



Designation: D 2616 – 96

Standard Test Method for Evaluation of Visual Color Difference With a Gray Scale¹

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INTRODUCTION

This test method was developed to provide a precise procedure for visually evaluating color difference of non-self luminous specimens. It was patterned after a method standardized by the American Association of Textile Chemists and Colorists (AATCC)² designed to evaluate “change in color” and this antecedent was reflected in the original title.

This test method provides for evaluation of small to moderate color differences (less than 15 CIELAB (International Commission on Illumination) color difference units) by comparing test specimens to a series of paired gray color chips having progressively larger lightness differences. Color difference is rated according to which of nine gray pairs of differences is visually closest to the test pair, or by interpolation between gray-pair differences.

The gray-scale pairs are specified in terms of decimal differences in CIELAB color space. This change together with two continuous, decimal numerical scale equations modeling the original scale comprise the major differences between the previous edition and this revision. The changes were made to provide an ASTM test method that parallels closely the AATCC method.

1. Scope

1.1 This test method describes a painted gray scale and the procedure to be used in the visual evaluation of color differences of non-self luminous materials by comparison to this scale.

1.2 *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.*

2. Referenced Documents

2.1 ASTM Standards:

E 284 Terminology of Appearance³

D 1729 Practice for Visual Evaluation of Color Differences of Opaque Materials³

E 1499 Guide to Selection, Evaluation and Training of Observers³

¹ This test method is under the jurisdiction of ASTM Committee E-12 on Appearance and is the direct responsibility of Subcommittee E12.11 on Visual Methods.

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² *Technical Manual of the American Association of Textile Chemists and Colorists*, P.O. Box 12215, Research Triangle Park, NC 27709, Vol 68, 1993, pp. 348–349.

³ *Annual Book of ASTM Standards*, Vol 06.01.

2.2 AATCC Procedures:

AATCC Evaluation Procedure 1, Gray Scale for Color Change²

3. Terminology

3.1 Definitions:

3.1.1 Definitions of appearance terms in Terminology E 284 are applicable to this test method.

4. Summary of Test Method

4.1 The gray scale consists of nine pairs of neutral gray color standards of which Reference Pair 5 is two examples of the same gray. One element common to each pair is the gray of Reference Pair 5; the other element, being progressively lighter, provides a succession of lightness differences. Total color differences between non-self luminous specimens are expressed as either fractional, linear scale value between 1 and 5 or as equivalent CIELAB color differences (ΔE^*_{ab}) by comparison with the paired differences of the gray scale, which are predominantly lightness differences.

NOTE 1—The gray specimen common to each pair is specified to have CIE 1976 metric lightness, $L^* = 41.2(+0.6, -0.0)$.

5. Significance and Use

5.1 The total perceived color difference between two non-self luminous specimens is compared as an equivalent lightness difference between two neutral gray specimens on a gray scale.