Designation: A 678/A 678M – 00a

Standard Specification for Quenched-and-Tempered Carbon and High-Strength Low-Alloy Structural Steel Plates[1]

This standard is issued under the fixed designation A 678/A 678M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers quenched-and-tempered carbon steel and high-strength low-alloy steel plates of structural quality for welded, riveted, or bolted construction.

1.2 When the steel is to be welded, it is presupposed that a welding procedure suitable for the grade of steel and intended use or service will be used.

1.3 Material under this specification is available in four grades as follows:

Grade	Yield Strength, min, ksi [MPa]	Tensile Strength, ksi [MPa]	Maximum Thickness, in. [mm]
A	50 [345]	70–90 [485–620]	1½ [40]
B	60 [415]	80–100 [550–690]	2½ [65]
C	[A]	[A]	2 [50]
D	75 [515]	90–110 [620–760]	3 [75]

[A] Varies with thickness. See Table 1.

1.4 The values stated in either inch-pound units or SI units are to be regarded as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents. Therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with this specification.

2. Referenced Documents

2.1 *ASTM Standards:*

A 6/A 6M Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling[2]

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products[3]

E 112 Test Methods for Determining the Average Grain Size[4]

3. Materials and Manufacture

3.1 The requirements for fine austenitic grain size in Specification A 6/A 6M shall be met.

4. Heat Treatment

4.1 The material shall be treated by the manufacturer by heating to a temperature that produces an austenitic structure, but not exceeding 1700°F [925°C], holding a sufficient time to attain uniform heat throughout the material, quenching in a suitable medium, and tempering at not less than 1100°F [593°C]. Heat-treating temperatures shall be reported on the mill certificates.

5. Chemical Composition

5.1 The heat analysis shall conform to the chemical composition requirements for the applicable grade as listed in Table 2.

5.2 The steel shall conform on product analysis to the requirements prescribed in Table 2, subject to the product analysis tolerances in Specification A 6/A 6M.

6. Tension Test

6.1 The material as represented by the test specimens shall conform to the requirements specified for the applicable grade in Table 1.

6.2 *Number of Tests*—One tension test shall be taken from a corner of each plate as heat treated. Plates wider than 24 in. [600 mm] shall be tested in the transverse direction and are subject to the modifications for elongation contained in Footnote D of Table 1.

7. General Requirements for Delivery

7.1 Material furnished under this specification shall conform to the requirements of the current edition of Specification A 6/A 6M, for the ordered material, unless a conflict exists in which case this specification shall prevail.

8. Keywords

8.1 carbon; bolted construction; high-strength; low-alloy; plates; quenched; riveted construction; steel; structural steel; tempered; welded construction

[1] This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel, and Related Alloys and is the direct responsibility of Subcommittee A01.02 on Structural Steel for Bridges, Buildings, Rolling Stock, and Ships.

Current edition approved Sept. 10, 2000. Published October 2000. Originally published as A 678 – 73. Last previous edition A 678/A 678M – 00.

[2] *Annual Book of ASTM Standards*, Vol 01.04.

[3] *Annual Book of ASTM Standards*, Vol 01.03.

[4] *Annual Book of ASTM Standards*, Vol 03.01.