



Standard Guide for Selection of Geometric Conditions for Measurement of Reflection and Transmission Properties of Materials¹

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INTRODUCTION

This is a guide describing the selecting of geometric conditions of measurement of appearance attributes such as color, gloss, reflectance, opacity, and transmittance. It includes a selection of numerical scales for appearance attributes other than color.

In describing appearance, wavelength (or spectral) variability is primarily responsible for color, while geometric (or directional) selectivity is primarily responsible for gloss, luster, translucency, and like attributes. However, geometric conditions not only affect geometric variables such as gloss and transparency, but also affect color, diffuse reflectance, and transmittance. Likewise spectral conditions can affect the measurement of geometric attributes of appearance. Therefore both the spectral and geometric conditions of measurement must be identified in specifying an appearance attribute of a specimen.

This guide describes the selection of geometric conditions and as a consequence should help improve agreement in these measurements as well as providing useful guidance in resolving differences between spectral-type measurements that are related to geometry.

1. Scope

1.1 This guide is intended for use in selecting terminology, measurement scales, and instrumentation for describing or evaluating such appearance characteristics as glossiness, opacity, lightness, transparency, and haziness in terms of reflected or transmitted light. This guide does not consider the spectral variations responsible for color, but the geometric variables described herein can importantly affect instrumentally measured values of color. This guide is general in scope rather than specific as to instrument or material.

2. Referenced Documents

2.1 *ASTM Standards*:²

C346 Test Method for 45-deg Specular Gloss of Ceramic Materials

C347 Test Method for Reflectivity and Coefficient of Scatter

of White Porcelain Enamels (Withdrawn 1990)³

C523 Test Method for Light Reflectance of Acoustical Materials by the Integrating Sphere Reflectometer (Withdrawn 1988)³

C584 Test Method for Specular Gloss of Glazed Ceramic Whitewares and Related Products

D523 Test Method for Specular Gloss

D1003 Test Method for Haze and Luminous Transmittance of Transparent Plastics

D1455 Test Method for 60° Specular Gloss of Emulsion Floor Polish

D1494 Test Method for Diffuse Light Transmission Factor of Reinforced Plastics Panels

D1746 Test Method for Transparency of Plastic Sheet

D1834 Test Method for 20° Specular Gloss of Waxed Paper (Withdrawn 2004)³

D4039 Test Method for Reflection Haze of High-Gloss Surfaces

D4061 Test Method for Retroreflectance of Horizontal Coatings

E97 Method of Test for Directional Reflectance Factor, 45-Deg 0-Deg, of Opaque Specimens by Broad-Band Filter Reflectometry (Withdrawn 1991)³

¹ This guide is under the jurisdiction of ASTM Committee E12 on Color and Appearance and is the direct responsibility of Subcommittee E12.03 on Geometry.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.