



# Standard Specification for Pressure Vessel Plates, Alloy Steel, Chromium-Manganese-Silicon<sup>1</sup>

This standard is issued under the fixed designation A 202/A 202M; 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<sup>2</sup> covers chromium-manganese-silicon alloy steel plates, intended particularly for welded boilers and other pressure vessels.

1.2 Plates under this specification are available in two grades having strength levels as follows:

Grade	Tensile Strength
	ksi [MPa]
A	75–95 [515–655]
B	85–110 [585–760]

1.3 The maximum thickness of plates is limited only by the capacity of the composition to meet the specified mechanical property requirements; however, current practice normally limits the maximum thickness of plates furnished under this specification to 2 in. [50 mm].

1.4 Grade A is suitable for rivets and when so used the bars shall be subject to the requirements for rolled bars specified in Specification A 31, except for the chemical and mechanical requirements.

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. Combining values from the two systems may result in nonconformance with this specification.

## 2. Referenced Documents

### 2.1 ASTM Standards:

A 20/A 20M Specification for General Requirements for Steel Plates for Pressure Vessels<sup>3</sup>

A 31 Specification for Steel Rivets and Bars for Rivets, Pressure Vessels<sup>4</sup>

A 435/A 435M Specification for Straight-Beam Ultrasonic Examination of Steel Plates<sup>3</sup>

A 577/A 577M Specification for Ultrasonic Angle-Beam Examination of Steel Plates<sup>3</sup>

A 578/A 578M Specification for Straight-Beam Ultrasonic Examination of Plain and Clad Steel Plates for Special Applications<sup>3</sup>

## 3. General Requirements and Ordering Information

3.1 Plates supplied to this product specification shall conform to Specification A 20/A 20M, which outlines the testing and retesting methods and procedures, permissible variations in dimensions and mass, quality and repair of defects, marking, loading, etc.

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

3.3 In addition to the basic requirements of this specification, certain supplementary requirements are available where additional control, testing, or examination is required to meet end use requirements.

3.4 The purchaser is referred to the listed supplementary requirements in this specification and to the detailed requirements in Specification A 20/A 20M.

3.5 Coils are excluded from qualification to this specification until they are processed into finished plates. Plates produced from coil means plates that have been cut to individual lengths from coil. The processor directly controls, or is responsible for, the operations involved in the processing of coils into finished plates. Such operations include decoiling, leveling, cutting to length, testing, inspection, conditioning, heat treatment (if applicable), packaging, marking, loading for shipment, and certification.

NOTE 1—For plates produced from coil and furnished without heat treatment or with stress relieving only, three test results are reported for each qualifying coil. Additional requirements regarding plates from coil are described in Specification A 20/A 20 M.

3.6 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.

<sup>1</sup> 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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<sup>2</sup> For ASME Boiler and Pressure Vessel Code applications, see related Specification SA-202/SA-202M in Section II of that Code.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 01.04.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 01.08.

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

**TABLE 1 Chemical Requirements**

Elements	Composition, %	
	Grade A	Grade B
Carbon, max <sup>A</sup>	0.17	0.25
Manganese:		
Heat analysis	1.05–1.40	1.05–1.40
Product analysis	0.97–1.52	0.97–1.52
Phosphorus, max <sup>A</sup>	0.035	0.035
Sulfur, max <sup>A</sup>	0.035	0.035
Silicon:		
Heat analysis	0.60–0.90	0.60–0.90
Product analysis	0.54–0.96	0.54–0.96
Chromium:		
Heat analysis	0.35–0.60	0.35–0.60
Product analysis	0.31–0.64	0.31–0.64

<sup>A</sup> Applies to both heat and product analyses.

**TABLE 2 Tensile Requirements**

	Grade A	Grade B
	ksi [MPa]	ksi [MPa]
Tensile strength	75–95 [515–655]	85–110 [585–760]
Yield strength, min <sup>A</sup>	45 [310]	47 [325]
Elongation in 8 in. [200 mm], min, % <sup>B</sup>	16	15
Elongation in 2 in. [50 mm], min, % <sup>B</sup>	19	18

<sup>A</sup> Determined by either the 0.2 % offset method or the 0.5 % extension-under-load method.

<sup>B</sup> See Specification A 20/A 20M for elongation adjustments.

#### 4. Materials and Manufacture

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

#### 5. Heat Treatment

5.1 Plates are normally supplied in the as-rolled condition. The plates may be ordered normalized or stress relieved, or both.

#### 6. Chemical Requirements

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

#### 7. Mechanical Requirements

7.1 *Tension Test Requirements*—The plates, as represented by the tension test specimens, shall conform to the requirements given in Table 2.

### SUPPLEMENTARY REQUIREMENTS

Supplementary requirements shall not apply unless specified in the purchase order.

A list of standardized supplementary requirements for use at the option of the purchaser is included in Specification A 20/A 20M. Those that are considered suitable for use with this specification are listed below by title.

- S1. Vacuum Treatment,
- S2. Product Analysis,
- S3. Simulated Post-Weld Heat Treatment of Mechanical Test Coupons,
- S4.1 Additional Tension Test,
- S5. Charpy V-Notch Impact Test,
- S6. Drop Weight Test,
- S7. High-Temperature Tension Test,

- S8. Ultrasonic Examination in accordance with Specification A 435/A 435M,
- S9. Magnetic Particle Examination,
- S11. Ultrasonic Examination in accordance with Specification A 577/A 577M, and
- S12. Ultrasonic Examination in accordance with Specification A 578/A 578M.

**SUMMARY OF CHANGES**

Committee A01 has identified the location of selected changes to this standard since the last issue (A 202/A 202M – 93 (1999)) that may impact the use of this standard.

(1) Added 3.5 and Note 1 to be consistent with the terminology and requirements of Specification A 20/A 20M. (2) 3.3 was revised to be more general.

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