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Textiles — Tests for colour fastness —

Part A08:
Vocabulary used in colour measurement

Textiles — Essais de solidité des teintures —

Partie A08: Vocabulaire relatif au mesurage de la couleur

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 105 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 105-A08 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 1, *Tests for coloured textiles and colorants*.

ISO 105 was previously published in thirteen "parts", each designated by a letter (e.g. "Part A"), with publication dates between 1978 and 1985. Each part contained a series of "sections", each designated by the respective part letter and by a two-digit serial number (e.g. "Section A01"). These sections are now being republished as separate documents, themselves designated "parts" but retaining their earlier alphanumeric designations. A complete list of these parts is given in ISO 105-A01.

Textiles — Tests for colour fastness —

Part A08:
Vocabulary used in colour measurement

1 Scope

This part of ISO 105 specifies the terms and definitions on colour measurements that are used throughout ISO 105. These definitions are intended to be used only within the context and scope of ISO 105.

2 Terms and definitions

2.1
chroma
attribute of colour used to indicate the degree of departure of the colour from a grey of the same lightness

NOTE C^*_{ab} is the metric chroma defined in the CIELAB equation.

2.2
CIE 1976, L^*, a^*, b^* colour space
CIELAB colour space

transform of CIE tristimulus values into an approximately uniform, three dimensional, opponent colour space

NOTE Its opponent variables are lightness-darkness (L^*), redness-greenness (a^*) and yellowness-blueness (b^*). The last two may be further transformed into those of chroma (C^*_{ab}) and hue (h_{ab}).

2.3
CIE 1976, L^*, a^*, b^* colour difference
CIELAB colour difference
ΔE^*_{ab}
Euclidean distance between the points representing a test specimen and its reference specimen in CIELAB colour space

2.4
CIE chromaticity coordinates
ratios of each of the members of a set of CIE tristimulus values to their sum

NOTE The corresponding symbols are x_{10}, y_{10} and z_{10} for X_{10}, Y_{10} and Z_{10}, and x, y and z for X, Y and Z. Since $x_{10} + y_{10} + z_{10} = 1$ and $x + y + z = 1$, x_{10} and y_{10} or x and y suffice to define chromaticity.

2.5
CIE standard observer data
relative amounts of three defined colour stimuli required, when mixed additively, by the average observer to match radiation at each wavelength of the visible spectrum under defined viewing conditions

NOTE The CIE defines the 1931 (2°) standard colorimetric observer and 1964 (10°) supplementary standard colorimetric observer.

2.6
CIE standard illuminant data
spectral power distributions of illuminants which the CIE has defined as standard

NOTE Those relevant to ISO 105 are designated A (representative of tungsten lighting), C (average daylight) and D_{65} (average daylight including the ultraviolet region). The CIE also defines the F series (F1 to F12) of recommended illuminants representative of various fluorescent discharge lamps.

2.7
CIE tristimulus values
amounts of three non-real reference colours required to give a colour match to the colour stimulus considered and defined by the CIE for the CIE 1931 (2°) and 1964 supplementary (10°) standard colorimetric observers and for particular conditions of illumination

NOTE Corresponding symbols are X, Y and Z for the 2° and X_{10}, Y_{10} and Z_{10} for the 10° observers.

2.8
colour change
change in colour of any kind, whether in lightness, chroma or hue, or any combination of them, discernible by comparing a test specimen with its corresponding reference specimen

2.9
colorimeter
tristimulus colorimeter
instrument designed to measure the colour of an object directly in terms of CIE tristimulus values

NOTE Applications of colorimeters within ISO 105 are limited.

2.10
colourant
chemical substance which is applied to a substrate for the express purpose of changing the reflectance or transmittance of visible light

2.11
ΔE
⟨colour-difference evaluation⟩ single number defining the total colour difference between a test specimen and its reference specimen

NOTE There are many equations for evaluating colour difference and the derivation of ΔE is identified by superscript and/or subscript character(s) [e.g. ΔE_{cmc} for CMC (Colour Measurement Committee) colour difference and ΔE^*_{ab} for CIELAB colour difference].

2.12
depth
that colour quality which is primarily associated with an increase in the quantity of colourant present, all other conditions (substrate, colourant(s), application method and viewing conditions) remaining the same

2.13
fluorescent whitening agent
FWA
colourant that absorbs near-ultraviolet radiation and emits primarily violet-blue radiation

NOTE This causes a yellowish material to which it has been applied to appear whiter. This term is preferred to optical brighting agent (OBA).

2.14
grey scale
series of neutrally coloured pairs of chips, one pair showing zero contrast and the other pair showing increasing contrast, used in the visual assessment of the contrast between reference and test specimen pairs (e.g. in fastness testing) for the purpose of assigning a numerical rating

NOTE There are, in common use, two types of grey scales, one for assessing change in colour (see ISO 105-A02) and another for assessing degree of staining (see ISO 105-A03).

2.15
hue
attribute of a visual sensation by which the colour of a specimen is judged to be similar to one of the perceived colours, red, yellow, green or blue, or to a combination of two of them

2.16
infrared radiation
IR radiation
radiant energy for which the wavelengths of the monochromatic components are longer than those for visible radiation and less than about 1 mm

NOTE The limits of the spectral range of infrared radiation are not well defined and may vary according to the application. Committee E-2.1.2 of the CIE distinguishes in the spectral range between 780 nm and 1 mm:

— IR-A: 780 nm to 1400 nm

— IR-B: 1,4 µm to 3,0 µm

— IR-C: 3,0 µm to 1 mm

2.17
lightness
attribute of colour perception by which a non-self-luminous body is judged to reflect more or less light

NOTE L^*_{ab} is the metric lightness defined in the CIELAB equation.

2.18
perfect reflecting diffuser
hypothetical material perfectly diffusely reflecting 100 % of visible radiation striking it

NOTE The perfect reflecting diffuser is the basis of calibration of reflectance-measuring instruments.

2.19
photochromism
qualitative designation for a reversible (or at least partially reversible) change in colour of any kind (whether a change in lightness, hue or chroma) which is immediately noticeable upon termination of light exposures when the exposed area of a specimen is compared to the unexposed area

NOTE A non-preferred synonym is phototropism.

2.20
semi-axes
lS_L, cS_C, S_H
individual dimensions of the CMC ellipsoid which are used to calculate a $\Delta E_{cmc(l:c)}$ value

NOTE The variables l and c quantify the tolerances for lightness differences and chroma differences, relative to hue differences.

2.21
spectral power distribution
SPD
distribution by wavelength of radiation emitted from a source or modelled by an illuminant over the relevant wavelength span of radiation

2.22
spectral reflectance
the fraction (0 to 1) or percentage (0 to 100) of incident radiation reflected by a given material (and neither absorbed nor transmitted by it) as a function of wavelength

2.23
spectral transmittance
the fraction (0 to 1) or percentage (0 to 100) of incident radiation passing through a given material (and neither absorbed nor reflected by it) as a function of wavelength

2.24
spectrophotometer
instrument for measuring the reflectance or transmittance of light (or other radiation) by an object at one or more wavelengths in the spectrum

2.25
standard depth scale
one of a number of sets of coloured standards, the members of each of which are of different brightness and hue but have been accepted as being of equal depth and which enable dyeing, fastness and other properties of colourants to be compared on a uniform basis

NOTE The series in most frequent use in textile applications are designated 1/25, 1/12, 1/3, 1/1 and 2/1 standard depths (where each given multiple expresses the relationship of the depth of the series to 1/1 standard depth), and the navy and black standard depth series.

2.26
tinctorial strength
effectiveness of a given mass of colourant in colouring a given mass of given material by means of a given application process

2.27
ultraviolet (UV) radiation

radiant energy for which the wavelengths of the monochromatic components are shorter than those for visible radiation and more than about 100 nm

NOTE The limits of the spectral range of ultraviolet radiation are not well defined and may vary according to the application. Committee E-2.1.2 of the CIE distinguishes in the spectral range between 100 nm and 400 nm:

— UV-A: 315 nm to 400 nm

— UV-B: 280 nm to 315 nm

— UV-C: 100 nm to 280 nm

2.28
visible radiation
any radiation capable of causing a visual sensation

NOTE 1 The limits of the spectral range of visible radiation are not well defined and may vary according to the application. The lower limit is generally taken to be between 380 nm and 400 nm and the upper limit to be between 700 nm and 780 nm.

NOTE 2 The CIE defines colour-matching functions for the 2° and 10° observers for the wavelength range of 380 nm to 780 nm.

2.29
whiteness
attribute of colour perception by which an object colour is judged to approach a preferred white

Bibliography

[1] ISO 105-A01, *Textiles — Tests for colour fastness — Part A01: General principles of testing.*

[2] ISO 105-A02, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour.*

[3] ISO 105-A03, *Textiles — Tests for colour fastness — Part A03: Grey scale for assessing staining.*