



Standard Test Method for Objective Measurement of Gingival Color Using Digital Still Cameras¹

This standard is issued under the fixed designation E2545; 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

The color of gingiva is an important parameter used to ascertain certain medical and esthetic information. RGB color values for gingiva are derived from the native signals generated by a digital still camera, DSC, by broadband measurement of the reflectance of gingiva. This Test Method, E2545, specifies the procedure used for the color measurement of gingival color at 45° relative to the sample plane containing the gingiva under a nearly equal energy illuminating at 45° and viewing at 0°. This method is appropriate for evaluating the color of facial gingiva.

1. Scope

1.1 This test method covers the procedure, instrumental requirements, standardization procedures, material standards, measurement procedures, and parameters necessary to make precise measurements of gingival color. In particular it is meant to measure the color of gingiva in human subjects.

1.2 Digital images are used to evaluate gingival color on the facial labial or buccal surfaces of the gingiva. The marginal gingival tissue adjacent to natural teeth may be of particular interest for analysis. All other non-relevant parts; such as teeth, tongue, spaces, dental restorations or prostheses, etc., must be separated from the measurement and the analysis. All localized discoloration; such as stains, inclusions, pigmentations, etc., may be separated from the measurement and the analysis.

1.2.1 The broadband reflectance factors of gingiva and the surrounding tissue are measured. The colorimetric measurement is performed using an illuminator(s) that provides controlled illumination on the gingiva using a digital still camera to capture the digital image.

1.3 Data acquired using this test method may be used to assess personal gingival color for the purposes of identifying overall health status, health status at specific sites in the mouth, or to track changes in personal health status for individuals over time. Pooled data may be used to assess gingival color, health and disease among populations in epidemiological

surveys, evaluation of comparative product efficacy, or safety and treatment response in clinical trials involving gingival health or disease.

1.4 The apparatus, measurement procedure, and data analysis technique are generic, so that a specific apparatus, measurement procedure, or data analysis technique may not be excluded.

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

1.6 *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:²

- E179 Guide for Selection of Geometric Conditions for Measurement of Reflection and Transmission Properties of Materials
- E284 Terminology of Appearance
- E308 Practice for Computing the Colors of Objects by Using the CIE System
- E1345 Practice for Reducing the Effect of Variability of Color Measurement by Use of Multiple Measurements
- E1767 Practice for Specifying the Geometries of Observation and Measurement to Characterize the Appearance of Materials

¹ This test method is under the jurisdiction of ASTM Committee E12 on Color and Appearance and is the direct responsibility of Subcommittee E12.06 on Image Based Color Measurement.

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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.