



Designation: E2194 – 14 (Reapproved 2017)

Standard Test Method for Multiangle Color Measurement of Metal Flake Pigmented Materials¹

This standard is issued under the fixed designation E2194; 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.

INTRODUCTION

Surfaces that exhibit different colors depending on the angles of illumination or sensing are said to be “gonioapparent.” Colorimetric values of reflecting gonioapparent materials are derived from spectrometric (narrow band) or colorimetric (broad band) measurements of reflectance factor, at various aspecular angles. When using spectral values, tristimulus values are computed using the CIE Standard Observer and the spectrum of the illuminant, as described in Practice E308. This test method, E2194, specifies the measurement of color observed at various aspecular angles.

1. Scope

1.1 This test method covers the instrumental requirements, standardization procedures, material standards, and parameters needed to make precise instrumental measurements of the colors of gonioapparent materials. This test method is designed to encompass gonioapparent materials; such as, automotive coatings, paints, plastics, and inks.

1.2 This test method addresses measurement of materials containing metal flake and pigments. The measurement of materials containing metal flakes requires three angles of measurement to characterize the colors of the specimen. The optical characteristics of materials containing pearlescent and interference materials are not covered by this test method.

NOTE 1—Data taken by utilizing this test method are for gonioappearance quality control purposes. This procedure may not necessarily supply appropriate data for spatial-appearance or pigment identification.

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

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.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standard-*

ization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 ASTM Standards:²

E284 Terminology of Appearance

E308 Practice for Computing the Colors of Objects by Using the CIE System

E805 Practice for Identification of Instrumental Methods of Color or Color-Difference Measurement of Materials

E1345 Practice for Reducing the Effect of Variability of Color Measurement by Use of Multiple Measurements

E1708 Practice for Electronic Interchange of Color and Appearance Data

E2539 Test Method for Multiangle Color Measurement of Interference Pigments

2.2 CIE Document:³

Publication No. 15 Colorimetry

2.3 NIST (NBS) Publication:⁴

LC-1017 Standards for Checking the Calibration of Spectrophotometers

¹ This test method is under the jurisdiction of ASTM Committee E12 on Color and Appearance and is the direct responsibility of Subcommittee E12.12 on Gonioapparent Color.

Current edition approved June 1, 2017. Published July 2017. Originally approved in 2003. Last previous edition approved in 2014 as E2194 – 14. DOI: 10.1520/E2194-14R17.

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 Available from CIE (International Commission on Illumination) at www.cie.co.at or www.techstreet.com.

⁴ Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899-1070, <http://www.nist.gov>.