



## Standard Specification for Straight-Beam Ultrasonic Examination of Plain and Clad Steel Plates for Special Applications<sup>1</sup>

This standard is issued under the fixed designation A 578/A578M; 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 specification<sup>2</sup> covers the procedure and acceptance standards for straight-beam, pulse-echo, ultrasonic examination of rolled carbon and alloy plain and clad steel plates,  $\frac{3}{8}$  in. [10 mm] in thickness and over, for special applications. The method will detect internal discontinuities parallel to the rolled surfaces. Three levels of acceptance standards are provided. Supplementary requirements are provided for examination of clad plate and for alternative procedures.

1.2 Individuals performing examinations in accordance with this specification shall be qualified and certified in accordance with the requirements of the latest edition of ASNT SNT-TC-1A or an equivalent accepted standard. An equivalent standard is one which covers the qualification and certification of ultrasonic nondestructive examination candidates and which is acceptable to the purchaser.

1.3 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.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:

A 263 Specification for Corrosion-Resisting Chromium Steel-Clad Plate, Sheet, and Strip<sup>3</sup>

A 264 Specification for Stainless Chromium-Nickel Steel-Clad Plate, Sheet, and Strip<sup>3</sup>

A 265 Specification for Nickel and Nickel-Base Alloy-Clad Steel Plate<sup>3</sup>

#### 2.2 ANSI Standard:

B 46.1 Surface Texture<sup>4</sup>

#### 2.3 ASNT Standard:

SNT-TC-1A<sup>5</sup>

### 3. Ordering Information

3.1 The inquiry and order shall indicate the following:

3.1.1 Acceptance level requirements (Sections 7, 8, and 9). Acceptance Level B shall apply unless otherwise agreed to by purchaser and manufacturer.

3.1.2 Any additions to the provisions of this specification as prescribed in 5.2, 13.1, and Section 10.

3.1.3 Supplementary requirements, if any.

### 4. Apparatus

4.1 The amplitude linearity shall be checked by positioning the transducer over the depth resolution notch in the IIW or similar block so that the signal from the notch is approximately 30 % of the screen height, and the signal from one of the back surfaces is approximately 60 % of the screen height (two times the height of the signal from the notch). A curve is then plotted showing the deviations from the above established 2:1 ratio that occurs as the amplitude of the signal from the notch is raised in increments of one scale division until the back reflection signal reaches full scale, and then is lowered in increments of one scale division until the notch signal reaches one scale division. At each increment the ratio of the two signals is determined. The ratios are plotted on the graph at the position corresponding to the larger signal. Between the limits of 20 and 80 % of the screen height, the ratio shall be within 10 % of 2:1. Instrument settings used during inspection shall not cause variation outside the 10 % limits established above.

4.2 The transducer shall be 1 or 1½ in. [25 or 30 mm] in diameter or 1 in. [25 mm] square.

4.3 Other search units may be used for evaluating and pinpointing indications.

<sup>1</sup> 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.

Current edition approved Sept. 10, 1996. Published November 1996. Originally published as A 578 – 67 T. Last previous edition A 578/A 578M – 92.

<sup>2</sup> For ASME Boiler and Pressure Vessel Code applications, see related Specification SA-578/SA-578M in Section II of that Code.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 01.03.

<sup>4</sup> Available from American National Standards Institute, 11 W. 42nd St., 13th floor, New York, NY 10036.

<sup>5</sup> Available from American Society for Nondestructive Testing, 1711 Arlington Plaza, Columbus, OH 43228.