



Standard Test Method for Determination of Slurry Abrasivity (Miller Number) and Slurry Abrasion Response of Materials (SAR Number)¹

This standard is issued under the fixed designation G 75; 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 a single laboratory procedure that can be used to develop data from which either the relative abrasivity of any slurry (Miller Number) or the response of different materials to the abrasivity of different slurries (SAR Number), can be determined.

1.2 The test data obtained by this procedure are used to calculate either a number related to the rate of mass loss of duplicate standard-shaped 27 % chromium iron wear blocks when run for a period of time in the slurry of interest (Miller Number), or to calculate a number related to the rate of mass loss (converted to volume loss) of duplicate standard-shaped wear specimens of any material of interest when run for a period of time in any slurry of interest (SAR Number).

1.3 The requirement for a finished flat wearing surface on the test specimen for a SAR Number test may preclude application of the procedure where thin (0.051 to 0.127-mm), hard, wear-resistant coatings will not allow for surface finishing. The 6 hours total duration of the SAR Number Test may not allow establishment of a consistent rate-of-mass-loss of the unfinished surface.

1.4 *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:

G 40 Terminology Relating to Wear and Erosion²

2.2 Military Standard:

MIL-R-6855C Rubber, Synthetic, Sheets, Strips, Molded or Extruded Shapes³

3. Terminology

3.1 *Definitions*—Definitions used in this test method are in accordance with Terminology G 40 as follows:

3.1.1 *abrasive wear*—wear due to hard particles or hard protuberances forced against and moving along a solid surface.

3.1.2 *corrosive wear*—wear in which chemical or electrochemical reaction with the environment is significant.

3.1.3 *abrasion-corrosion*—a synergistic process involving both abrasive wear and corrosion in which each of these processes is affected by the simultaneous action of the other and, in many cases is thereby accelerated.

3.1.4 *cumulative erosion-time curve*—a plot of cumulative erosion versus cumulative exposure duration, usually determined by periodic interruption of the test and weighing of the specimen. This is the primary record of an erosion test. Most other characteristics, such as the incubation period, maximum erosion rate, terminal erosion rate, and erosion rate-time curve, are derived from it.

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

3.1.6 *erosion-corrosion*—a conjoint action involving corrosion and erosion in the presence of a corrosive substance.

3.1.7 *instantaneous erosion rate*—the slope of a tangent to the cumulative erosion-time curve at a specified point on that curve.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *mass concentration*—the mass of solid particles per unit mass of mixture, expressed in percent.

3.2.2 *Miller Number*—a measure of slurry abrasivity as related to the instantaneous rate of mass loss of a standard metal wear block at a specific time on the cumulative abrasion-corrosion time curve.

3.2.3 *SAR Number*—a measure of the relative abrasion response of any material in any slurry, as related to the instantaneous rate of mass-loss of a specimen at a specific time on the cumulative abrasion-corrosion time curve, converted to volume or thickness loss rate.

3.2.4 *slurry*—a mixture of solid particles in liquid, of such a consistency as to be capable of being pumped like a liquid.

3.2.5 *slurry abrasivity*—the relative tendency of a particular

¹ This test method is under the jurisdiction of ASTM Committee G02 on Wear and Erosion and is the direct responsibility of Subcommittee G02.30 on Abrasive Wear.

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² *Annual Book of ASTM Standards*, Vol 03.02.

³ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.