



Designation: A 455/A 455M – 90 (Reapproved 2001)

Standard Specification for Pressure Vessel Plates, Carbon Steel, High-Strength Manganese

This standard is issued under the fixed designation A 455/A 455M; 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 specification¹ covers high-tensile strength carbon-manganese steel plates intended for welded pressure vessels.

1.2 This material is usually made to a semi-killed or capped deoxidation practice. However, at the purchaser's or the producer's option, the material may be made silicon-killed or aluminum-killed.

1.3 The maximum thickness of plates furnished under this specification shall be $\frac{3}{4}$ in. [20 mm].

1.4 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:

A 20/A 20M Specification for General Requirements for Steel Plates for Pressure Vessels²

3. General Requirements and Ordering Information

3.1 Material supplied to this material specification shall conform to Specification A 20/A 20M. These requirements outline 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 the ordering information that should be complied with when purchasing material to this specification.

3.3 In addition to the basic requirements, two supplementary requirements are available to meet end use requirements as follows:

3.3.1 Simulated post-weld heat treatment of test coupons, and

3.3.2 Bend test.

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 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. Heat Treatment

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

5. Chemical Requirements

5.1 The steel shall conform to the chemical requirements shown in Table 1.

6. Mechanical Requirements

6.1 *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

| Elements | Composition, % |
|------------------------------|----------------|
| Carbon, max ^{A,B} | 0.33 |
| Manganese: | |
| Heat analysis | 0.85–1.20 |
| Product analysis | 0.79–1.30 |
| Phosphorus, max ^A | 0.035 |
| Sulfur, max ^A | 0.035 |
| Silicon ^C : | |
| Heat analysis | 0.10 max |
| Product analysis | 0.13 max |

^AApplies to both heat and product analyses.

^BWhen the silicon is higher than 0.10 %, the carbon maximum shall be 0.28 %.

^CAt the purchaser's or the producer's option, silicon may be 0.40 % max on heat analysis, 0.45 % max on product analysis.

¹ For ASME Boiler and Pressure Vessel Code applications, see related Specification SA-455/SA-455M in Section II of that Code.

² *Annual Book of ASTM Standards*, Vol 01.04.