

## **Colorimetry - Part 1: CIE standard colorimetric observers (ISO 11664-1:2007)**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 11664-1:2011 sisaldab Euroopa standardi EN ISO 11664-1:2011 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 31.05.2011 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 20.04.2011.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN ISO 11664-1:2011 consists of the English text of the European standard EN ISO 11664-1:2011.

This standard is ratified with the order of Estonian Centre for Standardisation dated 31.05.2011 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

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English Version

Colorimetry - Part 1: CIE standard colorimetric observers (ISO  
11664-1:2007)

Colorimétrie - Partie 1: Observateurs CIE de référence pour  
la colorimétrie (ISO 11664-1:2007)

Farbmetrik - Teil 1: CIE farbmétrische Normalbeobachte  
(ISO 11664-1:2007)

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## Foreword

The text of ISO 11664-1:2007 has been prepared by Technical Committee CIE “International Commission on Illumination” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 11664-1:2011 by Technical Committee CEN/TC 139 “Paints and varnishes” the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2011, and conflicting national standards shall be withdrawn at the latest by October 2011.

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### Endorsement notice

The text of ISO 11664-1:2007 has been approved by CEN as a EN ISO 11664-1:2011 without any modification.

## FOREWORD

Standards produced by the Commission Internationale de l'Eclairage (CIE) are a concise documentation of data defining aspects of light and lighting, for which international harmony requires such unique definition. CIE Standards are therefore a primary source of internationally accepted and agreed data, which can be taken, essentially unaltered, into universal standard systems.

This CIE Standard replaces ISO/CIE 10527:1991 and was approved by the CIE Board of Administration and the National Committees of the CIE. This CIE Standard has been prepared by CIE Division 2 "Physical measurement of light and radiation".

This standard contains only minor changes from the previous standard, in particular the values in the tables of the colour matching functions and chromaticity coordinates of the CIE 1931 and 1964 standard colorimetric observers are identical with the previous standard, but it has now been clarified that they apply for standard air.

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# COLORIMETRY - PART 1: CIE STANDARD COLORIMETRIC OBSERVERS

## INTRODUCTION

Colours with different spectral compositions can look alike. An important function of colorimetry is to determine whether a pair of such metameric colours will look alike. The use of visual colorimeters for this purpose is handicapped by variations in the colour matches made amongst observers classified as having normal colour vision. Visual colorimetry also tends to be time-consuming. For these reasons, it has long been the practice in colorimetry to make use of sets of colour-matching functions to calculate tristimulus values for colours: equality of tristimulus values for a pair of colours indicates that the colour appearances of the two colours match, when they are viewed in the same conditions by an observer for whom the colour-matching functions apply. The use of standard sets of colour-matching functions makes the comparison of tristimulus values obtained at different times and locations possible.

## 1. SCOPE

This International Standard specifies colour-matching functions for use in colorimetry. Two sets of colour-matching functions are specified.

### a) Colour-matching functions for the CIE 1931 standard colorimetric observer

This set of colour-matching functions is representative of the colour-matching properties of observers with normal colour vision for visual field sizes of angular subtense from about 1° to about 4°, for vision at photopic levels of adaptation.

### b) Colour-matching functions for the CIE 1964 standard colorimetric observer

This set of colour-matching functions is representative of the colour-matching properties of observers with normal colour vision for visual field sizes of angular subtense greater than about 4°, for vision at sufficiently high photopic levels and with spectral power distributions such that no participation of the rod receptors of the retina is to be expected.

## 2. NORMATIVE REFERENCES

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CIE 15:2004. *Colorimetry*, 3<sup>d</sup> edition.

CIE 17.4-1987. *International lighting vocabulary* (ILV) - Joint publication IEC/CIE.

## 3. DEFINITIONS

For the purposes of this International Standard, the following definitions apply. These definitions are taken from CIE 17.4-1987, where other relevant terms will also be found.

### 3.1 colour stimulus function, $\phi_\lambda(\lambda)$ (see ILV 845-03-03)

description of a colour stimulus by the spectral concentration of a radiometric quantity (such as radiance or radiant power) as a function of wavelength

### 3.2 relative colour stimulus function, $\phi(\lambda)$ (see ILV 845-03-04)

relative spectral power distribution of the colour stimulus function