



Designation: C 346 – 87 (Reapproved 1998)^{ε1}

Standard Test Method for 45-deg Specular Gloss of Ceramic Materials¹

This standard is issued under the fixed designation C 346; 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.

^{ε1} NOTE—Section 2 was editorially changed in November 1998.

1. Scope

1.1 This test method covers the determination of the specular gloss of porcelain enameled specimens, but may be applicable to other specimens having similar reflection characteristics. This test method may be used to compare the gloss of porcelain enameled specimens or to provide an index of acid or abrasion resistance by measurement of gloss loss.

NOTE 1—Specular gloss is one of several related appearance attributes that produce the sensation of glossiness. For this reason, specular gloss measurements may not always correlate well with visual rankings of glossiness.

NOTE 2—Improved correlations with visual judgments can sometimes be achieved by the use of instruments with different geometries than those specified herein. Refer to Test Method D 523 for 20, 60, and 85-deg geometries. Values generally cannot be predicated for one geometry from measurements made with another.

1.2 *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:

D 523 Test Method for Specular Gloss²

E 1347 Test Method for Color and Color-Difference Measurement by Tristimulus (Filter) Colorimetry²

3. Terminology

3.1 Definitions:

3.1.1 *specular gloss*—the ratio of reflected to incident light, times 1000, for specified apertures of illumination and reception when the axis of reception coincides with the mirror image of the axis of illumination.

NOTE 3—In this operational definition, the quantity defined as specular gloss is composed of surface-reflected and body-reflected components. For some low-gloss measurements, an approximate evaluation of the surface-reflected component of specular gloss may be required (see Section 9).

3.1.2 *45-deg specular gloss*—the fraction of visible light incident upon the specimens at 45° to the normal that is reflected in the direction of mirror reflection.

NOTE 4—Under ideal conditions, the incident beam should consist of parallel light, and only light reflected in the true direction of mirror reflection should be accepted for measurement.

3.1.3 *source aperture*—the angular size (solid angle) of the light source (lamp filament, if an incandescent source is used) measured from the center of the incident beam lens.

3.1.4 *receptor aperture*—the angular size (solid angle) of the receptor window, measured from the center of the receptor lens.

4. Significance and Use

4.1 This test method may be used to compare the gloss of porcelain enamel, ceramic, and other finishes or to provide a comparison of their resistance to attack from acid, alkali, or other environmental factors by measurement of gloss loss.

5. Apparatus

5.1 *Instrumental Components*—The apparatus³ shall consist of an incandescent light source and lens furnishing an incident beam of rays of required aperture, means for locating the surface of the specimen, and a receptor located to receive the required pyramid of rays reflected from the specimen. The receptor shall be a photosensitive device having maximum response near the middle of the visible region of the spectrum.

5.2 *Geometric Conditions*—The axis of the incident beam shall be 45° from the perpendicular to the specimen surface. The axis of the receptor beam shall be coincident with the mirror image of the axis of the incident beam. A flat piece of polished black glass in the specimen position shall form an

¹ This test method is under the jurisdiction of ASTM Committee B-8 on Metallic and Inorganic Coatings and is the direct responsibility of Subcommittee B08.12 on Materials for Porcelain Enamel and Ceramic-Metal Systems, and is based on the "Gloss Test for Porcelain Enamels," *Bulletin T-18*, of the Porcelain Enamel Institute, 1111 N. 19th St., Suite 200, Arlington, VA 22209.

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² *Annual Book of ASTM Standards*, Vol 06.01.

³ Suitable instruments are available from: Hunter Associates Laboratory, Inc., 11495 Sunset Hills Rd., Reston, VA 22090, and Pacific Scientific Co., Gardner/Neotec, Instr. Div., 2431 Linden Lane, Silver Springs, MD 20910.