



Standard Specification for Precipitation–Strengthened Low-Carbon Nickel-Copper- Chromium-Molybdenum-Columbium Alloy Structural Steel Plates¹

This standard is issued under the fixed designation A 710/A 710M; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope *

1.1 This specification covers low-carbon precipitation—strengthened nickel - copper - chromium - molybdenum - columbium alloy steel plates for general applications. The alloys in this specification are strengthened by precipitation in various temperature ranges. Precipitation strengthening can occur upon air cooling after hot rolling, during normalizing, and by another heat treatment. These grades are not intended for use in applications above 900°F [540°C].

1.2 Two grades, each with three classes, are provided as follows:

Grade and Class	Condition
Grade A, Class 1	as-rolled and precipitation heat treated
Grade A, Class 2	normalized and precipitation heat treated
Grade A, Class 3	quenched and precipitation heat treated
Grade B, Class 1	as-rolled
Grade B, Class 2	normalized
Grade B, Class 3	normalized and precipitation heat treated

1.3 Grade A provides minimum yield strength levels ranging from 50 to 85 ksi [345 to 585 MPa], depending on thickness and condition.

1.4 Grade A, Class 1, plates are limited to a maximum thickness of ¾ in. [20 mm]. The maximum thickness of Grade A, Classes 2 and 3, is limited only by the capacity of the composition to meet the specified mechanical property requirements; however, current practice normally limits the maximum thickness to 8 in. [200 mm].

1.5 Mandatory notch toughness requirements are specified for Grade A, Class 1.

1.6 Grade B provides minimum yield strength levels ranging from 70 to 75 ksi [480 to 515 MPa], depending on thickness and condition.

1.7 Grade B plates are limited to a maximum thickness of 2 in. [50 mm].

1.8 Mandatory notch toughness requirements are specified for the three classes of Grade B.

1.9 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 utilized. See Appendix X3 of Specification A 6/A 6M for information on weldability.

1.10 The values stated in either inch-pound units or SI units are to be regarded separately 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 the 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 Piling²

A 673/A 673M Specification for Sampling Procedure for Impact Testing of Structural Steel²

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *precipitation heat treatment*—a sub-critical temperature thermal treatment performed to cause precipitation of submicroscopical constituents, etc., so as to result in enhancement of some desirable property.

3.1.2 *precipitation strengthening*—the precipitation of sub-microscopic and/or microscopic constituents of an alloy at various temperatures, which results in the alteration of certain properties.

3.1.3 *soak*—to hold at temperature after the material has attained the temperature throughout.

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.

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

***A Summary of Changes section appears at the end of this standard.**