



Standard Practice for Obtaining Colorimetric Data from a Visual Display Unit Using Tristimulus Colorimeters¹

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INTRODUCTION

This practice provides directions for correcting the results obtained with tristimulus colorimeters when measuring the tristimulus values or chromaticity coordinates of colored displays. Tristimulus colorimeters approximate the CIE color matching functions $\bar{x}(\lambda)$, $\bar{y}(\lambda)$, $\bar{z}(\lambda)$ to make these measurements. The errors generated in measuring colors on a display may be minimized using this practice.

1. Scope

1.1 This practice is intended as an aid for improving the accuracy of colorimetric measurements made with tristimulus colorimeters on visual display units, such as cathode ray tubes (CRTs) and self-luminous flat-panel displays. It explains a useful step in the analysis of colorimetric data that takes advantage of the fact that light from such displays consists of an additive mixture of three primary colored lights. However, it is not a complete specification of how such measurements should be made.

1.2 This practice is limited to display devices and colorimetric instruments that meet linearity criteria as defined in the practice. It is not concerned with effects that might cause measurement bias such as temporal or geometric differences between the instrument being optimized and the instrument used for reference.

1.3 *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

E284 Terminology of Appearance

E1336 Test Method for Obtaining Colorimetric Data From a Visual Display Unit by Spectroradiometry

E1341 Practice for Obtaining Spectroradiometric Data from Radiant Sources for Colorimetry

2.2 *ISO/CIE Standard:*

ISO 11664-1:2007(E)/CIE S 014-1/E:2006 Joint Standard ISO/CIE Standard: Colorimetry Part 1 – CIE Standard Colorimetric Observers³

3. Terminology

3.1 *Definitions*—Unless otherwise stated, definitions of appearance terms in Terminology E284 are applicable to this practice.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *calibration, n*—in reference to a tristimulus colorimeter, the process performed outside of this practice to adjust the tristimulus colorimeter to provide the best possible results for average or predefined conditions.

3.2.2 *optimization, n*—in reference to a tristimulus colorimeter, the process performed pursuant to this practice to adjust the tristimulus colorimeter or to interpret its readings to provide better results when applied to a particular display device.

3.2.3 *compatible, adj*—in reference to a tristimulus colorimeter, one so designed as to automate the procedure described in this practice.

4. Summary of Practice

4.1 Tristimulus colorimeters comprised of three or four detector channels are, in general, not amenable to accurate calibration that holds for all manner of usage with different

¹ This practice is under the jurisdiction of ASTM Committee E12 on Color and Appearance and is the direct responsibility of Subcommittee E12.06 on Display, Imaging and Imaging Colorimetry.

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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.

³ Currently available from CIE (Commission International on Illumination), <http://www.techstreet.com>.