



Designation: C 368 – 88 (Reapproved 1999)

Standard Test Method for Impact Resistance of Ceramic Tableware¹

This standard is issued under the fixed designation C 368; 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 following tests:

1.1.1 Impact tests at the center of both flatware and hollow ware and at the rim of hollow ware, and

1.1.2 Chipping tests at the rim of flatware. Specimens may be either glazed or unglazed.

NOTE 1—The impact test at the center of the specimen is used to determine: (1) the magnitude of a blow that will produce initial fracture, and (2) the amount of energy necessary to produce complete failure. In the first case, the initial fracture shows on the side of the piece opposite from that being struck and appears to be a function of the square of the thickness and of the inherent brittleness of the body or body-glaze combination; it is relatively independent of the size or design of the specimen. The second factor is more dependent upon design and often is subject to wide variation within a given group of pieces.

NOTE 2—The impact test at the rim of hollow ware is similar to a chipping test, and the type of failure that is obtained is useful in evaluating the effect of the shape of the object.

NOTE 3—In addition to the inherent strength of the body, chipping test results are greatly affected by contour of rim and to a lesser extent by thickness of rim, inclination of leaf, and fit of glaze.

1.2 The values stated in inch-pound units are to be regarded as the standard. The SI (metric) units given in parentheses are for information purposes only.

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. Significance and Use

2.1 The purpose of this test method is to predict product resistance to impact breakage in service.

3. Apparatus

3.1 *Impact Tester, Pendulum Type*—The impact test apparatus (Figs. 1 and 2)² shall consist of a device having the following essential features:

¹ This test method is under the jurisdiction of ASTM Committee C-21 on Ceramic Whitewares and Related Products and is the direct responsibility of Subcommittee C21.03 on Test Methods of Whiteware Properties.

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² Detailed working drawings of the apparatus are available from ASTM Headquarters. Request Adjunct No. ADJC0368.

3.1.1 A steel tup of specified size and of hardness Rockwell C 55,

3.1.2 Support of a tup by a V-suspension,

3.1.3 Provision for a means of release from fixed heights so as to give reproducible results, independent of the operator, and

3.1.4 Provision for holding the test specimen in place by spring clamps against rigid metal supports.

3.2 *Micrometer*—For measuring thickness of test specimens, a micrometer caliper that can be read to 0.001 in. (0.03 mm) shall be used.

4. Test Specimens

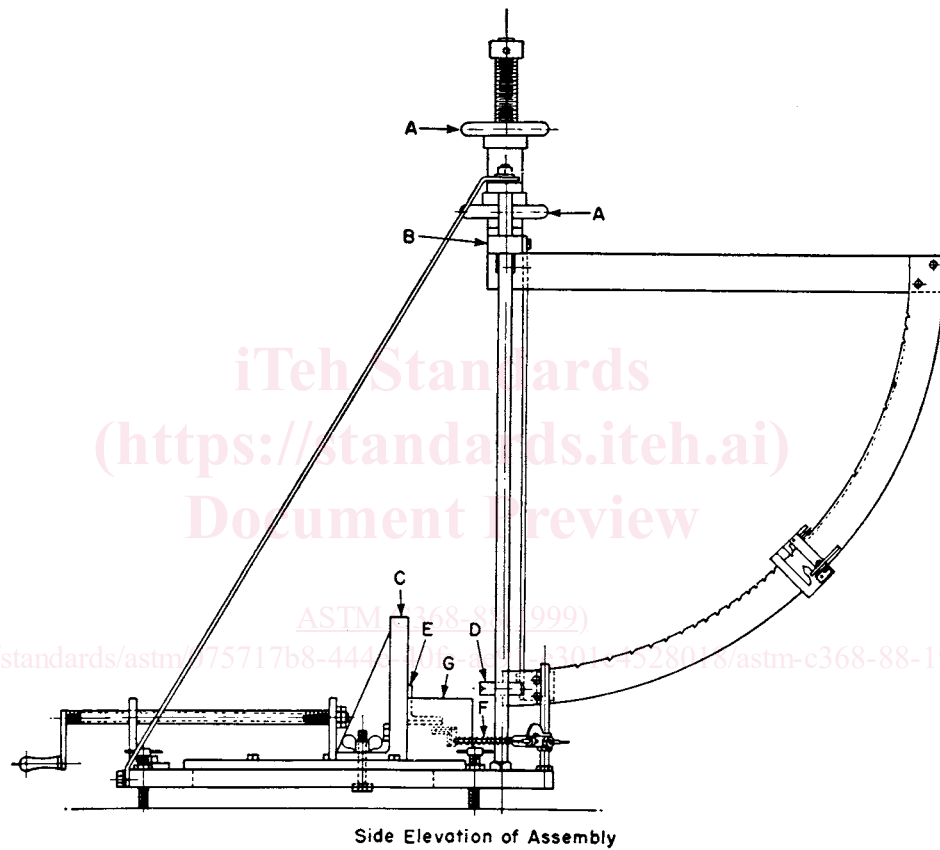
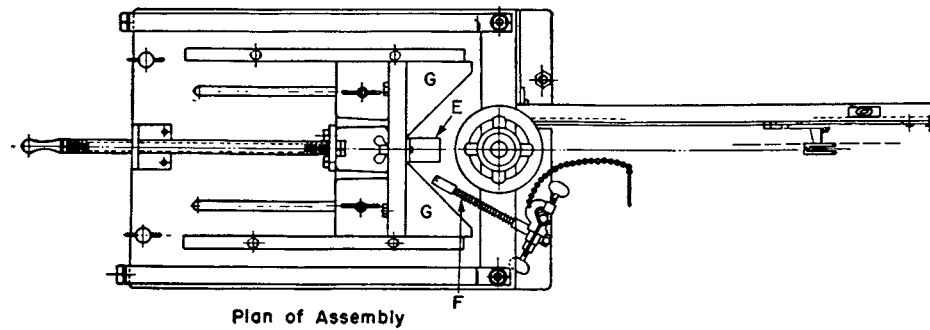
4.1 Specimens shall be selected so as to be representative of the lot being sampled. In general, impact tests shall be based on a minimum of ten specimens and chipping tests on at least five specimens. Specimens shall be inspected for soundness and obvious physical defects before testing.

5. Procedure for Impact Testing of Flatware

5.1 Mount the cylindrical tube shown in Fig. 2 (Note 4) on the backstop, C, Fig. 1, and set at a height such that the three ball bearings mounted in the end of the cylindrical tube are in contact and symmetrical with the central portion of the specimen, which shall be stood on edge on the base plate. The specimen may be tested with either the face or the back toward the hammer; in general, a lower failure value is obtained when the face is struck. Adjust the backstop so that the *spherical surface* of the tup, D, just touches the surface of the specimen when the tup is hanging free (vertically). Tighten the two wing nuts at the base of the backstop.

NOTE 4—In this portion of the test, the cylindrical tube replaces the angle clamp, E, shown in position on the backstop, C, in Fig. 1.

5.2 Adjust the positioning arms, F, held in retracted position by means of their cotter keys so that the forward edges of the sleeve and of the clamp coincide. Adjust the clamps on the vertical posts to grip the specimen at the same height that the pendulum will strike it; that is, halfway up. Adjust the arms so that the rubber-covered surface at right angles to its rod will contact the rim of the sample; remove the cotter keys to permit the positioning arms to hold the specimen against the cylindrical tube. Adjust the pendulum support bar, B, and lock it in position by means of the handwheels, A, so that the tup strikes the center of the specimen.



A—Handwheels.
B—Pendulum support bar.
C—Backstop.
D—Tup.

E—Angle clamp.
F—Positioning arm.
G—Triangular castings for specimen supports.

FIG. 1 Impact Test Apparatus

5.3 With the preliminary adjustments completed, subject the specimen to a schedule of impacts starting at 0.02 ft·lbf (0.027 J) and increasing in increments of 0.01 ft·lbf (0.014 J) until initial fracture, and in increments of 0.02 ft·lbf thereafter to failure.

NOTE 5—The tests may be performed rapidly by grasping the portion of the releasing device that lies below the dial segment from beneath with the tip of the middle finger of the right hand and moving it back to the correct notch for the next blow immediately after the tup has been released. Catch the pendulum on the rebound with the left hand, reset the tip of the tup