



Designation: A435/A435M – 17 (Reapproved 2023)

Standard Specification for Straight-Beam Ultrasonic Examination of Steel Plates¹

This standard is issued under the fixed designation A435/A435M; 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 specification² covers the procedure and acceptance standards for straight-beam, pulse-echo, ultrasonic examination of rolled fully killed carbon and alloy steel plates, ½ in. [12.5 mm] and over in thickness. It was developed to assure delivery of steel plates free of gross internal discontinuities such as pipe, ruptures, or laminations and is to be used whenever the inquiry, contract, order, or specification states that the plates are to be subjected to ultrasonic examination.

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 international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:³

¹ This specification is under the jurisdiction of ASTM Committee A01 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 Nov. 1, 2023. Published November 2023. Originally approved in 1959. Last previous edition approved in 2017 as A435/A435M – 17. DOI: 10.1520/A0435_A0435M-17R23.

² For ASME Boiler and Pressure Vessel Code applications, see related Specifications SA-435/SA-435M in Section II of that Code.

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

E317 Practice for Evaluating Performance Characteristics of Ultrasonic Pulse-Echo Testing Instruments and Systems without the Use of Electronic Measurement Instruments
E1316 Terminology for Nondestructive Examinations
E2491 Guide for Evaluating Performance Characteristics of Phased-Array Ultrasonic Testing Instruments and Systems
2.2 ASNT Documents:⁴
ASNT SNT-TC-1A Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing

3. Terminology

3.1 *Definitions*—For definitions of terms relating to nondestructive examinations used in this specification, refer to Terminology E1316.

4. Apparatus

4.1 The manufacturer shall furnish suitable ultrasonic equipment and qualified personnel necessary for performing the test. The equipment shall be of the pulse-echo straight beam type. The transducer is normally 1 in. to 1½ in. [25 mm to 30 mm] in diameter or 1 in. [25 mm] square; however, any transducer having a minimum active area of 0.7 in.² [450 mm²] may be used, including phased-array probes using an equivalent active aperture. The test shall be performed by one of the following methods: direct contact, immersion, or liquid column coupling.

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

4.3 Vertical or horizontal linearity or both shall be checked in accordance with Practice E317, Guide E2491, or another procedure approved by the users of this specification. An acceptable linearity performance may be agreed upon by the manufacturer and purchaser.

5. Test Conditions

5.1 Conduct the examination in an area free of operations that interfere with proper functioning of the equipment.

5.2 Clean and smooth the plate surface sufficiently to maintain a reference back reflection from the opposite side of the plate at least 50 % of the full scale during scanning.

⁴ Available from American Society for Nondestructive Testing (ASNT), P.O. Box 28518, 1711 Arlingate Ln., Columbus, OH 43228-0518, <https://www.asnt.org>.