



Standard Practice for Acoustic Emission Examination of High Pressure, Low Carbon, Forged Piping using Controlled Hydrostatic Pressurization¹

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1. Scope

1.1 In the preferred embodiment, this practice examines immersed low carbon, forged piping being immersed in a water tank with the acoustic sensors permanently mounted on the tank walls rather than temporarily on the part itself. The pipes are monitored while being internally loaded (stressed) by hydrostatic means up to 1000 bar.

1.2 This practice examines either an immersed pipe, or non-immersed pipe being stressed by internal hydrostatic means to create acoustic emissions when cracks are present. However, the non-immersed method is time consuming, requiring placement and removal of sensors for each pipe inspected, while the immersed method has sensors permanently mounted, providing consistent sensor coupling to the tank-eliminating reinstallation. The non-immersed method is not recommended for the specified reasons and only the immersed method will be discussed throughout the remainder of the standard. This is similar to pressure vessel testing described in Practice E569, but uses hydrostatic means not included in that standard.

1.3 This Acoustic Emission (AE) method addresses examination for monitoring low carbon, forged piping systems being internally loaded (stressed) by hydrostatic means up to 1000 bar [15,000 psi] while being immersed in a water bath to facilitate sensor coupling.

1.4 The basic functions of an AE monitoring system are to detect, locate, and classify emission sources. Other methods of nondestructive testing (NDT) may be used to further evaluate the significance of acoustic emission sources.

1.5 This practice can be used to replace visual methods, which are unreliable and have significant safety risks.

1.6 This practice describes procedures to install and monitor acoustic emission resulting from local anomalies stimulated by controlled hydrostatic pressure.

1.7 Other methods of nondestructive testing (NDT) may be used to further evaluate the significance of acoustic emission sources.

1.8 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.9 *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

E543 Specification for Agencies Performing Nondestructive Testing

E569 Practice for Acoustic Emission Monitoring of Structures During Controlled Stimulation

E650 Guide for Mounting Piezoelectric Acoustic Emission Sensors

E750 Practice for Characterizing Acoustic Emission Instrumentation

E976 Guide for Determining the Reproducibility of Acoustic Emission Sensor Response

E1316 Terminology for Nondestructive Examinations

E2374 Guide for Acoustic Emission System Performance Verification

2.2 Other Referenced Documents

ANSI/ASNT CP-189 Standard for Qualification and Certification of Nondestructive Testing Personnel³

¹ This test method is under the jurisdiction of ASTM Committee E07 on Nondestructive Testing and is the direct responsibility of Subcommittee E07.04 on Acoustic Emission Method.

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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.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.