



Designation: E 1541 – 98

AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Practice for Specifying and Matching Color Using the Colorcurve System¹

This standard is issued under the fixed designation E 1541; 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 COLORCURVE® System² provides a systematic array of color samples whose arrangement has a simple relationship to the international CIE 1964 system, described in Test Method E 308 and used widely in industry to specify color and color differences from instrumental measurements. The system is based on four main elements: (1) aim points displayed on CIE (CIELAB) a^* , b^* planes at constant L^* ; (2) atlases containing physical representations of those aim points; (3) tables of spectral and colorimetric data for those aim points; and (4) computational methods and computer software that furnish Colorcurve notations and reflectances when CIE data are entered, or tristimulus values and reflectance data when Colorcurve notations are entered. The tristimulus data can be used in color formulation software to formulate specimens with minimum metamerism to the atlas samples.

The Master Atlas consists of 1231 atlas samples approximating the computed aim points and the corresponding data tables. A separate Gray and Pastel Atlas contains 956 additional samples, for a total of 2187 unique samples.

1. Scope

1.1 This practice provides a means for specifying the colors of objects in terms of the Colorcurve system. Both computational and visual methods are included. This practice is applicable to inked, painted, dyed, or mass-colored surfaces viewed by an observer with normal color vision.

1.2 This practice includes a method for producing a color specimen to match a Colorcurve sample.

1.3 This practice does not cover the preparation of specimens. If specimen preparation is required in conjunction with this practice, a mutually agreed upon procedure shall be established.

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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 1729 Practice for Visual Appraisal of Color and Color

Differences of Diffusely-Illuminated Opaque Materials³
E 284 Terminology of Appearance³

E 308 Practice for Computing the Colors of Objects by Using the CIE System³

E 1164 Practice for Obtaining Spectrophotometric Data for Object-Color Evaluation³

3. Terminology

3.1 Definitions of appearance terms in Terminology E 284 are applicable to this practice.

3.2 Definitions:

3.2.1 *chromaticness, n* —the attribute of visual sensation combining the hue and saturation.

3.2.2 *hue, n* —the attribute of color perception by means of which an object is judged to be red, yellow, green, blue, purple, or intermediate between some adjacent pair of these, considered in a closed ring (red and purple being an adjacent pair).

3.3 Definitions of Terms Specific to This Standard:

3.3.1 *Colorcurve atlas, n* —physical exemplification of the Colorcurve system, consisting of a three-dimensional array of 2187 samples displayed on CIELAB cartesian coordinates in two atlases.

3.3.2 *Colorcurve system, n* —a color order system based on the CIE 1964 space, which uses the CIELAB L^* lightness scale ($L^* = L$) and in which chromaticity is represented by opponent-color scales R/G (reds-greens) and Y/B (yellows-blues).

¹ This practice is under the jurisdiction of ASTM Committee E-12 on Color and Appearance and is the direct responsibility of Subcommittee E12.07 on Color Order Systems US Tag ISO TC 187.

Current edition approved Dec. 10, 1998. Published March 1999. Originally published as E 1541 – 93. Last previous edition E 1541 – 94.

² Colorcurve® is a registered U.S. trademark used by ASTM under the authorization of Colorcurve Systems, Inc. Aspects of Colorcurve technology are covered by U.S. Patent 5 012 482.

³ Annual Book of ASTM Standards, Vol 06.01.