



Standard Test Method for Cavitation Erosion Using Vibratory Apparatus¹

This standard is issued under the fixed designation G32; 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 production of cavitation damage on the face of a specimen vibrated at high frequency while immersed in a liquid. The vibration induces the formation and collapse of cavities in the liquid, and the collapsing cavities produce the damage to and erosion (material loss) of the specimen.

1.2 Although the mechanism for generating fluid cavitation in this method differs from that occurring in flowing systems and hydraulic machines (see 5.1), the nature of the material damage mechanism is believed to be basically similar. The method therefore offers a small-scale, relatively simple and controllable test that can be used to compare the cavitation erosion resistance of different materials, to study in detail the nature and progress of damage in a given material, or—by varying some of the test conditions—to study the effect of test variables on the damage produced.

1.3 This test method specifies standard test conditions covering the diameter, vibratory amplitude and frequency of the specimen, as well as the test liquid and its container. It permits deviations from some of these conditions if properly documented, that may be appropriate for some purposes. It gives guidance on setting up a suitable apparatus and covers test and reporting procedures and precautions to be taken. It also specifies standard reference materials that must be used to verify the operation of the facility and to define the normalized erosion resistance of other test materials.

1.4 A history of this test method is given in [Appendix X4](#), followed by a comprehensive bibliography.

1.5 The values stated in SI units are to be regarded as standard. The inch-pound units given in parentheses are for information only.

1.6 *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 applica-*

bility of regulatory limitations prior to use. For specific safety warning information, see [6.1](#), [10.3](#), and [10.6.1](#).

2. Referenced Documents

2.1 ASTM Standards:²

- [A276](#) Specification for Stainless Steel Bars and Shapes
- [B160](#) Specification for Nickel Rod and Bar
- [B211](#) Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire
- [D1193](#) Specification for Reagent Water
- [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
- [E960](#) Specification for Laboratory Glass Beakers
- [G40](#) Terminology Relating to Wear and Erosion
- [G73](#) Test Method for Liquid Impingement Erosion Using Rotating Apparatus
- [G117](#) Guide for Calculating and Reporting Measures of Precision Using Data from Interlaboratory Wear or Erosion Tests
- [G119](#) Guide for Determining Synergism Between Wear and Corrosion
- [G134](#) Test Method for Erosion of Solid Materials by Cavitating Liquid Jet

3. Terminology

3.1 Definitions:

3.1.1 See Terminology [G40](#) for definitions of terms relating to cavitation erosion. For convenience, important definitions for this standard are listed below; some are slightly modified from Terminology [G40](#) or not contained therein.

3.1.2 *average erosion rate, n*—a less preferred term for cumulative erosion rate.

3.1.3 *cavitation, n*—the formation and subsequent collapse, within a liquid, of cavities or bubbles that contain vapor or a mixture of vapor and gas.

3.1.3.1 *Discussion*—In general, cavitation originates from a local decrease in hydrostatic pressure in the liquid, produced

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.