



Standard Specification for Straight Beam Ultrasonic Examination of Rolled Steel Structural Shapes¹

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1. Scope

1.1 This specification covers the procedure and acceptance standards for straight beam, pulse echo, ultrasonic examination of rolled structural shapes having a minimum section thickness of ½ in. [12.5 mm]. It was developed to ensure delivery of steel structural shapes 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 shapes are to be ultrasonically examined. Two levels of acceptance standards are included. Level II is intended for normal applications where freedom from gross internal discontinuities is desired, particularly in connection regions. Level I is intended for critical applications such as welded chord members used in tension loading, where internal discontinuities could be detrimental. Level II is normally applicable unless otherwise specified in contract documents or the purchase order. Supplementary requirements for alternative scanning coverages are provided.

1.2 The values stated in either inch-pound 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.

2. Referenced Documents

2.1 ASTM Standards:

A 6/A 6M Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling²

E 317 Practice for Evaluating Performance Characteristics of Ultrasonic Pulse Echo Testing Systems without the Use of Electronic Measurement Instruments³

2.2 ASNT Standard:

SNT-TC-1A Recommended Practice for Personnel Qualifi-

cation and Certification in Nondestructive Testing⁴

3. Ordering Information

3.1 The inquiry and order should indicate the following:

3.1.1 Acceptance level requirements will be Level II unless otherwise specified.

3.1.2 Any additions to the provisions of this specification as outlined in 8.3.

3.1.3 Supplementary requirements, if any.

4. Apparatus

4.1 The manufacturer shall furnish suitable ultrasonic equipment and qualified personnel necessary for performing the examination. The equipment shall be straight beam, pulse-echo and span a nominal test frequency range of 1 to 5 MHz. The search unit shall be within the range of ½ in. [12.5 mm] to 1½ in. [30 mm] in diameter or ½ [12.5 mm] to 1 in. [25 mm] square (including the pitch-catch type probe). The test shall be performed by one of the following methods: contact, immersion, or liquid column coupling.

4.2 Other search units may be used for evaluating and pin-pointing indications.

5. Personnel Qualification

5.1 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 that covers the qualification and certification of ultrasonic nondestructive examination candidates, and that is acceptable to the purchaser.

6. Test Conditions

6.1 Conduct the examination in an area free of operations that interfere with proper functioning of equipment and testing personnel.

6.2 The section surfaces shall be sufficiently clean and smooth to maintain a back reflection from the opposite side of the flanges, legs, and webs approximately comparable to the height observed at the scanning gain level obtained in 8.2.

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 A01.02 on Structural Steel for Bridges, Buildings, Rolling Stock, and Ships.

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² *Annual Book of ASTM Standards*, Vol 01.04.

³ *Annual Book of ASTM Standards*, Vol 03.03.

⁴ Available from American Society for Nondestructive Testing, Inc., P.O. Box 28518, Columbus, OH 43228.