Designation: D4086 – 18 (Reapproved 2023)

Standard Practice for Visual Evaluation of Metamerism[1]

This standard is issued under the fixed designation D4086; 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

Because perceived color involves the spectral characteristics of source, object, and eye, different combinations of spectral characteristics can evoke the same color sensation. For this reason, metamerism has been described as "invisible spectral differences."

A pair of specimens is said to be metameric when the specimens match under one set of illuminating and viewing conditions and do not match under another set. For this condition to exist, there must be differences in spectral character of specimens and sources or specimens and observers. There may be more than one condition under which the specimens match, as well as more than one for which they are a mismatch. Similarly, two specimens may be a near-match under one set of conditions, and under another set the direction and magnitude of the color difference may change.

1. Scope

1.1 This practice describes visual methods for detecting metamerism and for estimating the magnitude of a metameric color difference.

1.2 The practice is limited to the consideration of illuminant metamerism and observer metamerism. This practice does not cover gonioapparent samples.

1.3 This practice does not provide for the computation of indices of metamerism based upon instrumental measurement of spectral characteristics.

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, health, and environmental 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 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:*[2]

D2616 Test Method for Evaluation of Visual Color Difference With a Gray Scale

E284 Terminology of Appearance

3. Terminology

3.1 Definitions of appearance terms used in this practice may be found in Terminology E284.

3.2 *Definitions:*

3.2.1 *metamerism, n*—property of two specimens that match under a specified illuminator and to a specified observer and whose spectral reflectances or transmittances differ in the visible wavelengths.

3.2.1.1 *Discussion*—As a consequence of the required difference, the two specimens may not match under a different illuminator or to a different observer. Similar considerations apply to two lights matching to a specified observer but not to other observers. **(E284)**

3.2.2 *paramerism, n*—phenomenon in which specimens having different spectrophotometric curves produce approximately the same color sensation under the same illuminating and viewing conditions. **(E284)**

[1] This practice is under the jurisdiction of ASTM Committee E12 on Color and Appearance and is the direct responsibility of Subcommittee E12.11 on Visual Methods.

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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.