



Standard Practice for Acoustic Emission Examination of Reinforced Thermosetting Resin Pipe (RTRP)¹

This standard is issued under the fixed designation E 1118; 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 practice covers acoustic emission (AE) examination or monitoring of reinforced thermosetting resin pipe (RTRP) to determine structural integrity. It is applicable to lined or unlined pipe, fittings, joints, and piping systems.

1.2 This practice is applicable to pipe that is fabricated with fiberglass and carbon fiber reinforcements with reinforcing contents greater than 15 % by weight. The suitability of these procedures must be demonstrated before they are used for piping that is constructed with other reinforcing materials.

1.3 This practice is applicable to tests below pressures of 35 MPa absolute (5000 psia).

1.4 This practice is limited to pipe up to and including 0.6 m (24 in.) in diameter. Larger diameter pipe can be examined with AE, however, the procedure is outside the scope of this practice.

1.5 This practice applies to examinations of new or in-service RTRP.

1.6 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.7 *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 to determine the applicability of regulatory limitations prior to use. For more specific safety precautionary information see 8.1.*

2. Referenced Documents

2.1 ASTM Standards:

D 883 Terminology Relating to Plastics²

E 650 Guide for Mounting Piezoelectric Acoustic Emission Sensors³

E 750 Practice for Measuring Operating Characteristics of Acoustic Emission Instrumentation³

E 976 Guide for Determining the Reproducibility of Acoustic Emission Sensor Response³

¹ This practice is under the jurisdiction of ASTM Committee E-7 on Nondestructive Testing and is the direct responsibility of Subcommittee E07.04 on Acoustic Emission.

Current edition approved Jan. 15, 1995. Published March 1995. Originally published as E 1118 – 86. Last previous edition E 1118 – 89.

² Annual Book of ASTM Standards, Vol 08.01.

³ Annual Book of ASTM Standards, Vol 03.03.

E 1316 Terminology for Nondestructive Examinations³

3. Terminology

3.1 Complete glossaries of terms related to plastics and acoustic emission will be found in Terminologies D 883 and E 1316.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *component and assembly proof testing*—a program of tests on RTRP components designed to assess product quality in a manufacturer's plant, at the installation site, or when taken out of service for retesting. An assembly is a shippable unit of factory-assembled components.

3.2.2 *count value N_c* —an evaluation criterion based on the total number of AE counts. (See A2.5.)

3.2.3 *diameter to thickness ratio (d/t)*—equal to $\frac{D_o + D_i}{2t}$ where (D_o) is the outside pipe diameter, (D_i) is the inside pipe diameter, and (t) is the wall thickness, as measured in a section of straight pipe.

3.2.4 *high-amplitude threshold*—a threshold for large amplitude events. (See A2.3.)

3.2.5 *in-service systems testing*—a program of periodic tests during the lifetime of an RTRP system designed to assess its structural integrity.

3.2.6 *low-amplitude threshold*—the threshold above which AE counts (N) are measured. (See A2.2.)

3.2.7 *manufacturers qualification testing*—a comprehensive program of tests to confirm product design, performance acceptability, and fabricator capability.

3.2.8 *operating pressure*—pressure at which the RTRP normally operates. It should not exceed design pressure.

3.2.9 *qualification test pressure*—a test pressure which is set by agreement between the user, manufacturer, or test agency, or combination thereof.

3.2.10 *rated pressure*—a nonstandard term used by RTRP pipe manufacturers as an indication of the maximum operating pressure.

3.2.11 *RTRP*—Reinforced Thermosetting Resin Pipe, a tubular product containing reinforcement embedded in or surrounded by cured thermosetting resin.

3.2.12 *RTRP system*—a pipe structure assembled from various components that are bonded, threaded, layed-up, etc., into a functional unit.

3.2.13 *signal value M* —a measure of the AE signal power