

RELIABLE STEEL DISTRIBUTORS

(A GOVT. OF INDIA RECOGNIZED EXPORT HOUSE) (A PED CERTIFIED COMPANY)
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Standard Specification for Pressure Vessel Plates, Carbon Steel, Low- and Intermediate-Tensile Strength¹

This standard is issued under the fixed designation A 285/A285M; 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.

This standard has been approved for use by agencies of the Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

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.

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

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

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

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

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.

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 Plates for Boilers and Pressure Vessels.

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

³ Annual Book of ASTM Standards, Vol 01.04.

2. Referenced Documents

2.1 ASTM Standards:

A 20/A20M Specification for General Requirements for Steel Plates for Pressure Vessels³

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 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/A 20M.

3.4 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 requirements as to chemical composition as shown in Table 1.

6. Mechanical Requirements

6.1 Tension Tests:

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

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A 285/A285M

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	0.035	0.035	0.035

^AApplies to both heat and product analyses.

TABLE 2 Tensile Requirements

	Grade A		Grade B		Grade C	
	ksi	[MPa]	ksi	[MPa]	ksi	[MPa]
Tensile strength	45–65	[310–450]	50–70	[345–485]	55–75	[380–515]
Yield strength, min ^A	24	[165]	27	[185]	30	[205]
Elongation in 8 in. or [200 mm], min, % ^B	27		25		23	
Elongation in 2 in. or [50 mm], min, %	30		28		27	

^ADetermined by either the 0.2 % offset method or the 0.5 % extension-under-load method.

^BSee Specification A 20/A 20M for elongation adjustment.

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

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