



Designation: E1164 – 12 (Reapproved 2017)<sup>ε1</sup>

## Standard Practice for Obtaining Spectrometric Data for Object-Color Evaluation<sup>1</sup>

This standard is issued under the fixed designation E1164; 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.

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<sup>ε1</sup> NOTE—Editorial corrections were made throughout in May 2017.

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### INTRODUCTION

The fundamental procedure for evaluating the color of a reflecting or transmitting object is to obtain spectrometric data for specified illuminating and viewing conditions, and from these data to compute tristimulus values based on a CIE (International Commission on Illumination) standard observer and a CIE standard illuminant. The considerations involved and the procedures used to obtain precise spectrometric data are contained in this practice. The values and procedures for computing CIE tristimulus values from spectrometric data are contained in Practice E308. Considerations regarding the selection of appropriate illuminating and viewing geometries are contained in Guide E179.

### 1. Scope

1.1 This practice covers the instrumental measurement requirements, calibration procedures, and material standards needed to obtain precise spectral data for computing the colors of objects.

1.2 This practice lists the parameters that must be specified when spectrometric measurements are required in specific methods, practices, or specifications.

1.3 Most sections of this practice apply to both spectrometers, which can produce spectral data as output, and spectrophotometers, which are similar in principle but can produce only colorimetric data as output. Exceptions to this applicability are noted.

1.4 This practice is limited in scope to spectrometers and spectrometric colorimeters that employ only a single monochromator. This practice is general as to the materials to be characterized for color.

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.6 *This standard does not purport to address 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.*

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<sup>1</sup> This practice is under the jurisdiction of ASTM Committee E12 on Color and Appearance and is the direct responsibility of Subcommittee E12.02 on Spectrophotometry and Colorimetry.

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1.7 *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.*

### 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

D1003 Test Method for Haze and Luminous Transmittance of Transparent Plastics

E179 Guide for Selection of Geometric Conditions for Measurement of Reflection and Transmission Properties of Materials

E259 Practice for Preparation of Pressed Powder White Reflectance Factor Transfer Standards for Hemispherical and Bi-Directional Geometries

E275 Practice for Describing and Measuring Performance of Ultraviolet and Visible Spectrophotometers

E284 Terminology of Appearance

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

E387 Test Method for Estimating Stray Radiant Power Ratio of Dispersive Spectrophotometers by the Opaque Filter Method

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

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.