



Standard Specification for Structural Steel for Ships¹

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1. Scope

1.1 This specification covers structural steel plates, shapes, bars, and rivets intended primarily for use in ship construction.

1.2 Material under this specification is available in the following categories:

1.2.1 *Ordinary Strength*—Grades A, B, D, CS, and E with a specified minimum yield point of 34 ksi [235 MPa], and

1.2.2 *Higher Strength*—Grades AH, DH, EH, and FH with specified minimum yield points of either 46 ksi [315 MPa], 51 ksi [350 MPa], or 57 ksi [390 MPa].

1.3 Shapes and bars are normally available as Grades A, AH32, or AH36. Other grades may be furnished by agreement between the purchaser and the manufacturer.

1.4 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.

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

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products³

E 112 Test Methods for Determining Average Grain Size⁴

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *control rolling, n*—a steel treatment that consists of final rolling within the range used for normalizing heat

treatments so that the austenite completely recrystallizes.

3.1.2 *thermo-mechanical controlled processing, n*—a steel treatment that consists of strict control of the steel temperature and the rolling reduction. A high proportion of the rolling reduction is to be carried out close to or below the A_{r3} transformation temperature and may involve rolling towards the lower end of the temperature range of the intercritical duplex phase region thus permitting little if any recrystallization of the austenite. The process may involve accelerated cooling on completion of rolling.

4. Ordering Information

4.1 Specification A 6/A 6M establishes the rules for the ordering information that should be complied with when purchasing material to this specification.

4.2 Additional ordering considerations specific to this specification are:

4.2.1 Cold flanging, if applicable, and

4.2.2 Condition (control rolled or thermo-mechanical control processed).

5. Materials and Manufacture

5.1 Except for Grade A steel up to and including ½ in. [12.5 mm] in thickness, rimmed steels shall not be applied.

5.2 Except for Grades A and B steel, semi-killed steels shall not be applied.

5.3 Except as permitted in 5.3.1, Grades D, CS, E, AH32, AH36, AH40, DH32, DH36, DH40, EH32, EH36, EH40, FH32, FH36, and FH40 shall be made using a fine grain practice. For ordinary strength grades, aluminum shall be used to obtain grain refinement. For high strength grades, aluminum, vanadium, or columbium (niobium) may be used for grain refinement.

5.3.1 Grade D material 1.0 in. [25 mm] and under in thickness, at the option of the manufacturer, may be killed and exempt from the fine austenitic grain size requirement of 7.1, but such material shall be subject to the toughness requirement of 8.2.1.

5.4 Plates in all thicknesses ordered to Grade CS shall be normalized. Plates in all thicknesses ordered to Grade E shall be normalized, or thermo-mechanical control processed. Plates over 1⅜ in. [35 mm] in thickness ordered to Grade D shall be normalized, control rolled, or thermo-mechanical control processed. See Table 1.

5.5 Plates in all thicknesses ordered to Grades EH32 and

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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.