

Ask Dr. Galv

DEAR DR GALV: Some of my steel fabricators have been giving me a strange steel designation for the jobs that they are planning for the future. Can you tell me more about this new steel designation and what it will mean to the galvanizing business?

A. A new specification has been drafted by the American Institute of Steel Construction (AISC) in conjunction with the Steel Shape Producers Council (SSPC). This specification is in response to changes in steel mill production technology and practices as well as design needs. The new specification proposes a new grade of steel, called A572 Building Grade S 50. The material properties and compositional limits of this new grade of steel are tailored to respond to the new steel making practices. Steelmakers are producing the new steel and suggesting its use in building projects as a replacement for A36 or A572 steel. Galvanizers may begin to see the new A572 BG-S-50 steel in the near future and should be aware of its properties.

The advantages that the AISC forecasts for this new grade of steel are as follows:

- An accurate description of the typical steel material being produced today using scrap steel and continuous casting
- Explicit limits on minimum and maximum yield strength
- A specified maximum yield-to-tensile strength ratio
- A more complete description of chemical properties including limits on several residual elements
- A maximum carbon equivalent to ensure weldability
- A single high-strength grade that simplifies the design of the majority of buildings
- Increased competitiveness of steel through economies of scale for mills, steel service centers and fabricators

Much of the push for this new steel designation comes from the steel producers so that the specification directly reflects the steel being produced and from the Northridge earthquake in California. Designers need a more complete description of the mechanical properties of the steel to deal with seismic design parameters.

This steel specification incorporates an upper limit on yield strength of 65ksi and a minimum tensile strength of 65ksi. There is also a specified maximum yield-to-tensile ratio of 0.85. In the specification there is a maximum carbon equivalent of 0.50 to produce a steel that can be successfully welded.

In terms of galvanizing, the steel has the following chemistry:

ELEMENT	COMPOSITION %
CARBON, MAX	%see A572 (0.21 - 0.26)
MANGANESE	0.50 - 1.50
SILICON, MAX	see A572 (0.40)
VANADIUM	see A572 (0.01 - 0.15)
COLUMBIUM	see A572 (0.05- 0.05)
PHOSPHOROUS, MAX	0.035
SULFUR, MAX	0.045
COPPER, MAX	0.60
NICKEL, MAX	0.45
CHROMIUM, MAX	0.35
MOLYBDENUM, MAX	0.15

NOTES:

- (1) Minimum manganese for Group I shapes is 0.30 percent. The ratio of manganese to sulfur shall not be less than 20 to 1.
- (2) Columbium plus vanadium is not to exceed 0.15 percent maximum. Nitrogen when added as a supplement to vanadium shall be reported and the minimum ratio of vanadium to nitrogen shall be 4 to 1.

The new grade of steel should be no different than the present A572 for galvanizing. There is no change in the silicon content requirements and the phosphorous content in the new steel is lower than in A572. This means that the steel should be easily galvanized but there may be some cases where the silicon is in the Sandelin region or when the silicon is near 0.40 percent, making for a thicker than desired coating. As with all structural steel, the more the galvanizer can find out about the steel up front, the better a zinc coating they can provide.