



Designation: E2539 – 14 (Reapproved 2017)

Standard Test Method for Multiangle Color Measurement of Interference Pigments¹

This standard is issued under the fixed designation E2539; 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

Objects that exhibit a change in color with different angles of illumination and view are said to be “gonioapparent.” The tristimulus colorimetric values of gonioapparent objects are derived using the spectral reflectance factors obtained from spectrometric measurements or colorimetric measurements at various angles of illumination and detection. The tristimulus colorimetric values are computed using the spectral reflectance factors of the object, the CIE Standard Observer, and the spectral power distribution of the illuminant, as described in Practice E308. This Test Method, E2539, specifies the color measurement of interference pigments at various illumination and detection angles.

1. Scope

1.1 This test method covers the instrumental requirements and required parameters needed to make instrumental color measurements of thin film interference pigments. This test method is designed to encompass interference pigments used in architectural applications, automobiles, coatings, cosmetics, inks, packaging, paints, plastics, printing, security, and other applications.

1.2 Characterization of the optical behavior of materials colored with interference pigments requires measurement at multiple angles of illumination and detection.

1.3 Data taken utilizing this test method are quantitative and are appropriate for quality control of interference pigment color.

1.4 The measurement results are usually expressed as reflectance factors, tristimulus color values, or as CIE $L^*a^*b^*$ color coordinates and color difference.

1.5 The totality of data taken may not be necessary for evaluating mixtures also containing non-interference pigments. The committee is investigating and evaluating the appropriateness of this test method for those materials. It is the responsibility of the users to determine the applicability of this test method for their specific applications.

1.6 Interference pigments are typically evaluated for color and color appearance in a medium, such as paint or ink. The gonioapparent effect depends strongly on the physical and chemical properties of the medium. Some of the properties affecting color and color appearance include vehicle viscosity, thickness, transparency, and volume solids. As a general rule, for quality control purposes, interference pigments are best evaluated in a masstone product form. In some cases this product form may be the final product form, or more typically a qualified simulation of the intended product form (such as a paint drawdown) that in terms of color and appearance correlates to final product application.

1.7 This standard does not address the requirements for characterizing materials containing metal flake pigments. Measurements of the optical characteristics of materials containing metal flake pigments are described in Test Method E2194.

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

1.9 *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.*

1.10 *This international standard was developed in accordance with internationally recognized principles on standardization 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.*

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.

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