



Standard Specification for PRESSURE VESSEL PLATES, CARBON STEEL, LOW- AND INTERMEDIATE-TENSILE STRENGTH¹

This Standard is issued under the fixed designation A 285; 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 reappraisal.

1. Scope

1.1 This specification² covers carbon steel plates of low- and intermediate-tensile strengths which may be made by killed, semi-killed, capped, or rimmed steel practices at the producer's option. These plates are intended for fusion-welded pressure vessels.

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

Grade	Tensile Strength, ksi (MPa)
A	45-65 (310-450)
B	50-70 (345-485)
C	55-75 (380-515)

1.3 The maximum thickness of plates under this specification, for reasons of internal soundness, is limited to a maximum thickness of 2 in. (50 mm) for all grades.

1.4 Plates to a maximum thickness of 1/2 in. (13 mm) may be processed as coils. All such plates must be furnished by the producer in cut lengths only. When processed in this manner, an additional tension test per coil is required.

NOTE 1—For killed carbon steels only refer to the following ASTM specifications:³

A 299 Pressure Vessel Plates, Carbon Steel, Manganese-Silicon.

A 455 Pressure Vessel Plates, Carbon Steel, High Strength Manganese.

A 515 Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service.

A 516 Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service.

NOTE 2—The values stated in U.S. customary units are to be regarded as the standard.

2. Applicable Documents

2.1 ASTM Standard:

A 20 Specification for General Require-

ments for Steel Plates for Pressure Vessels.³

3. General Requirements and Ordering Information

3.1 Material supplied to this material specification shall conform to the current issue of Specification A 20. 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 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 of this specification, certain supplementary requirements are available when additional control testing or examination is required to meet end use requirements. The purchaser is referred to the listed supplementary requirements in this specification and to the detailed requirements in Specification A 20.

3.4 If the requirements of this specification are in conflict with the requirements of Specification A 20, the requirements of this specification shall prevail.

¹ This specification is under the jurisdiction of ASTM Committee A-1 on Steel, Stainless Steel and Related Alloys, and is the direct responsibility of Subcommittee A01.11 on Steel for Boilers and Pressure Vessels.

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² For ASME Boiler and Pressure Vessel Code applications see related Specification SA-285 in Section II of that Code.

³ Annual Book of ASTM Standards, Part 4.



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 requirements as to chemical composition as shown in Table 1.

6. Mechanical Requirements

6.1 Tension Tests:

6.1.1 Requirements:

6.1.1.1 The material as represented by the tension-test specimens shall conform to the requirements shown in Table 2.

6.1.2 Number and Location of Tension Tests:

6.1.2.1 When plates are processed as coils, one tension-test specimen shall be taken from the approximate center lap and one tension-test specimen shall be taken from the outer lap of the coil as rolled.

6.1.2.2 When plates are processed other than as coils, one tension test shall be taken from each plate as rolled as specified in Specification A 20.

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 A 20. Those which are considered suitable for use with this specification are listed below by title.

S3. Simulated Post-Weld Heat Treatment of Mechanical Test Coupons,

S4. Additional Tension Test, and

S14. Bend Test.

Also listed below are additional optional supplementary requirements suitable for this specification:

S57. Copper-Bearing

S57.1 The copper content, by heat analysis shall be 0.20–0.35 % and by product analysis 0.18–0.37 %.

S58. Restricted Copper

S58.1 The maximum incidental copper content by heat analysis shall not exceed 0.25 %.

TABLE 1 Chemical Requirements

Elements	Composition, %		
	Grade A	Grade B	Grade C
Carbon, max ^a	0.17	0.22	0.28
Manganese, max			
Heat analysis	0.90	0.90	0.90
Product analysis	0.98	0.98	0.98
Phosphorus, max ^a	0.035	0.035	0.035
Sulfur, max ^a	0.040	0.040	0.040

^a Applies to both heat and product analyses.