

ASTM A6

What Recent Changes Mean for Designers and Fabricators

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Every day we design projects calling for ASTM A992, A36, A572, A588, or some other steel. We have confidence that these materials provide us with mechanical properties that meet our design demands—and, like the roads we drive on, we expect them to provide us with a smooth ride with little thought to the work that was done to make the reliable and useful. The material specifications included in every steel design refer to a standard that defines the infrastructure of steel construction and is as important to the steel construction community as the roads and sewers and power grid are to the people in the residential communities in which we live. That standard is ASTM A6.

Material specifications such as ASTM A992 define the chemistry and mechanical property requirements for various types of steel. They don't, however, define the product forms with which we work—that's the job of ASTM A6.

ASTM A6/A6M-01b, titled "Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling," is one of the key building blocks of steel construction. It provides dimensions of shapes and tolerances for plates, shapes, and bars. ASTM A6 also includes order, testing, inspection, identification and shipping requirements. There are surface quality limits and provisions for repair by grinding or welding. Material marking is mandated. Testing requirements are shown and information to be included on ma-

terial test reports is defined. Finally there are Supplementary Requirements that define optional provisions that can be ordered on some products.

The specification is maintained by ASTM Committee A1 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A1.02 on Structural Steel for Bridges, Buildings, Rolling Stock, and Ships. These ASTM committees meet twice a year to consider revisions to their assigned specifications and to develop new specifications as needed. While most of the best-known requirements in ASTM A6 do not change dramatically very often, adjustments are often considered and implemented.

RECENT CHANGES

The location from which structural shape tension tests are taken was moved from the web to the flange for most of the wide-flange sections we use. This was done because engineers design for flexure using the extreme fiber stress and the thicker flanges usually have a lower yield stress than the thinner webs. By taking the tensile specimens from the flange we are being more conservative and obtaining a more direct measure of the property (yield point/strength) engineers need to have for design.

Also, welded repair requirements to be followed by producers were brought up to date, and the list of chemical elements to be shown on a test report was expanded.

More recently, the requirement to mark structural products with color codes was removed from ASTM A6.

The color codes were a good "second line" method of marking the grade, but they were labor intensive to apply, processors frequently removed them and they were considered to be redundant. A survey of fabricators showed that many did not use the color codes and there were many that did without understanding what the rules were. There were inspectors who insisted that the color codes had to remain through fabrication, which was not the intent of the system.

The requirement for alternate core testing of heavy shapes that first appeared in the AISC specification was included in ASTM A992 and ASTM A913, but may be applied to all steel shape material specifications. Therefore it was removed from ASTM A992 and ASTM A913 and a supplementary requirement (S30) was placed in ASTM A6; S30 is now referenced in the material specifications to which it applies. Now, if you need the core toughness test all you need to do is specify S30 Alternate Core CVN for compliance with the AISC requirement.

Some may have noted the disappearance of Supplementary Requirement (SR) S91-Fine Austenitic Grain Size from ASTM A572 and other material specifications. ASTM has added a definition of "Fine Grain Practice" to A6 and has added new SRs to ASTM A6 for "Fine Grain Practice" (S28) and "Fine Austenitic Grain Size" (S29) detailing these requirements. These changes were made because these supplemental requirements may be applied to many common structural steel

specifications and properly belong with the other general requirements.

ASTM A6 is the specification where shape dimensions are linked to a shape profile designation, (for example, W14 × 257). This list of shapes is revised periodically. Shape availability is communicated to the public through AISC's web site (www.aisc.org/steelavailability) and the January and July issues of *Modern Steel Construction*. Producers are now able to add to or subtract from the list of shapes they roll whenever they make a change. When those changes appear to be for the long run, ASTM will reflect them in ASTM A6. Typically, ASTM tries to show new shapes as soon as practical after they are introduced, but they keep discontinued shapes on the list for a while to provide for inventory use and to provide for possible re-entry into the market if demand justifies. In the latest ASTM A6, the W14 × 808 was dropped and heavy W18s were added. The S24 shapes were not omitted even though AISC

found no producers of these shapes; producers felt the product was of enough interest that it might be produced in the future.

UPCOMING CHANGES

A few changes are under consideration by the ASTM committee right now.

- Table A defining the shape "Groups" may be deleted. Historically, the groups were defined using the web thickness. This was done because the tension test specimens were previously taken from the web. Presently we take the tension test specimens from the flanges. Since the tensile properties are based on flange thicknesses we use regularly, members of the committee felt it would be easier if we related the properties and requirements that vary by group to the flange thickness. That way, users will not have to look in a separate table to see what properties apply to

the sections they are selecting. Not coincidentally, it will no longer be necessary for ASTM revise the "Group" table every time they change the list of shapes.

- Other changes under consideration include updated provisions for labeling beams, methods to deal with bundles of material produced during a change in heat (bundles containing more than a single heat number) and clarifying the testing requirements for plates made from coil.

The changes mentioned above are by no means all of those that have occurred in recent years nor are those described as under consideration going to be the last changes in A6. ASTM subcommittee A1.02 is working continuously to keep structural steel standards reliable and current with industry practices and technology.

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