



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

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1. Scope

1.1 This test method is concerned with the determination of material loss by gas-entrained solid particle impingement erosion with jet nozzle type erosion equipment. This test method can 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. Erosion service takes place under conditions where particle sizes, chemistry, microstructure, velocity, attack angles, temperature, environments, etc., vary over a wide range. 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 from multiple laboratories.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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:²

- E822** Test Method for Particle Size Distribution of Metal Powders and Related Compounds by Light Scattering
- 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 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.

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

E1601 Practice for Conducting an Interlaboratory Study to Evaluate the Performance of an Analytical Method

E1617 Practice for Reporting Particle Size Characterization Data

G40 Terminology Relating to Wear and Erosion

G76 Test Method for Conducting Erosion Tests by Solid Particle Impingement Using Gas Jets

2.2 *American National Standard:*³

ANSI B74.10 Grading of Abrasive Microgrits

2.3 *Japanese Industrial Standard:*⁴

JIS 6001 Bonded Abrasive Grain Sizes

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.

3.1.3 *interlaboratory study (ILS)*—study undertaken to ascertain if a test method is suitable for its intended use. The ILS includes preparation, testing, and evaluation phases.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *mass loss erosion rate*—the mass loss of specimen material divided by the total mass of erodent particles that impacted the specimen (milligrams of specimen material loss / gram of erodent impacting the specimen).

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

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

⁴ Available from Japanese Standards Organization (JSA), 4-1-24 Akasaka Minato-Ku, Tokyo 107-8440, Japan, <http://www.jsa.or.jp>.