



Standard Test Method for Conducting Erosion Tests by Solid Particle Impingement Using Gas Jets¹

This standard is issued under the fixed designation G76; 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 test method covers the determination of material loss by gas-entrained solid particle impingement erosion with jetnozzle type erosion equipment. This test method may be used in the laboratory to measure the solid particle erosion of different materials and has been used as a screening test for ranking solid particle erosion rates of materials in simulated service environments (1, 2).² Actual erosion service involves particle sizes, velocities, attack angles, environments, and so forth, that will vary over a wide range (3-5). Hence, any single laboratory test may not be sufficient to evaluate expected service performance. This test method describes one well characterized procedure for solid particle impingement erosion measurement for which interlaboratory test results are available.

1.2 *Units*—The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard (exceptions below).

1.2.1 *Exceptions*: Table 1 uses HRB hardness. Footnote 7 and 11.2 use abrasive grit designations.

1.3 *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*:³

E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process

¹ This test method is under the jurisdiction of ASTM Committee G02 on Wear and Erosion and is the direct responsibility of Subcommittee G02.10 on Erosion by Solids and Liquids.

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² The boldface numbers in parentheses refer to a list of references at the end of this standard.

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.

G40 Terminology Relating to Wear and Erosion

2.2 *American National Standard*:

ANSI B74.10 Grading of Abrasive Microgrits⁴

3. Terminology

3.1 *Definitions*:

3.1.1 *erosion*—progressive loss of original material from a solid surface due to mechanical interaction between that surface and a fluid, a multicomponent fluid, or impinging liquid or solid particles.

3.1.2 *impingement*—a process resulting in a continuing succession of impacts between (liquid or solid) particles and a solid surface.

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *erosion value*—the volume loss of specimen material divided by the total mass of abrasive particles that impacted the specimen ($\text{mm}^3 \cdot \text{g}^{-1}$).

3.2.2 *Normalized Erosion Rate*—erosion value ($\text{mm}^3 \cdot \text{g}^{-1}$) of specimen material divided by erosion value ($\text{mm}^3 \cdot \text{g}^{-1}$) of reference material.

4. Summary of Test Method

4.1 This test method utilizes a repeated impact erosion approach involving a small nozzle delivering a stream of gas containing abrasive particles which impacts the surface of a test specimen. A standard set of test conditions is described. However, deviations from some of the standard conditions are permitted if described thoroughly. This allows for laboratory scale erosion measurements under a range of conditions. Test methods are described for preparing the specimens, conducting the erosion exposure, and reporting the results.

5. Significance and Use

5.1 The significance of this test method in any overall measurements program to assess the erosion behavior of materials will depend on many factors concerning the conditions of service applications. The users of this test method should determine the degree of correlation of the results

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.