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Standard Specification for Pressure Vessel Plates, Heat-Treated, Carbon-Manganese- Silicon Steel, for Moderate and Lower Temperature Service¹

This standard is issued under the fixed designation A738/A738M; 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 heat-treated carbon-manganese-silicon steel plates intended for use in welded pressure vessels at moderate and lower temperature service.

1.2 Material under this specification is available in four strength levels, 75 ksi [515 MPa], 85 ksi [585 MPa], 80 ksi [550 MPa], and 90 ksi [620 MPa] minimum ultimate tensile strengths.

~~1.3~~ ~~The~~ ~~1.3~~ The maximum thickness of plates is limited only by the capacity of the chemical composition and heat treatment to meet the specified mechanical property requirements; however, current practice normally limits the maximum thickness of plates furnished under this specification to 6 in. [150 mm] for Grade A, 4 in. [100 mm] for Grade B, and 6 in. [150 mm] for Grade C. For Grades D and E, the maximum permitted nominal thickness is 1.5 in. [40 mm].

1.4 Grade A is the material that, prior to 1984, was covered by Specification A738 without a grade designation.

1.5 The values stated in either ~~inch-pound~~ SI units or ~~SI~~ inch-pound units are to be regarded separately as ~~standards~~. ~~Within the text, the SI units are shown in brackets.~~ ~~standard~~. The values stated in each system ~~are~~ may not be exact equivalents; therefore, each system ~~must~~ shall be used independently of the other. Combining values from the two systems may result in non-conformance with the ~~specification.~~ standard.

2. Referenced Documents

2.1 *ASTM Standards*:³

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

3. General Requirements and Ordering Information

3.1 Plates supplied to this product specification shall conform to the requirements of Specification ~~A 20/A20M/A 20M,~~₂ which outlines the testing and retesting methods and procedures, permissible variations in dimensions and mass, quality, repair of defects, marking, loading, etc.

3.2 Specification ~~A 20/A20M/A 20M~~ also establishes the rules for compliance to the ordering information when purchasing material to this specification.

~~3.3~~ ~~In~~ ~~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 the end use requirements.

~~3.4~~ ~~The~~ ~~3.4~~ The purchaser is referred to the listed supplementary requirements in this specification and to the supplementary requirements in Specification ~~A 20/A 20M~~ A20/A20M.

4. Manufacture

4.1 *Steelmaking Practice*—The steel shall be killed and shall conform to the fine austenitic grain size requirement of Specification ~~A 20/A20M/A 20M,~~₂

5. Heat Treatment

5.1 Grade A plates 2.5 in. [65 mm] and under in thickness shall be supplied in either the normalized or quenched and tempered condition.

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-738/SA-738M 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.

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

5.2 Grade A plates over 2.5 in. [65 mm] in thickness and Grade B, Grade C, Grade D, and Grade E plates in all thicknesses shall be quenched-and-tempered.

5.3 When plates are tempered, the minimum tempering temperature shall be 1100°F [595°C].

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 S 17, Vacuum Carbon-Deoxidized Steel in Specification ~~A 20A20/A20M/A 20M~~.

7. Mechanical Requirements

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

7.1.1 For nominal plate thicknesses of $\frac{3}{4}$ in. [20 mm] and under, the 1.5-in. [40-mm] wide rectangular specimen may be used for the tension test and the elongation may be determined in a 2-in. [50-mm] gage length that includes the fracture and shows the greatest elongation.

8. Keywords

8.1 pressure-containing parts; pressure vessel steel; steel plates; steel plates for pressure vessel applications

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