



Designation: A562/A562M – 10 (Reapproved 2021)

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.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*³

[A20/A20M Specification for General Requirements for Steel Plates for Pressure Vessels](#)

[A435/A435M Specification for Straight-Beam Ultrasonic Examination of Steel Plates](#)

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.

[A577/A577M Specification for Ultrasonic Angle-Beam Examination of Steel Plates](#)

[A578/A578M Specification for Straight-Beam Ultrasonic Examination of Rolled Steel Plates for Special Applications](#)

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.

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| S1. Vacuum Treatment, | S8. Ultrasonic Examination in accordance with Specification A435/A435M , |
| S2. Product Analysis, | S9. Magnetic Particle Examination, |
| S3. Simulated Post-Weld Heat Treatment of Mechanical Test Coupons, | S11. Ultrasonic Examination in accordance with Specification A577/A577M , |
| S4. Additional Tension Test, | S12. Ultrasonic Examination in accordance with Specification A578/A578M , and |
| S5. Charpy V-Notch Impact Test, | S17. Vacuum Carbon-Deoxidized Steel. |
| S6. Drop Weight Test (for Material 0.625 in. [16 mm] and over in Thickness), | |
| S7. High-temperature Tension Test, | |

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