



Designation: A 1017/A 1017M – 01

Standard Specification for Pressure Vessel Plates, Alloy Steel, Chromium- Molybdenum-Tungsten¹

This standard is issued under the fixed designation A 1017/A 1017M; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This specification covers Chromium-Molybdenum-Tungsten alloy steel plates intended primarily for welded boilers and pressure vessels designed for elevated temperature service.

1.2 Plates are available under this specification in three grades having different alloy contents as follows:

| Grade | Nominal Chromium Content, % | Nominal Molybdenum Content, % | Nominal Tungsten Content, % |
|-------|-----------------------------|-------------------------------|-----------------------------|
| 23 | 2.25 | 0.20 | 1.60 |
| 911 | 9.00 | 1.00 | 1.00 |
| 122 | 12.00 | 0.40 | 2.00 |

1.3 The maximum thickness of plates is limited only by the capacity of the composition to meet the specified mechanical property requirements.

1.4 The specification is expressed in both inch-pound units and in SI units. However, unless the order specifies the applicable "M" specification designation (SI units), the material shall be furnished to inch-pound units.

1.5 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.

2. Referenced Documents

2.1 ASTM Standards:

- A 20/A 20M Specification for General Requirements for Steel Plates for Pressure Vessels²
- A 370 Test Methods and Definitions for Mechanical Testing of Steel Products³
- A 435/A 435M Specification for Straight-Beam Ultrasonic Examination of Steel Plates²
- A 577/A 577M Specification for Ultrasonic Beam Examination of Plain and Clad Steel Plates for Special Applications²

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 A01.11 on Steel Plates for Boilers and Pressure Vessels.

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² Annual Book of ASTM Standards, Vol 01.04.

³ Annual Book of ASTM Standards, Vol 01.03.

3. General Requirements

3.1 Material supplied to this material specification shall conform to Specification A 20/A 20M. Such requirements outline the testing and retesting methods and procedures, permissible variations in dimensions and weight [mass], quality and repair of defects, marking, loading, etc.

3.2 Specification A 20/A 20M also establishes the rules for the ordering information that should be complied with when purchasing material to this specification.

3.3 In addition to the basic requirements of this specification, certain supplementary requirements are available when additional control, testing, or examination is required to meet end use requirements. The purchaser is referred to the listed supplementary requirements in this specification and to the detailed requirements in Specification A 20/A 20M.

3.4 If the requirements of this specification are in conflict with the requirements of Specification A 20/A 20M, the requirements of this specification shall prevail.

4. Materials and Manufacture

4.1 *Steelmaking Practice*—The steel shall be killed.

5. Heat Treatment

5.1 Except as allowed by 5.2, all plates shall be normalized at 1900 to 2000°F [1040 to 1095°C] and then tempered at not less than 1350°F [730°C]; alternatively, if permitted by the purchaser, plates for Grades 23 and 122 may be austenitized at 1900 to 2000°F [1040 to 1095°C], subjected to accelerated cooling from the austenitizing temperature by air blasting or liquid quenching, and then tempered at not less than 1350°F [730°C].

5.2 Plates ordered without the heat treatment required by 5.1 shall be furnished in either the stress-relieved or annealed condition, and the purchaser shall be responsible for the heat treatment of such plates to conform to 5.1.

6. Chemical Composition

6.1 The steel shall conform to the requirements for chemical composition given in Table 1.

7. Mechanical Properties

7.1 *Tension Test*: