



Standard Specification for Agencies Performing Nondestructive Testing¹

This standard is issued under the fixed designation E543; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

This specification has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This specification covers minimum requirements for agencies performing nondestructive testing (NDT).

1.2 When using this specification to assess the capability of, or to accredit NDT agencies, Guide E1359 shall be used as a basis for the survey. It can be supplemented as necessary with more detail in order to meet the auditor's specific needs.

1.3 This specification can be used as a basis to evaluate testing or inspection agencies, or both, and is intended for use for the qualifying or accrediting, or both, of testing or inspection agencies, public or private.

1.4 The use of SI or inch-pound units, or combination thereof, will be the responsibility of the technical committee whose standards are referred to in this standard.

1.5 *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:*²

- E94 Guide for Radiographic Examination
- E114 Practice for Ultrasonic Pulse-Echo Straight-Beam Contact Testing
- E125 Reference Photographs for Magnetic Particle Indications on Ferrous Castings
- E127 Practice for Fabricating and Checking Aluminum Alloy Ultrasonic Standard Reference Blocks
- E164 Practice for Contact Ultrasonic Testing of Weldments
- E165 Practice for Liquid Penetrant Examination for General Industry

¹ This specification is under the jurisdiction of ASTM Committee E07 on Nondestructive Testing and is the direct responsibility of Subcommittee E07.09 on Nondestructive Testing Agencies.

Current edition approved Feb. 15, 2015. Published March 2015. Originally approved in 1976. Last previous edition approved in 2013 as E543 - 13. DOI: 10.1520/E0543-15.

² 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.

- E213 Practice for Ultrasonic Testing of Metal Pipe and Tubing
- E215 Practice for Standardizing Equipment for Electromagnetic Testing of Seamless Aluminum-Alloy Tube
- E243 Practice for Electromagnetic (Eddy Current) Examination of Copper and Copper-Alloy Tubes
- E273 Practice for Ultrasonic Testing of the Weld Zone of Welded Pipe and Tubing
- E309 Practice for Eddy-Current Examination of Steel Tubular Products Using Magnetic Saturation
- E317 Practice for Evaluating Performance Characteristics of Ultrasonic Pulse-Echo Testing Instruments and Systems without the Use of Electronic Measurement Instruments
- E376 Practice for Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Testing Methods
- E426 Practice for Electromagnetic (Eddy-Current) Examination of Seamless and Welded Tubular Products, Titanium, Austenitic Stainless Steel and Similar Alloys
- E427 Practice for Testing for Leaks Using the Halogen Leak Detector Alkali-Ion Diode (Withdrawn 2013)³
- E428 Practice for Fabrication and Control of Metal, Other than Aluminum, Reference Blocks Used in Ultrasonic Testing
- E431 Guide to Interpretation of Radiographs of Semiconductors and Related Devices
- E432 Guide for Selection of a Leak Testing Method
- E433 Reference Photographs for Liquid Penetrant Inspection
- E479 Guide for Preparation of a Leak Testing Specification (Withdrawn 2014)³
- E493 Test Methods for Leaks Using the Mass Spectrometer Leak Detector in the Inside-Out Testing Mode
- E494 Practice for Measuring Ultrasonic Velocity in Materials
- E498 Test Methods for Leaks Using the Mass Spectrometer Leak Detector or Residual Gas Analyzer in the Tracer Probe Mode
- E499 Test Methods for Leaks Using the Mass Spectrometer

³ The last approved version of this historical standard is referenced on www.astm.org.

*A Summary of Changes section appears at the end of this standard

- Leak Detector in the Detector Probe Mode
- E515** Practice for Leaks Using Bubble Emission Techniques
- E545** Test Method for Determining Image Quality in Direct Thermal Neutron Radiographic Examination
- E566** Practice for Electromagnetic (Eddy Current) Sorting of Ferrous Metals
- E569** Practice for Acoustic Emission Monitoring of Structures During Controlled Stimulation
- E570** Practice for Flux Leakage Examination of Ferromagnetic Steel Tubular Products
- E571** Practice for Electromagnetic (Eddy-Current) Examination of Nickel and Nickel Alloy Tubular Products
- E587** Practice for Ultrasonic Angle-Beam Contact Testing
- E592** Guide to Obtainable ASTM Equivalent Penetrant Sensitivity for Radiography of Steel Plates ¼ to 2 in. (6 to 51 mm) Thick with X Rays and 1 to 6 in. (25 to 152 mm) Thick with Cobalt-60
- E650** Guide for Mounting Piezoelectric Acoustic Emission Sensors
- E664** Practice for the Measurement of the Apparent Attenuation of Longitudinal Ultrasonic Waves by Immersion Method
- E690** Practice for In Situ Electromagnetic (Eddy-Current) Examination of Nonmagnetic Heat Exchanger Tubes
- E703** Practice for Electromagnetic (Eddy Current) Sorting of Nonferrous Metals
- E709** Guide for Magnetic Particle Testing
- E746** Practice for Determining Relative Image Quality Response of Industrial Radiographic Imaging Systems
- E747** Practice for Design, Manufacture and Material Grouping Classification of Wire Image Quality Indicators (IQI) Used for Radiology
- E748** Practices for Thermal Neutron Radiography of Materials
- E749** Practice for Acoustic Emission Monitoring During Continuous Welding
- E750** Practice for Characterizing Acoustic Emission Instrumentation
- E751** Practice for Acoustic Emission Monitoring During Resistance Spot-Welding
- E797** Practice for Measuring Thickness by Manual Ultrasonic Pulse-Echo Contact Method
- E801** Practice for Controlling Quality of Radiological Examination of Electronic Devices
- E803** Test Method for Determining the *L/D* Ratio of Neutron Radiography Beams
- E908** Practice for Calibrating Gaseous Reference Leaks
- E976** Guide for Determining the Reproducibility of Acoustic Emission Sensor Response
- E999** Guide for Controlling the Quality of Industrial Radiographic Film Processing
- E1001** Practice for Detection and Evaluation of Discontinuities by the Immersed Pulse-Echo Ultrasonic Method Using Longitudinal Waves
- E1004** Test Method for Determining Electrical Conductivity Using the Electromagnetic (Eddy-Current) Method
- E1025** Practice for Design, Manufacture, and Material Grouping Classification of Hole-Type Image Quality Indicators (IQI) Used for Radiology
- E1030** Test Method for Radiographic Examination of Metallic Castings
- E1032** Test Method for Radiographic Examination of Weldments
- E1033** Practice for Electromagnetic (Eddy Current) Examination of Type F-Continuously Welded (CW) Ferromagnetic Pipe and Tubing Above the Curie Temperature
- E1067** Practice for Acoustic Emission Examination of Fiberglass Reinforced Plastic Resin (FRP) Tanks/Vessels
- E1118** Practice for Acoustic Emission Examination of Reinforced Thermosetting Resin Pipe (RTRP)
- E1139** Practice for Continuous Monitoring of Acoustic Emission from Metal Pressure Boundaries
- E1211** Practice for Leak Detection and Location Using Surface-Mounted Acoustic Emission Sensors
- E1212** Practice for Quality Management Systems for Nondestructive Testing Agencies
- E1254** Guide for Storage of Radiographs and Unexposed Industrial Radiographic Films
- E1312** Practice for Electromagnetic (Eddy Current) Examination of Ferromagnetic Cylindrical Bar Product Above the Curie Temperature
- E1315** Practice for Ultrasonic Examination of Steel with Convex Cylindrically Curved Entry Surfaces (Withdrawn 2006)³
- E1316** Terminology for Nondestructive Examinations
- E1359** Guide for Evaluating Capabilities of Nondestructive Testing Agencies
- E1417** Practice for Liquid Penetrant Testing
- E1419** Practice for Examination of Seamless, Gas-Filled, Pressure Vessels Using Acoustic Emission
- E1444** Practice for Magnetic Particle Testing
- E1496** Test Method for Neutron Radiographic Dimensional Measurements (Withdrawn 2012)³
- E1571** Practice for Electromagnetic Examination of Ferromagnetic Steel Wire Rope
- E1606** Practice for Electromagnetic (Eddy-Current) Examination of Copper Redraw Rod for Electrical Purposes
- E1629** Practice for Determining the Impedance of Absolute Eddy-Current Probes
- E1742** Practice for Radiographic Examination
- E1774** Guide for Electromagnetic Acoustic Transducers (EMATs)
- E1781** Practice for Secondary Calibration of Acoustic Emission Sensors
- E1816** Practice for Ultrasonic Testing Using Electromagnetic Acoustic Transducer (EMAT) Techniques
- E1888/E1888M** Practice for Acoustic Emission Examination of Pressurized Containers Made of Fiberglass Reinforced Plastic with Balsa Wood Cores
- E1901** Guide for Detection and Evaluation of Discontinuities by Contact Pulse-Echo Straight-Beam Ultrasonic Methods

- [E1930 Practice for Examination of Liquid-Filled Atmospheric and Low-Pressure Metal Storage Tanks Using Acoustic Emission](#)
- [E1932 Guide for Acoustic Emission Examination of Small Parts](#)
- [E1961 Practice for Mechanized Ultrasonic Testing of Girth Welds Using Zonal Discrimination with Focused Search Units](#)
- [E1962 Practice for Ultrasonic Surface Testing Using Electromagnetic Acoustic Transducer \(EMAT\) Techniques](#)
- [E2001 Guide for Resonant Ultrasound Spectroscopy for Defect Detection in Both Metallic and Non-metallic Parts](#)
- [E2075 Practice for Verifying the Consistency of AE-Sensor Response Using an Acrylic Rod](#)
- [E2076 Test Method for Examination of Fiberglass Reinforced Plastic Fan Blades Using Acoustic Emission](#)
- [E2096 Practice for In Situ Examination of Ferromagnetic Heat-Exchanger Tubes Using Remote Field Testing](#)
- [E2191 Practice for Examination of Gas-Filled Filament-Wound Composite Pressure Vessels Using Acoustic Emission](#)
- [E2192 Guide for Planar Flaw Height Sizing by Ultrasonics](#)
- [E2223 Practice for Examination of Seamless, Gas-Filled, Steel Pressure Vessels Using Angle Beam Ultrasonics](#)
- [E2261 Practice for Examination of Welds Using the Alternating Current Field Measurement Technique](#)
- [E2338 Practice for Characterization of Coatings Using Conformable Eddy-Current Sensors without Coating Reference Standards](#)
- [E2373 Practice for Use of the Ultrasonic Time of Flight Diffraction \(TOFD\) Technique](#)
- [E2374 Guide for Acoustic Emission System Performance Verification](#)
- [E2375 Practice for Ultrasonic Testing of Wrought Products](#)
- [E2479 Practice for Measuring the Ultrasonic Velocity in Polyethylene Tank Walls Using Lateral Longitudinal \(\$L_{CR}\$ \) Waves](#)
- [E2491 Guide for Evaluating Performance Characteristics of Phased-Array Ultrasonic Testing Instruments and Systems](#)
- [E2534 Practice for Process Compensated Resonance Testing Via Swept Sine Input for Metallic and Non-Metallic Parts](#)
- [E2580 Practice for Ultrasonic Testing of Flat Panel Composites and Sandwich Core Materials Used in Aerospace Applications](#)
- [E2700 Practice for Contact Ultrasonic Testing of Welds Using Phased Arrays](#)

2.2 Other Documents:

- [ASNT Recommended Practice No. SNT-TC-1A Personnel Qualification and Certification in Nondestructive Testing⁴](#)
- [ANSI/ASNT-CP-189 ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel⁴](#)
- [NAS-410 Certification and Qualification of Nondestructive Personnel \(Quality Assurance Committee\)⁵](#)

3. Terminology

3.1 *Definitions*—Additional definitions are contained in the specific specification or in Terminology [E1316](#).

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *agency*—the public, independent, or in-house nondestructive testing organization selected by the authority to perform the examination(s) required by the purchase order or specification.

3.2.2 *authority*—the owner, prime contractor, engineer, architect, or purchasing agent in responsible charge of the work, or duly recognized or designated representative.

3.2.2.1 *Discussion*—The agency and the authority may be the same in some cases.

4. Significance and Use

4.1 This specification is applicable where the systematic assessment of the competence of a nondestructive testing agency by a user or other party is desired.

4.2 It is intended that the requirements specified in this specification apply to independent, public, or in-house agencies to the extent required by the purchase order or specification. This specification does not apply to in-house equipment, methods, and examinations used for the exclusive purpose of internal process control. It is intended that this specification apply to all examination(s) used for the final acceptance examination(s) if such examination(s) are required by the purchase order or specification.

4.3 Criteria are provided for evaluating the capability of an agency to properly perform designated examinations and establishes essential characteristics pertaining to the organization, personnel, facilities, and quality systems of the agency. This specification may be supplemented by more specific criteria and requirements for particular projects.

5. Organization of the Agency

5.1 The following information concerning the organization of the agency shall be provided by documentation:

5.1.1 A description of the organization including:

5.1.1.1 The complete legal name and address of the main office,

5.1.1.2 The names and positions of the principal officers and directors,

5.1.1.3 The agency's ownership, managerial structure, and principal members,

5.1.1.4 The functional description of the agency's organizational structure, operational departments, and support departments and services. This may be demonstrated in the form of charts that depict all the divisions, departments, sections and units, and their relationships,

5.1.1.5 All relevant organizational affiliates of the agency and the principal officers of affiliates and directors of the affiliates where applicable,

5.1.1.6 External organizations and organizational components and their functions that are utilized for significant technical support services, and

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

⁵ Available from Aerospace Industries Association of America, Inc. (AIA), 1000 Wilson Blvd., Suite 1700, Arlington, VA 22209-3928, <http://www.aia-aerospace.org>.