
**Textiles — Tests for colour fastness —
Part X18:
Assessment of the potential to phenolic
yellowing of materials**

Textiles — Essais de solidité des teintures —

*Partie X18: Évaluation de la sensibilité au jaunissement phénolique
des matériaux*

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ISO 105-X18:2007

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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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 105-X18 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 1, *Tests for coloured textiles and colorants*.

ISO 105-X18 is part of a series of standards which were originally published as 13 “parts”, under the general title *Textiles — Tests for colour fastness*, each part being designated by a letter (for example “Part A”), the publication dates being between 1978 and 1985. Each part included a series of “sections”, each designated by the letter corresponding to the part and by a series number with two figures (for example, “Section A01”). A complete list of these parts is given in ISO 105-A01.

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Textiles — Tests for colour fastness —

Part X18:

Assessment of the potential to phenolic yellowing of materials

1 Scope

This part of ISO 105 specifies a method intended for assessment of the potential to phenolic yellowing of textile materials.

The method is specific to phenolic yellowing and does not cover the many other possible causes of yellow discolouration found on textile materials.

NOTE Use of the method does not guarantee that the materials tested will not exhibit yellowing in some form. It is intended as a screening test which, in practice, has been found to significantly reduce the number of complaints of phenolic yellowing by enabling corrective action to be taken with materials which, after testing, exhibit yellowing.

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.

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

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

ISO 105-A04, *Textiles — Tests for colour fastness — Part A04: Method for the instrumental assessment of the degree of staining of adjacent fabrics*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

phenolic yellowing

discolouration of textile materials caused by the action of oxides of nitrogen and phenolic compounds, which lead to the production of a yellow colour

3.2

potential to phenolic yellowing

possibility or capability of phenolic yellowing

4 Principle

A test package is prepared, consisting of test papers, test specimens and one control fabric.

Each specimen and the control fabric are individually placed between a folded test paper placed between two glass plates in a horizontal formation. The stack of plates, test papers, specimens and control fabric is then wrapped firmly in BHT (butyl hydroxytoluene) free polyethylene film to create an airtight package.

The package is loaded in a test device, which is placed in an incubator/oven, for a specified time at a specific temperature.

On removal of the package from the incubator/oven and test device, it is allowed to cool. The package is opened, and the control fabric and specimens are assessed immediately by comparison with the grey scale for assessing staining.

5 Test specimens

5.1 Select the specimens to represent the sample, or as agreed between the interested parties.

5.2 If yarn or fibre is to be tested, then take a mass of the yarn or loose fibre that is sufficient to form by hand a mat of material approximately 100 mm × 30 mm.

6 Apparatus

6.1 Glass plates, each $(100 \pm 1) \text{ mm} \times (40 \pm 1) \text{ mm} \times (3 \pm 0,5) \text{ mm}$.

Clean the glass plates thoroughly between each test, using a cleaner that does not leave a residue (e.g. alcohol).

6.2 Incubator or oven, to maintain $(50 \pm 3) ^\circ\text{C}$.

6.3 Test device, consisting of a stainless-steel frame into which a weight of mass $(5 \pm 0,1) \text{ kg}$ and base of minimum $(60 \times 115) \text{ mm}$ is closely fitted.

The test device shall be constructed so that, if the weight is removed during the test, the pressure applied to the specimens remains unchanged.

7 Materials

7.1 Test papers¹⁾, $(100 \pm 2) \text{ mm} \times (75 \pm 2) \text{ mm}$, density $(88 \pm 7) \text{ g/m}^2$ at $20 ^\circ\text{C}$, of $> 98 \%$ pure cellulose treated with $< 0,1 \%$ 2,6-di-tert-butyl-4-nitrophenol to give a Grey Scale for Staining Grade 3 or worse (i.e. 2/3, 2, etc.) on the control fabric.

Use new test papers for each test.

Store the test papers in resealable aluminium foil packaging in a cool dry environment or conditioned laboratory. Use within 6 months of opening.

NOTE It is advisable to wear protective gloves when handling.

1) Test papers and control fabrics may be purchased from the following sources: James H Heal & Co Ltd, Richmond Works, Halifax, HX3 6EP, UK, or SDL-Atlas, PO Box 162, Crown Royal, Shawcross Street, Stockport, SK1 3JW, UK. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of these products.

7.2 Control fabric¹⁾, $(100 \pm 2) \text{ mm} \times (30 \pm 2) \text{ mm}$, white polyamide, that is known to yellow when subjected to the test method described within this part of ISO 105, see 7.1.

Use new control fabric for each test.

Store the control fabric in resealable aluminium foil packaging in a cool dry environment.

7.3 Butyl hydroxytoluene (BHT)-free polyethylene film, approximately $63 \mu\text{m}$ thick, measuring a minimum of $(400 \pm 5) \text{ mm} \times (200 \pm 5) \text{ mm}$.

7.4 Grey scale, for assessing staining (in accordance with ISO 105-A03).

8 Procedure

8.1 Prepare a sealed test package, consisting of seven glass plates (6.1), up to six test papers (7.1), up to five test specimens (see Clause 5) and one control fabric (7.2), as shown in Figure 1.

8.2 Place each individual specimen and the control fabric between a test paper folded in half along the 100 mm axis, making a total of six sandwiches. Place each sandwich between the glass plates so that each sandwich is separated from the other by a glass plate.

If less than five specimens are being tested, use seven glass plates in the package. Ensure that, for a reduced number of specimens, the control fabric is still tested.

8.3 Wrap the stack of plates, test papers, specimens and control fabric firmly in three layers of BHT-free polyethylene film (7.3) and seal with adhesive tape to create an airtight package.

8.4 Place the package in a test device (6.3) such that a mass of $(5 \pm 0,1) \text{ kg}$ is applied to the test specimens.

NOTE Each test device can accept 3 packages, one placed on top of the other.

8.5 Place the test device on its side inside an incubator/oven for a period of $16 \text{ h} \pm 15 \text{ min}$, at $(50 \pm 3) ^\circ\text{C}$.

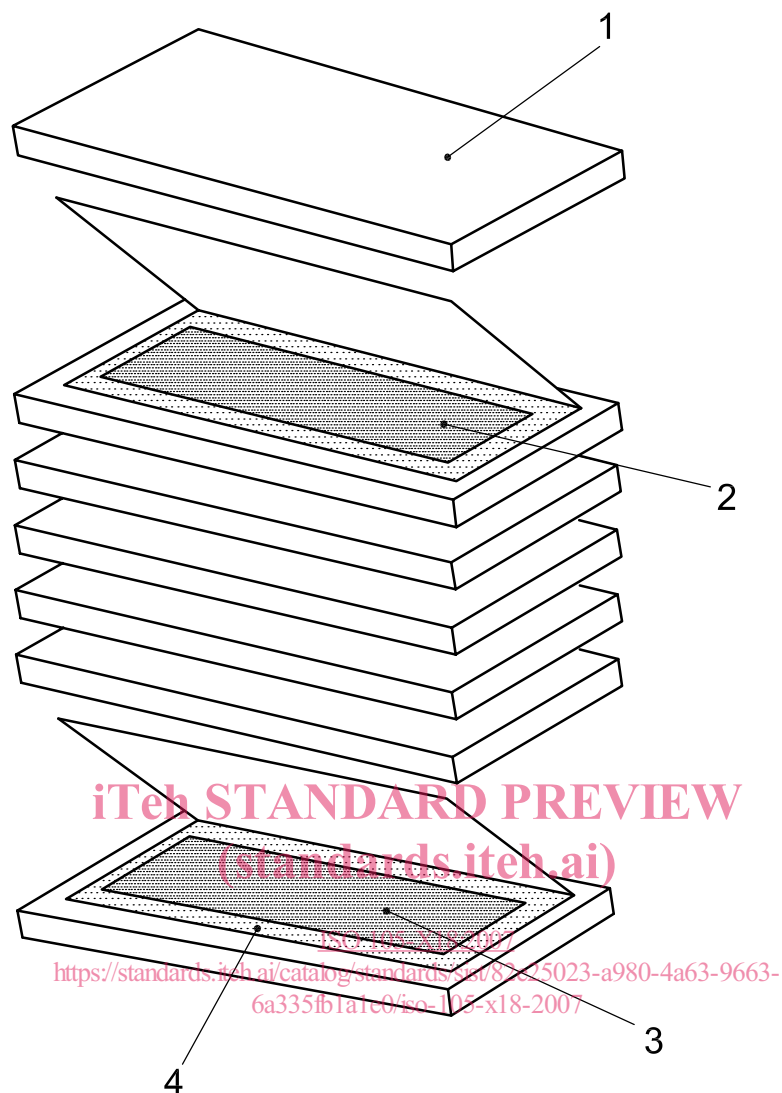
8.6 On removal of the package from the incubator/oven and test device, allow it to cool.

9 Assessment

9.1 Assess the test specimens within 30 min of opening the test package, as any change in colour developed during the test may fade rapidly on some materials when exposed to air.

9.2 Examine the control fabric first to ensure that it has yellowed to at least grade 3 using the grey scale for assessing staining. This verifies that the test has been carried out successfully. If the control fabric does not exhibit yellowing, repeat the test using new materials and specimens.

9.3 Assess the staining of the specimens against the original material from which the specimens were prepared, using the grey scale for assessing staining (in accordance with the viewing conditions described in ISO 105-A01) or Instrumental Assessment (in accordance with ISO 105-A04).



Key

- 1 7 glass plates
- 2 5 test specimens
- 3 1 control fabric
- 4 6 impregnated test papers

Figure 1 — Test package

10 Test report

The test report shall include the following information:

- a) the number and date of this part of ISO 105 (i.e. ISO 105-X18:2007);
- b) identification of the test sample and sampling procedure, if required;
- c) the numerical grey scale rating for staining to express the potential of phenolic yellowness of materials.

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