



Standard Specification for Pressure Vessel Plates, Carbon Steel, Manganese-Titanium for Glass or Diffused Metallic Coatings¹

This standard is issued under the fixed designation A562/A562M; 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 specification² covers titanium-bearing carbon steel plates intended for welded glass lined pressure vessels or other applications where the presence of free-iron carbide would be deleterious to the coating. A minimum specific ratio of titanium to carbon is specified.

1.2 The maximum thickness of plates is limited to 2 in. [50 mm].

1.3 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*:³

A20/A20M Specification for General Requirements for Steel Plates for Pressure Vessels

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 For ASME Boiler and Pressure Vessel Code applications, see related Specification SA-562/SA-562M in Section II of that Code.

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3. General Requirements and Ordering Information

3.1 Material supplied to this material specification shall conform to Specification A20/A20M. These requirements outline the testing and retesting methods and procedures, permitted variations in dimensions, and mass, quality and repair of defects, marking, loading, and ordering information.

3.2 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.

3.3 If the requirements of this specification are in conflict with the requirements of Specification A20/A20M, the requirements of this specification shall prevail.

4. Manufacture

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

5. Heat Treatment

5.1 Plates shall be thermally treated to produce grain refinement, either by normalizing or heating uniformly for hot forming at a minimum temperature of 1600°F [870°C] or some higher agreed temperature, and held at this temperature for a minimum of 1 h/in. [2.4 min/mm] of thickness.

6. Chemical Requirements

6.1 The steel shall conform to the chemical requirements shown in Table 1 unless otherwise modified in accordance with Supplementary Requirement S17, Vacuum Carbon-Deoxidized Steel, in Specification A20/A20M.

7. Mechanical Requirements

7.1 *Tension Test Requirements*—The material as represented by the tension-test specimens shall conform to the requirements shown in Table 2.

TABLE 1 Chemical Requirements

| Element | Composition, % |
|------------------------------|----------------|
| Carbon, max ^A | 0.12 |
| Manganese, max | |
| Heat analysis | 1.20 |
| Product analysis | 1.30 |
| Phosphorus, max ^A | 0.025 |
| Sulfur, max ^A | 0.025 |
| Silicon ^A | 0.15–0.50 |
| Copper, max ^A | 0.15 |
| Titanium, min | 4 × C |

^A Applies to both heat and product analyses.

TABLE 2 Tensile Requirements

| | ksi [MPa] |
|--|-----------------|
| Tensile strength | 55–75 [380–515] |
| Yield strength, min | 30 [205] |
| Elongation in 8 in. [200 mm] min, % ^A | 22 |
| Elongation in 2 in. [50 mm] min, % ^A | 26 |

^A See Specification **A20/A20M** for elongation adjustments.

SUPPLEMENTARY REQUIREMENTS

Supplementary requirements shall not apply unless specified in the order.

A list of standardized supplementary requirements for use at the option of the purchaser are included in Specification **A20/A20M**. Those which 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. Additional Tension Test,
- S5. Charpy V-Notch Impact Test,
- S6. Drop Weight Test (for Material 0.625 in. [16 mm] and over in Thickness),
- S7. High-temperature Tension Test,

- S8. Ultrasonic Examination in accordance with Specification A435/A435M,
- S9. Magnetic Particle Examination,
- S11. Ultrasonic Examination in accordance with Specification A577/A577M,
- S12. Ultrasonic Examination in accordance with Specification A578/A578M, and
- S17. Vacuum Carbon-Deoxidized Steel.

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