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Fourth edition
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Textiles — Tests for colour fastness —

Part A02:
Grey scale for assessing change in colour

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Textiles — Essais de solidité des teintures —
Partie A02: Échelle de gris pour l'évaluation des dégradations

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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.

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.

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International Standard ISO 105-A02 was prepared by Technical Committee ISO/TC 38, *Textiles*, Sub-Committee SC 1, *Tests for coloured textiles and colorants*.

This fourth edition cancels and replaces the third edition (ISO 105-A02:1987), of which it constitutes a minor revision.

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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.

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Textiles — Tests for colour fastness —

Part A02:
Grey scale for assessing change in colour

1 Scope

This part of ISO 105 describes the grey scale for determining changes in colour of textiles in colour fastness tests, and its use. A precise colorimetric specification of the scale is given as a permanent record against which newly prepared working standards and standards that may have changed can be compared.

2 Principle

2.1 The essential, or 5-step, scale consists of five pairs of non-glossy grey colour chips (or swatches of grey cloth), which illustrate the perceived colour differences corresponding to fastness ratings 5, 4, 3, 2 and 1. This essential scale may be augmented by the provision of similar chips or swatches illustrating the perceived colour differences corresponding to the half-step fastness ratings 4-5, 3-4, 2-3 and 1-2, such scales being termed 9-step scales. The first member of each pair is neutral grey in colour and the second member of the pair illustrating fastness rating 5 is identical with the first member. The second members of the remaining pairs are increasingly lighter in colour so that each pair illustrates increasing contrasts or perceived colour differences which are defined colorimetrically. The full colorimetric specification is given below.

2.2 The chips or swatches shall be neutral grey in colour and shall be measured with a spectrophotometer with the specular component included. The colorimetric data shall be calculated using CIE 1964 supplementary standard colorimetric system (10° observer data) for illuminant D_{65}.

2.3 The Y tristimulus value of the first member of each pair shall be 12 ± 1.

2.4 The second member of each pair shall be such that the colour difference between it and the adjacent first member is as follows:

Fastness grade	CIELAB difference	Tolerance
5	0	0,2
(4-5)	0,8	± 0,2
4	1,7	± 0,3
(3-4)	2,5	± 0,35
3	3,4	± 0,4
(2-3)	4,8	± 0,5
2	6,8	± 0,6
(1-2)	9,6	± 0,7
1	13,6	± 1,0

(Bracketed values apply only to the 9-step scale.)

2.5 Use of the scale. Place a piece of the original textile and the tested specimen of it side by side in the same plane and oriented in the same direction. Place the grey scale nearby in the same plane. The surrounding field should be neutral grey colour approximately midway between that illustrating grade 1 and that illustrating grade 2 of the grey scale for assessing change in colour (this is approximately Munsell N5). If necessary to avoid effects of the backing on the appearance of the textiles, use two or more layers of the original textile under both original and tested specimens. Illuminate the surfaces with north sky light in the Northern hemisphere, south sky light in the Southern hemisphere, or an equivalent source with an illumination of 600 lx or more. The light should be incident upon the surfaces at approximately 45°, and the direction of viewing approximately perpendicular to the plane of the surfaces. Compare the visual difference between original and tested material with the differences represented by the grey scale.

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ISO 105-A02:1993

If the 5-step scale is used, the fastness rating of the specimen is that number of the grey scale which has a perceived colour difference equal in magnitude to the perceived colour difference between the original and the treated specimens; if the latter is judged to be nearer the imaginary contrast lying midway between two adjacent pairs than it is to either, the tested specimen is given an intermediate assessment, for example 4-5 or 2-3. A rating of 5 is given only when there is no perceived difference between the tested specimen and the original material.

If the 9-step scale is used, the fastness rating of the specimen is that number of the grey scale which has a perceived colour difference nearest in magnitude to the perceived colour difference between the original piece and the tested specimen. A rating of 5 is given only when there is no perceived difference between the tested specimen and the original material.

When a number of assessments have been made, it is very useful to compare all the pairs of original and tested specimens which have been given the same numerical rating. This gives a good indication of the consistency of the assessments, since any errors become prominent. Pairs which do not appear to have the same degree of contrast as the remainder of their groups should be re-checked against the grey scale and, if necessary, the rating should be changed.

3 Describing colour changes in fastness tests

3.1 In using the grey scale, as outlined in 2.5, the character of the change in colour, whether in hue, depth, brightness or any combination of these, is not rated: the overall difference or contrast, between original and tested specimens, is the basis for the assessment.

3.2 If, as in rating dyes on textiles for example, it is desired to record the character of the change in colour of the textile in the test, appropriate qualitative terms may be added to the numerical rating, as illustrated by the examples shown in table 1.

Table 1 — Examples of descriptions of change in character

Rating	Meaning	
	Contrast corresponding to following grades of grey scale	Character of change
3	Grade 3	Loss in depth of colour only
3 redder	Grade 3	No significant loss in depth but colour redder
3 weaker yellower	Grade 3	Loss in depth and change in hue
3 weaker bluer duller	Grade 3	Loss in depth and change in both hue and brightness
4-5 redder	Intermediate between grades 4 and 5	No significant loss in depth but colour slightly redder

3.3 When changes in colour occur in two or three directions, it is considered neither feasible nor necessary to indicate the relative magnitude of each change.

3.4 When the space available for recording qualitative terms is restricted, as on pattern cards, the abbreviations shown in table 2 may be used.

Table 2 — Abbreviations of qualitative terms

Abbreviation	Meaning	French abbreviation
Bl	Bluer	B
G	Greener	V
R	Redder	R
Y	Yellower	J
W	Weaker	C
Str	Stronger	F
D	Duller	T
Br	Brighter	Pu

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ISO 105-A02:1993
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