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Colorimetry —

Part 4: CIE 1976 L*a*b* colour space

Colorimétrie —

*Partie 4: Espace chromatique L*a*b* CIE 1976*



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Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Symbols and abbreviated terms	2
5 Calculation method	2
5.1 Basic coordinates	2
5.2 Correlates of lightness, chroma and hue	4
5.3 Colour differences	4
Annex A (informative) Reverse transformation	7
Bibliography	8

Foreword

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This document was prepared by the International Commission on Illumination (CIE) in cooperation with Technical Committee ISO/TC 274, *Light and lighting*.

This first edition of ISO/CIE 11664-4 cancels and replaces ISO 11664-4:2008 | CIE 11664-4:2007, of which it constitutes a minor revision. The document has been editorially revised as per current ISO rules and the references have been updated.

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Introduction

The three-dimensional colour space produced by plotting CIE tristimulus values (X, Y, Z) in rectangular coordinates is not visually uniform, nor is the (x, y, Y) space nor the two-dimensional CIE (x, y) chromaticity diagram. Equal distances in these spaces do not represent equally perceptible differences between colour stimuli. For this reason, in 1976, the CIE introduced and recommended two new spaces (known as CIELAB and CIELUV) whose coordinates are nonlinear functions of X, Y and Z . The recommendation was put forward in an attempt to unify the then very diverse practice in uniform colour spaces and associated colour-difference formulae^{[1][2]}. Both these more-nearly uniform colour spaces have become well accepted and widely used. Numerical values representing approximately the magnitude of colour differences can be described by simple Euclidean distances in the spaces or by more sophisticated formulae that improve the correlation with the perceived size of differences.

The purpose of this document is to define procedures for calculating the coordinates of the CIE 1976 $L^*a^*b^*$ (CIELAB) colour space and the Euclidean colour difference values based on these coordinates. This document does not cover more sophisticated colour-difference formulae based on CIELAB, such as the CMC formula^[3], the CIE94 formula^[4], the DIN99 formula^[5], and the CIEDE2000 formula^{[6][7]}, nor does it cover the alternative uniform colour space, CIELUV^[8].