



Revised American National Standard/
American Dental Association
Standard No. 161

Guidance on Color Measurement in Dentistry

Identical adoption of ISO/TR 28642:2016, *Dentistry — Guidance on colour measurement*

ADA American
Dental
Association®

Standards Committee on Dental Products

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REVISED AMERICAN NATIONAL STANDARD/AMERICAN DENTAL ASSOCIATION STANDARD NO. 161 FOR GUIDANCE ON COLOR MEASUREMENT IN DENTISTRY

The ADA Standards Committee on Dental Products (SCDP) has approved ANSI/ADA Standard No. 161 for Guidance on Color Measurement in Dentistry. This and other standards for dental materials, instruments and equipment are being formulated by working groups of the ADA SCDP. The Committee has representation from all interests in the United States in the standardization of materials, instruments and equipment in dentistry. The Committee has adopted the standards, showing professional recognition of their usefulness in dentistry, and has forwarded them to the American National Standards Institute with a recommendation that the standards be approved as American National Standards. The American National Standards Institute granted approval of ADA Standard No. 161 as an American National Standard on May 18, 2018.

The ADA Standards Committee on Dental Products thanks the members of ADA SCDP Working Group No. 2.14 on Color Stability and the organizations with which they were affiliated at the time the standard was developed:

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FOREWORD

(This Foreword does not form a part of revised ANSI/ADA Standard No. 161 for Guidance on Color Measurement in Dentistry).

This standard is an identical adoption of ISO/TR 28642:2016, Dentistry – Guidance on colour measurement. ADA SCDP Working Group No. 2.14 on Color Stability examined the international technical report and found it acceptable for identical adoption as ANSI/ADA Standard No. 161.

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Introduction

The color appearance of teeth and other dentistry related tissues need to be matched and reproduced in order to achieve acceptable aesthetics in an efficient manner. Three major groups of issues, related to color compatibility, color stability and color interactions, are identified and considered in this standard. Interpretation of color differences associated with these three groups through 50:50% perceptibility and acceptability visual thresholds is suggested. Color is a psychophysical phenomenon that is assessed by both visual and instrumental methods. Other elements of appearance, including gloss and translucency, affect aesthetics and may influence the characterization of color appearance.

The International Commission on Illumination (CIE) color difference formulas and resources, in particular CIE Pub No 15.3, were used in this standard.

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1 Scope

This standard identifies three types of topics related to shade conformity and interconvertibility of monochromatic and polychromatic tissues and materials related to the discipline of dentistry; it describes visual and instrumental methods for assessment of these topics.

This standard suggests interpretation of the findings through color difference thresholds and provides guidelines for future standardization related to dental shade conformity and interconvertibility. It also includes guidelines related to color vision of persons undertaking visual color assessments and instructions for reporting of color and color difference assessments.

2 Normative references

The following standards are referred to in the text in such a way that some or all of their content constitutes requirements of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced standard (including any amendments) applies.

ISO 1942, *Dentistry — Vocabulary*

ISO 11664-1, *Colorimetry — Part 1: CIE standard colorimetric observers*

(ISO standard for dentistry are available from the American National Standards Institute, <http://www.ansi.org>)

3 Terms and definitions

For the purposes of this standard, the terms and definitions given in ISO 1942 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

color difference

single number or metric expressing the distance from complete match in color or shade

Note 1 to entry: A color distance metric defined by the International Commission on Illumination (CIE) is called delta E (ΔE).

Note 2 to entry: Two formulae for calculating ΔE are recommended in this standard: CIE 76 (denoted ΔE^*_{ab}) and CIEDE2000 (denoted ΔE_{00}).

3.2

50:50 % perceptibility threshold of color difference