

Standard Specification for
**STEEL PLATES FOR PRESSURE VESSELS FOR SERVICE
AT LOW TEMPERATURES¹**



ASTM Designation: A 300 – 58

ADOPTED, 1956; REVISED, 1957, 1958.²

This Standard of the American Society for Testing Materials is issued under the fixed designation A 300; the final number indicates the year of original adoption as standard or, in the case of revision, the year of last revision.

Scope

1. This specification covers steel plates for use in welded pressure vessels that are to operate at low temperatures. The classes of plates covered by this specification shall conform to all requirements of the ASTM specifications for the particular grade referred to in Table I in addition to the requirements of this specification (See Note 2 in Section 2). It is desired that the steel supplied under this specification be made to fine grain melting practice.

NOTE 1.—It should be recognized that fabricating processes, such as forming and welding, may affect the impact properties of steel so that the impact properties of the plate in a fabricated pressure vessel may differ from the impact properties of the plate as tested.

¹ Under the standardization procedure of the Society, this specification is under the jurisdiction of the ASTM Committee A-1 on Steel.

² Prior to adoption as standard, this specification was published as tentative from 1947 to 1956, being revised in 1950, 1952, 1953, and 1954.

Heat Treatment (Note 2)

2. (a) Plates shall be furnished in the heat-treated condition unless otherwise specified on the order.

(b) Plates shall be uniformly heat treated. Heat treatment shall consist of normalizing.

(c) When a fabricator, who is equipped to perform properly the work, elects to do the required heat treatment, he shall so indicate in his orders to the mill, and he shall accept the plates on the basis of mill tests. In this case the plate manufacturer shall make the tests prescribed in this specification, the test specimens to be heat treated under conditions agreed upon to meet the test requirements. Samples for heat treatment shall consist of the full thickness of the plate with the two other dimensions at least three times the thickness, but in no case less than 2 in. The plate manufacturer shall furnish the details of heat treatment of the test pieces to the fabricator for guidance in heat treating the plates.

TABLE I.—STEEL PLATES FOR USE AT LOW TEMPERATURES.

Class	ASTM Specification and Grades ^a	Minimum Test Temperature, deg Fahr
1.....	A 201, A 212 flange or firebox quality	-50
2.....	A 203, grades A and B, firebox quality	-75
3.....	A 203, grades D and E, firebox quality	-150
4.....	A 353, firebox quality	-320
5.....	A 410, firebox quality	-150

^a These designations refer to the latest issue of the following specifications of the American Society for Testing Materials:

A 201,³ Specification for Carbon-Silicon Steel Plates of Intermediate Tensile Ranges for Fusion-Welded Boilers and Other Pressure Vessels,

A 212,³ Specification for High Tensile Strength Carbon-Silicon Steel Plates for Boilers and Other Pressure Vessels,

A 203,³ Specification for Nickel-Steel Plates for Boilers and Other Pressure Vessels,

A 353,³ Specification for Low-Carbon, High-Nickel Steel Plate for Pressure Vessels, and

A 410,³ Specification for Chromium-Copper-Nickel-Aluminum Alloy Steel Plates for Pressure Vessels.

NOTE 2.—This section supersedes the heat treatment clauses of the respective material specifications referred to in Table I.

Impact Properties

3. (a) The notched bar impact properties of the material, described in Paragraph (b), shall not be less than 15 ft-lb when tested at the specified temperature. Unless otherwise agreed upon, tests will be conducted at a temperature at least as low as the minimum temperature listed in Table I for the respective classes.

(b) Each impact test value shall constitute the average value of three specimens taken from each plate as rolled (Note 3) with not more than one value below the specified minimum value of 15 ft-lb, but in no case below 10 ft-lb.

³ Appears in this publication, see Contents in Numeric Sequence of ASTM Designations at front of book.

NOTE 3.—The term "plate as rolled," used here and in Section 4(b), refers to the unit plate from a slab or rolled directly from an ingot in its relation to the location and number of specimens; not to its condition. If the plate is sheared or otherwise cut into smaller sizes after rolling, the impact test made from the original plate shall govern.

(c) If the value for more than one specimen is below 15 ft-lb, or if the value for one specimen is below 10 ft-lb, a retest of three additional specimens shall be made, each of which must equal or exceed the specified minimum value of 15 ft-lb. Such a retest shall be permitted only when the average value of the three specimens equals or exceeds 10 ft-lb. If the required values are not obtained upon retest or if the values on the initial test are below the minimum required for retest, the plate may be reheat treated. After reheat treatment, a set of three specimens shall be made, each of which must equal or exceed the specified minimum value of 15 ft-lb.

(d) For plate which is not of sufficient thickness to permit the preparation of full size impact specimens, tests may be made on the largest of the subsize specimens listed in Table II which can be prepared from the plate. The impact values obtained on subsize specimens shall not be less than the values listed in Table II.

Impact Test Specimens

4. (a) The impact test specimen shall be of the Charpy type, keyhole (or milled "U") notch, and shall conform in all

TABLE II.—CHARPY IMPACT REQUIREMENTS FOR SUBSIZE SPECIMENS.

Size of Specimen, mm	Minimum Impact Value Requirement, Average of Three Specimens, ft-lb	Minimum Impact Value Permitted on One Specimen, ft-lb
10 by 7.5.....	12.5	8.5
10 by 5.....	10.0	7.0

