



Standard Practice for Specifying Color by Using the Optical Society of America Uniform Color Scales System¹

This standard is issued under the fixed designation E1360; 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 Optical Society of America Uniform Color Scales (OSA-UCS) were developed by a committee of the Optical Society of America in the years between 1947 and 1974 in an effort to provide a system and a set of samples that represent the closest possible approximation to equal visual spacing (**1**).² The system is defined by a set of equations derived from the results of visual scaling experiments and related to the 1964 CIE system. The OSA sample set consisted of 558 atlas samples that fell at the lattice points of a rhombohedral close-packed arrangement within the color space defined by the equations. The unit in this spacing is a cuboctahedron, each color being surrounded by twelve equidistant nearest neighbors. See Fig. 1 and Fig. 2. Fig. 3 shows a OSA-UCS lightness plane plotted on the CIE 1964 chromaticity diagram. The OSA-UCS system is described in Appendix X1.

The system is independent of the OSA-UCS atlas samples, and other groups of samples could be chosen within the defined color space; however, for the visual determination of colors described in this standard, the OSA set of samples is used.

1. Scope

1.1 This practice provides a means for specifying the colors of objects in terms of the Optical Society of America Uniform Color Scales. Both computational and visual methods are included. The practice is limited to opaque objects, such as painted surfaces, viewed in daylight by an observer having normal color vision.

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

2. Referenced Documents

2.1 *ASTM Standards*:³

D1535 Practice for Specifying Color by the Munsell System

D1729 Practice for Visual Appraisal of Colors and Color Differences of Diffusely-Illuminated Opaque Materials
E284 Terminology of Appearance
E308 Practice for Computing the Colors of Objects by Using the CIE System
E1164 Practice for Obtaining Spectrometric Data for Object-Color Evaluation

3. Terminology

3.1 *Definitions of Terms Specific to This Standard*:

3.1.1 *chromaticness, n*—an attribute of a visual sensation combining hue and chroma; the visual correlate of the colorimetric quantity chromaticity.

3.1.2 *hue, n*—the attribute of color perception by means of which an object is judged to be red, yellow, green, blue, or intermediate between some adjacent pair of these. In the OSA-UCS system each hue is denoted by its angle within a 360° circle beginning in the yellow direction on the right hand side of the hue circle and proceeding counterclockwise through the greens, blues, and reds to return to the yellow hue, 360, on the + *j* axis.

3.1.3 *OSA-UCS color system, n*—Optical Society of America Uniform Color Scales color order system based on equality of visual spacing, which uses the lightness scale $\pm L$ and the opponent-color scales $\pm j$ (yellowness-blueness) and $\pm g$ (greenness-redness). A color in the OSA-UCS system may be

¹ This practice is under the jurisdiction of ASTM Committee E12 on Color and Appearance and is the direct responsibility of Subcommittee E12.07 on Color Order Systems.

Current edition approved May 1, 2015. Published May 2015. Originally approved in 1990. Last previous edition approved in 2010 as E1360 – 05 (2010). DOI: 10.1520/E1360-05R15.

² The boldface numbers in parentheses refer to a list of references at the end of this practice.

³ 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.