Introducing ASTM A1085: A New Specification for Hollow Structural Sections (HSS)

On April 11, 2013, The American Society for Testing and Materials (ASTM) announced a new specification, A1085, impacting the production of steel Hollow Structural Sections (HSS). This new specification provides for enhanced performance to make designing with HSS easier and more efficient for structural engineers.

Some of the benefits of the new specification include:

Tighter material tolerances and a single minimum yield stress of 50 ksi

- More stringent wall tolerances and the addition of a mass tolerance mean the full nominal wall thickness can be used for design of HSS. This means no longer needing to reduce the nominal wall thickness by 0.93 as prescribed in the AISC Steel Construction Manual for both member selection and connection design.

- More area available for design and a higher min yield means that HSS are more economical and more efficient.

Maximum specified yield stress of 70 ksi

- The maximum yield will result in a lower expected yield strength and reduce capacity design requirements and column required strengths in seismic designs.

- This is the only specification used in North America or Europe that limits the maximum yield stress in HSS.

Standard requirement for Charpy notch toughness

- A1085 will require all HSS to meet a minimum CVN value of 25 ft-lb @ 40° F, which corresponds to AASHTO Zone 2.

- Having the minimum CVN required makes HSS more suitable for use in dynamically loaded structures.
Seismic design

- Ry takes into account the variability of a material. A1085 reduces variability, lowers connection requirements, and, therefore, will improve an engineer's ability to specify in HSS in seismic applications.

Corner radius

- A range has now been specified with a lower and upper bound.

Additional detailed information on this new specification can be found in the graph below. The full specification is available on the ASTM website that can be found [here](#).

The HSS Committee of the American Institute of Steel Construction (AISC) worked for over six years to get this new specification approved. The committee is composed of producers, academics and others involved directly in the HSS marketplace. The iterative process for gaining ASTM approval involves multiple rounds of discussions, feedback sessions, voting and balloting.

For those involved on the AISC committee, the process started with a “wishlist” that was debated from multiple standpoints including impact on future design opportunities and production feasibility. Rounds of feedback morphed this “wishlist” into a proposed new specification that was reviewed by ASTM at multiple levels including sub-committee and full committee with balloting for approval held at each stage. The final hurdle was a full society review which also required ballot approval to be accepted as a new ASTM spec.

According to Erika Winters-Downey, Great Plains Regional Engineer for AISC and Secretary of the HSS Committee, this multi-year process was initially driven by the desire to provide a material more suitable for seismic and dynamic applications, as well as to tighten tolerances to give engineers an easier material to design. That desire to provide a more advanced product never wavered.

“All through this process, our focus was making sure we were being proactive in addressing needs in the marketplace, especially those of structural engineers,” said Winters-Downey. “Material specifiers had been achieving some of the requirements now available in A1085 by asking for special orders. This new specification is about making those advances available to everyone.”

As A1085 was just announced about two weeks ago, detailed information on the new specification is just reaching interested parties. The new spec was met with excitement at last week’s NASCC conference in St. Louis where AISC and STI first announced it to attending engineers. Domestic HSS producers have voiced their commitment to manufacturing this new specification, and service centers and fabricators are in early stages of bringing this advanced material to the marketplace.
“For projects just starting design, I suggest engineers consider where this new spec can be incorporated into future projects and consult their fabricator,” Winters-Downey said.

### ABOUT STEEL TUBE INSTITUTE

The Steel Tube Institute was formed in 1930 when a group of manufacturers joined forces to promote and market steel tubing. Their goal was to mount a cooperative effort that would improve manufacturing techniques and inform customers about their products’ utility, versatility and competitive advantages. This, along with providing a forum for the discussion of issues impacting the industry, remains the focus of the Institute’s efforts. [www.steeltubeinstitute.org](http://www.steeltubeinstitute.org)

Steel Tube Institute’s HSS Committee includes the majority of the leading producers of HSS in the United States and Canada. The group has been active as an Institute committee for more than 20 years, providing technical and design help for the industry, and promoting the features, benefits and uses of steel hollow structural sections (HSS). [www.hss-steeltubing.org](http://www.hss-steeltubing.org)