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GB/T 6151-2016

Replacing GB/T 6151-1997

Textiles - Tests for colour fastness
- General principles of testing

纺织品 色牢度试验 试验通则

(ISO 105-A01:2010, MOD)

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Foreword

This Standard is drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard replaces GB/T 6151-1997 "Textiles - Tests for colour fastness - General principles of testing".

Compared with GB/T 6151-1997, the main changes in this Standard are as follows:

- DELETE the ISO foreword (see ISO foreword of 1997 edition);
- DELETE the number of subclauses in Clause 1 and Clause 5, to be the same as ISO;
- ADJUST "Any loose fibres from the specimen adhering to the adjacent fabrics shall be removed before assessment of staining." in the scope TO Clause 14 (see 14.1 of this Standard, 1.2 of 1997 edition);
- DELETE GB/T 11404 and ADD GB/T 8431, GB/T 14576, GB/T 16991 and CIE 51 in the "Normative references".
- MODIFY the heading of Clause 4; ADD "Introductory" and "Terms and definitions" in the headings of the principal clauses;
- ADD Clause 7 "Terms and definitions", followed by subsequent clauses;
- ADD 9.1 in Clause 9 and DELETE note 1 (see clause 8 of 1997 edition);
- DELETE the provisions for adding seam allowances in preparation of composite specimens (see 9.3.2.4 and 9.3.3.4 of 1997);
- ADD "For standard and alternative standard atmospheres for conditioning and testing, see GB/T 6529." (see 11.2);
- ADD the provision for mask in accessing color fastness (see Clause 15);
- ADD information on the test report (see Clause 16).

This Standard uses the re-drafting method to amend ISO 105-A01:2010 "Textiles - Tests for colour fastness - Part A01: General principles of testing". Main differences between this Standard and ISO 105-A01:2010 are as follows:

- DELETE the "Table of contents" and "Foreword";
- ADJUST the bibliography TO Clause 2 and the ISO standard is replaced by the corresponding national and industry standards;

Textiles - Tests for colour fastness

- General principles of testing

1 Scope

This Standard provides general information about the methods for testing colour fastness of textiles for the guidance of users. The uses and limitations of the methods are pointed out, several terms are defined, an outline of the form of the methods is given and the contents of the clauses constituting the methods are discussed. Procedures common to a number of the methods are discussed briefly.

Colour fastness means the resistance of the colour of textiles to the different agents to which these materials may be exposed during manufacture and their subsequent use. The change in colour and staining of undyed adjacent fabrics are assessed as fastness ratings. Other visible changes in the textile material under test, for example surface effects, change in gloss or shrinkage, are considered as separate properties and reported as such.

This Standard can be used not only for assessing colour fastness of textiles but also for assessing colour fastness of dyes. When the method is used for assessing colour fastness of dyes, the dye is applied to the textile in specified depths of colour by stated procedures and the textile is then tested in the usual way.

Generally, individual methods are concerned with colour fastness to a single agent, as the agents of interest in a particular case, and the order of application, will generally vary. It is recognized that experience and future developments in practice can justify procedures in which two or more agents are combined.

The conditions in the tests have been chosen to correspond closely to treatments usually employed in manufacture and to conditions of ordinary use. At the same time, they have been kept as simple and reproducible as possible. As it cannot be hoped that the tests will duplicate all the conditions under which textiles are processed or used, the fastness ratings are interpreted according to the particular needs of each user. They provide, however, a common basis for testing and reporting colour fastness.

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.

GB/T 250 Textiles - Tests for colour fastness - Grey scale for assessing change in colour (ISO 105-A02:1993, IDT)

GB/T 251 Textiles - Tests for colour fastness - Grey scale for assessing staining (ISO 105-A03:1993, IDT)

GB/T 6529 Textiles - Standard atmospheres for conditioning and testing (ISO 139:2005, MOD)

GB/T 6682 Water for analytical laboratory use - Specification and test methods (ISO 3696:1987, MOD)

GB/T 7568.7 Textiles - Tests for colour fastness - Standard adjacent fabrics - Part 7: Multifibre (ISO 105-F10:1989, MOD)

GB/T 8426 Textiles - Testing method for colour fastness - Colour fastness to light: Daylight (eqv ISO 105-B01:1994)

GB/T 8427 Textiles - Tests for color fastness - Color fastness to artificial light: Xenon arc fading lamp test (ISO 105-B02:1994, MOD)

GB/T 8429 Textiles - Tests for colour fastness - Colour fastness to weathering: Outdoor exposure (eqv ISO 105-B03:1994)

GB/T 8430 Textiles - Tests for colour fastness - Colour fastness to artificial weathering: Xenon arc fading lamp test (eqv ISO 105-B04:1994)

GB/T 8431 Textiles - Tests for colour fastness - Detection and assessment of photochromism (eqv ISO 105-B05:1993)

GB/T 14576 Textiles - Tests for colour fastness - Colour fastness to light of textiles wetted with artificial perspiration (ISO 105-B07:2009, MOD)

GB/T 16991 Textiles - Test for colour fastness - Colour fastness and ageing to artificial light at high temperatures: Xenon arc (ISO 105-B06:1998, MOD)

GB/T 32598 Textiles - Tests for colour fastness - Method for the instrumental assessment of staining of adjacent fabrics (ISO 105-A04:1989, MOD)

GB/T 32616 Textiles - Tests for colour fastness - Instrumental assessment of change in colour for determination of grey scale rating (ISO 105-A05:1996, MOD)

CIE 51 A method for assessing the quality of daylight simulators for colorimetry

Yarns to be tested may be knitted into fabric, from which a specimen is taken. They may also be wound parallel, for example on a U-shaped wire frame. For dry treatments, close winding on a card is recommended. For certain wet treatments without accompanying undyed adjacent material, hanks of yarn tied at both ends may be used.

The method of preparation used shall be specified in the test report (see Clause 16).

10.2.3 Loose fibres

Loose fibres may be tested after combing and compressing into a sheet.

10.2.4 Oiled woollen materials

For oiled woollen materials where the oil may be contaminated with a dyestuff, the samples shall be scoured so that they are clean, having an oil content of less than 0.5 % prior to fastness testing, using the following method.

Hand-scour the sample in a solution containing 5 g/L nonionic detergent using a liquor ratio of 50:1 at a temperature between 40 °C and 45 °C for 1 min. Rinse thoroughly using Grade 3 water at a temperature between 40 °C and 45 °C. If colour is still visible in the liquor at the end of the rinsing cycle, repeat the rinsing procedure until the final rinse liquor is completely clear.

10.3 Preparation of composite specimens

10.3.1 Sewing threads

It shall be free from fluorescent brightening agents.

10.3.2 Composite specimens using two single-fibre adjacents

10.3.2.1 If the specimen is a fabric, it is normally placed between the two adjacent fabrics and sewn along one short side, although for certain methods it is sewn along all four sides.

10.3.2.2 When testing unions in which one fibre predominates on one side and another fibre on the other side, the specimen shall be placed between the adjacent fabrics, so that the predominant fibre is next to the adjacent fabric of the same generic kind of fibre.

10.3.2.3 If the specimen is a printed fabric, the composite specimen is arranged in such a manner that the face is in contact with half of each of the two adjacent fabrics; depending on the design of the print, more than one composite specimen may be required.

10.3.2.4 If the specimen is yarn or loose fibre, an amount approximately equal to one-half of that of the combined mass of the adjacent fabrics is evenly spread over one

care. The precision is further indicated by the number of significant figures in the values given.

12.3 Liquor ratio means the ratio of the volume of the liquor used in the treatment, expressed in millilitres (mL), to the mass of the specimen or the composite specimen (specimen plus adjacent fabric), expressed in grams (g).

12.4 Wetting out. When wetting specimens, special care shall be taken to ensure that they are uniformly saturated. In particular, when wool or materials containing wool are wetted out, it is necessary for them to be immersed in Grade 3 water complying with GB/T 6682 and thoroughly kneaded either by hand or with a mechanical device, for example the flattened end of a glass rod.

12.5 Spotting. For tests in which the material is spotted with water or a reagent and the surface rubbed with a glass rod to ensure penetration, care shall be taken not to raise the surface of the material, otherwise there will be a change in the reflection of light and hence in appearance.

12.6 Wetting to 100 % increase in mass. When the material is to be wetted to contain its own mass of liquor, it may be saturated with the liquor and then drawn between two rubber rollers or squeezed by means of a rubber roller on a glass plate, or centrifuged. Wringing by hand does not give uniform wetting.

12.7 Temperatures are given in degrees Celsius (°C), usually with a tolerance of ± 2 °C. For reliable results, continuous temperature control is essential.

13 Fastness of dyes

13.1 As the fastness of a dye depends on the depth of colour, it is necessary to specify standard depths which are to be used by dye manufacturers. A main range of standard depths, referred to as 1/1 standard depths, is recommended in 18 hues and is to be used whenever possible.

13.2 Supplementary ranges with double the depth of colour (referred to as 2/1 standard depths), and weaker colour (referred to as 1/3, 1/6, 1/12 and 1/25 standard depths), are also recommended and are to be used whenever additional fastness data are required.

13.3 In the case of navy blues and blacks, only two standard depths are recommended, namely:

- navy blue/light (N/L), black/light (B/L);
- navy blue/dark (N/DK), black/dark (B/DK).

(see GB/T 8426, GB/T 8427, GB/T 8429, GB/T 8430, GB/T 8431, GB/T 14576 and GB/T 16991).

In some tests, changes occur in the surface appearance of the specimen (for example, pile arrangement, structure, lustre, etc.) in addition to the change in colour. In such cases, the surface of the specimen shall be restored, if possible, to its original condition by combing or brushing, etc. If this restoration is not possible, then the fact that the resultant rating gives not only the change in colour but also the overall change in appearance shall be noted in the test report.

For certain types of textile products, a simple wetting can create an apparent difference in colour compared with a fabric which has not been wetted, and this is not due to a real change in colour. This colour difference is due to a modification of the surface of the fabric or to a migration of the finish. In this case, evaluation shall be made by comparison with the original fabric which has been wetted and not with the original fabric. The original fabric, placed horizontally, is wetted superficially and evenly by spraying with distilled water, avoiding formation of drips, and is left to dry. If this procedure has been conducted, details shall be included in the test report.

In case of dispute, carry out instrumental assessment according to GB/T 32616.

14.3 Colour fastness with respect to staining

The degree of staining of the adjacent fabric, either by absorption of dye from the bath or by direct transfer of colour from the specimen, is assessed by visual inspection of the side of the adjacent fabric which was in contact with the specimen; the colour of the bath is ignored, unless otherwise specified.

For assessing staining, the five- or nine-step scale in accordance with GB/T 251 is used in a manner similar to that described for assessing change in colour in 14.2. Staining is assessed for each type of adjacent fabric in the test, staining at the stitching being ignored. If the adjacent fabric undergoes any visual change when subjected to a test in the absence of a specimen, a sample of the adjacent fabric which has been treated in this manner shall be used as the reference sample for the assessment of staining.

In case of dispute, carry out an instrumental assessment according to GB/T 32598.

14.4 Influence of pretreatments and after-treatments

It is well known that the fastness of a dyeing obtained with a given dyestuff depends on the amount of dye, the substrate and the treatments applied to the textile material before, during or after dyeing. It follows that fastness is not a property of the dye itself, but only of a given dyeing.

14.5 Simple checks on colour fastness

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