more and contains several differences from ASTM A500.

Tighter Material Tolerances

For starters, ASTM A500 permits wall thickness to be as much as 10% less than the specified nominal thickness compared to a 2.5% variation permitted in wide-flange shapes. To account for this larger variation, AISC *Specification* Section B4.2 requires that the design wall thickness must be taken as 93% of the nominal wall thickness. This affects both member and connection design; the latter can have a significant reduction when the thickness term is squared or cubed.

ASTM A1085 provides two controls on cross section that do not exist or are more lenient in ASTM A500: The wall thickness must be no more than 5% under nominal and the mass must be no more than 3.5% under nominal. In most situations, the latter requirement will ultimately dictate the wall thickness. Regardless,

North America or Europe to place an upper limit on yield

wall thickness for ASTM A1085, and this has a direct effect on every property in the table with the exception of the nominal weight, which has always been based upon nominal dimensions.

- ▶ Axial compression strength tables also are available, as illustrated in Table 4, which shows an excerpt of an axial compression table for square A1085 HSS. These tables are modeled after Tables 4-3 through 4-5 in the AISC *Steel Construction Manual*.
- ▶ A design example is provided that compares a column designed with ASTM 1085 material to a column designed with A500 material. The calculations for the design example are omitted in this article, but a summary of the comparison results is shown.

▼ Table 3: Typical Dimensions and Section Properties for A1085 Round HSS

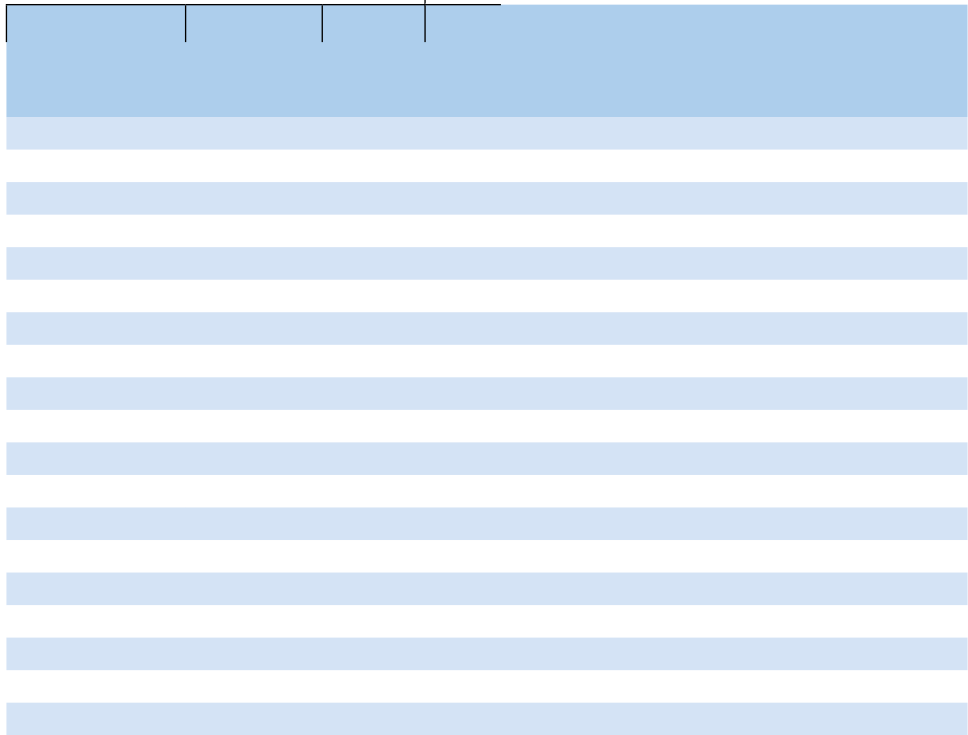


Table 4: Available Strength in A