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**Leather — Measuring the colour and  
colour difference of finished leather**

*Cuir — Mesurage de la couleur et des écarts de couleur des cuirs finis*

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CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by the Fastness Test Commission of the International Union of Leather Technologists and Chemists Societies (IUF Commission, IULTCS) in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 289, *Leather*, the secretariat of which is held by UNI, in accordance with the agreement on technical cooperation between ISO and CEN (Vienna Agreement).

IULTCS, originally formed in 1897, is a world-wide organization of professional leather societies to further the advancement of leather science and technology. IULTCS has three Commissions, which are responsible for establishing international methods for the sampling and testing of leather. ISO recognizes IULTCS as an international standardizing body for the preparation of test methods for leather.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Leather — Measuring the colour and colour difference of finished leather

## 1 Scope

This document specifies a method for the correct measurement of the colour of finished leather by instrumental means. The document describes general concepts of colour measurement adapted to leather and the calculation of differences in colour.

This document defines the following:

- a) the use of D65 as the standard light source for the leather industry;
- b) the use of D65 light source 10° as standard conditions for colour matching, for the definition of daylight simulators and as the reference light source for metamerism analysis;
- c) the use of CIEDE2000 as the colour difference formula.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 2419, *Leather — Physical and mechanical tests — Sample preparation and conditioning*

ISO 11664-3, *Colorimetry — Part 3: CIE tristimulus values*

ISO 11664-4, *Colorimetry — Part 4: CIE 1976 L\*a\*b\* Colour space*

ISO/CIE 11664-6, *Colorimetry — Part 6: CIEDE2000 Colour-difference formula*

EN 15987, *Leather — Terminology — Key definitions for the leather trade*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15987 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 3.1

#### colour measurement

numerical representation of the colour of a specimen obtained by use of a *colour measuring instrument* (3.2) in terms of tristimulus values, colour coordinates or spectral response within the visible and near UV spectra

### 3.2

#### colour measuring instrument

device which measures reflected radiations in the visible spectrum (wavelengths between 360 nm and 780 nm) covering as a minimum area wavelengths between 400 nm and 700 nm

Note 1 to entry: Instruments included in this definition are named colorimeters and spectrophotometers.

### 3.3 geometry

<colour measuring instrument> relative position illumination/observer (detector)

Note 1 to entry: Typical geometries include the following:

- d/0°;
- 0°/d;
- 0°/45°;
- 45°/0°;

with a tolerable angle of 0° to 10° on the diffuse geometries and 45° ± 2° on the 45° geometries. Different geometries may generate different results on the same specimen.

### 3.4 specularity

<colour measuring instrument> *specular reflectance* (3.6) on glossy, metallic and reflective specimens caused by illumination, with the potential to disturb colour measurement

Note 1 to entry: Specular reflectance may be included “SPINC” (for matt specimens) or excluded “SPEX” (for reflective specimens); different specularity may generate different results on the same specimen.

### 3.5 area of view

<optical aperture; colour measuring instrument> area and shape of the target covered by the instrument in a single colour measurement

### 3.6 specular reflectance

reflection without diffusion, in accordance with the laws of optical reflection

Note 1 to entry: As in a mirror.

### 3.7 standardization

<colour measuring instrument> measurement of one or more calibrated materials with a colour measuring instrument for the purpose of calculating a set of correction factors to be applied to subsequent measurements

Note 1 to entry: Calibrating materials are normally a white tile for the white standardization, and a light trap or black tile for the black standardization.

### 3.8 verification standard

<colour measurement> stable material which is used for the purpose of confirming (or verifying) the validity of an instrument standardization

Note 1 to entry: Colour measurements, which are made immediately following standardization, are compared with the original measurements of one standard, or series of standards, to verify the correct standardization.

## 4 Principle

The surface of a finished leather specimen is measured by reflectance methods in order to obtain a numerical representation of the colour of the specimen. This numerical representation may have two different scopes:

- the definition of a certain colour by absolute chromatic coordinates or by definition of a specific spectral distribution;