
International Standard



105/P

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Textiles — Tests for colour fastness — Part P: Colour fastness to heat treatments

Textiles — Essais de solidité des teintures — Partie P: Solidité des teintures aux traitements thermiques

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Descriptors : textiles, dyes, tests, colour fastness, visual inspection, synthetic fibres, thermal tests, dry heat tests, water vapour tests, pleating.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 105/P was developed by Technical Committee ISO/TC 38, *Textiles*.

It was submitted directly to the ISO Council, in accordance with sub-clause 5.10.1 of part 1 of the Directives for the technical work of ISO.

This part of ISO 105 cancels and replaces group P of ISO 105-1978, originally published as parts 2 and 5 of ISO Recommendation R 105/IV-1968.

NOTE — International Standard ISO 105 is presented in the form of parts. Each of these parts corresponds to a group and is split up into its different component sections. This form facilitates the replacement of existing sections by successive editions as necessary.

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Textiles — Tests for colour fastness

P01 Colour fastness to dry heat (excluding pressing)

1 SCOPE AND FIELD OF APPLICATION

1.1 This method is intended for determining the resistance of the colour of textiles of all kinds and in all forms to the action of dry heat, excluding pressing.

1.2 Three tests differing in temperature are provided; one or more of them may be used, depending on the requirements and the stability of the fibres.

1.3 When this method is used for assessing colour change and staining in dyeing, printing and finishing processes, it should be recognized that other chemical and physical factors may influence the results.

2 PRINCIPLE

A specimen of the textile in contact with specified adjacent fabrics is heated by close contact with a medium which is heated to the required temperature. The change in colour of the specimen and the staining of the adjacent fabrics are assessed with the grey scales.

3 REFERENCES

ISO 105 :

Section A01, *General principles of testing.*

Section A02, *Grey scale for assessing change in colour.*

Section A03, *Grey scale for assessing staining.*

ISO 139, *Textiles — Standard atmospheres for conditioning and testing.*

4 APPARATUS

4.1 **Heating device** equipped with two heated plates with an electrical heating system, accurately controllable, which

allows the composite specimen to be set in a flat position under a pressure of 4 ± 1 kPa at a pre-selected and uniformly distributed temperature (see clause 8).

4.2 **Two adjacent fabrics**, each of a size adapted to that of the heating device, one piece made of the same kind of fibre as that of the textile to be tested, or that predominating in the case of blends, the second piece made of polyester fibre unless otherwise specified.

4.3 **Grey scales** for assessing change in colour and staining (see clause 3).

5 TEST SPECIMEN

5.1 If the textile to be tested is fabric, place a specimen of a size adapted to that of the heating device between the two adjacent fabrics (4.2) and sew along one of the shorter sides to form a composite specimen.

5.2 If the textile to be tested is yarn, knit it into fabric and treat it as in 5.1 or form a layer of parallel lengths of it between the two adjacent fabrics (4.2), the amount of yarn taken being approximately equal to half the combined mass of the adjacent fabrics. Sew along two opposite sides to hold the yarn in place and to form a composite specimen.

5.3 If the textile to be tested is loose fibre, comb and compress an amount approximately equal to half the combined mass of the adjacent fabrics (4.2) into a sheet of the required size. Place the sheet between the two adjacent fabrics and sew along all four sides to hold the fibre in place and to form a composite specimen.

6 PROCEDURE

6.1 Place the composite specimen in the heating device

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and leave it there for 30 s at one or more of the following temperatures :

$150 \pm 2^{\circ}\text{C}$

$180 \pm 2^{\circ}\text{C}$

$210 \pm 2^{\circ}\text{C}$

When desired, other temperatures and/or times may be used, provided that they are specially noted in the test report. The pressure on the specimen should amount to 4 ± 1 kPa.

6.2 Remove the composite specimen and leave it for 4 h in air in the standard temperate atmosphere for testing (see clause 3), i.e. a temperature of $20 \pm 2^{\circ}\text{C}$ and relative humidity of $65 \pm 2\%$.

In tropical countries the standard tropical atmosphere for testing may be used, i.e. a temperature of $27 \pm 2^{\circ}\text{C}$ and relative humidity of $65 \pm 2\%$.

6.3 Assess the change in colour of the specimen with the grey scale and the staining of the adjacent fabric against pieces of the adjacent fabrics similarly treated in the absence of a specimen.

7 TEST REPORT

Report, for each test made, the temperature and the

numerical ratings for changes in colour and for staining of each kind of adjacent fabric used.

8 NOTES

8.1 A suitable apparatus is one of the following :

a) a heating press as described in *Zeitschrift für die gesamte Textilindustrie*, **60**, (1958), p. 1017;

b) a molten metal bath, in which a holder containing the composite specimen is immersed, as described in *The Journal of the Society of Dyers and Colourists*, **76**, March 1960, p. 158.

8.2 Other devices can be used provided that the same results are obtained as with the apparatus described in 4.1.

8.3 Under normal gravitational conditions, the area over which the mass of the heating-plate should be distributed can be calculated in square centimetres by multiplying the mass in kilograms of the heating-plate by the factor 24,525. If the area of the heating-plate is less than that of the specimen, the required mass is calculated in kilograms by dividing plate area (expressed in square centimetres) by the same factor. For composite specimens $10\text{ cm} \times 4\text{ cm}$, the mass of the heating-plate assembly should be between 1,25 and 2,00 kg.

Textiles — Tests for colour fastness

P02 Colour fastness to pleating : Steam pleating

1 SCOPE AND FIELD OF APPLICATION

1.1 This method is intended for determining the resistance of the colour of textiles of all kinds and in all forms to the action of steam pleating processes. The materials are not pleated during the test, and it is emphasized that the test is not intended for assessing the quality of the pleating process.

1.2 Three tests differing in severity are provided; one or more of them may be used depending on the requirements.

2 PRINCIPLE

A specimen of the textile in contact with specified adjacent fabrics is steamed under pressure and dried. The change in colour of the specimen and the staining of the adjacent fabrics are assessed with the grey scales.

3 REFERENCES

ISO 105 :

- Section A01, *General principles of testing*.
- Section A02, *Grey scale for assessing change in colour*.
- Section A03, *Grey scale for assessing staining*.

ISO 139, *Textiles — Standard atmospheres for conditioning and testing*.

4 APPARATUS

4.1 Specimen holder, consisting of a copper tube 8 cm in external diameter. The thickness of the copper is 0,15 cm. The copper tube is wrapped with six layers of bleached cotton cloth of mass per unit area approximately 125 g/m². The outside layer is made from bleached cotton cloth of mass per unit area approximately 185 g/m². The rods at each end are made from 0,6 cm diameter mild steel. The strength of the springs is not critical, but it should be sufficient to hold the layer tightly against the tube. The

springs are fastened to one of the steel rods and should hook easily on to the other steel rod (see figure 1).

4.2 Jacketed steamer or pressure cooker. A jacketed steamer may be used, provided that the pressure can be accurately determined and that no water splashes onto the specimen during the test.

A domestic pressure cooker may be used as an alternative to a jacketed steamer. Its dimensions should be sufficiently large to avoid water splashing onto the specimen during the test; it is suggested that the minimum size should be 23 cm in diameter and 26 cm high. It should be fitted with an accurate pressure gauge. If a domestic pressure cooker is used, the specimen holder should be loosely wrapped in one layer of polyester film, which projects 1 cm over each end of the tube and is not closed at the ends. The specimen holder should then be placed in a rectangular metal container containing ten 0,1 cm holes equally spaced along the centre of the bottom. The container should be sufficiently deep to reach to 1 cm from the top of the specimen holder (see figure 2). The bottom of the container should be slightly concave to ensure that condensed water rapidly drains away. The container is then placed on a stand which holds it 5 cm from the surface of the water. The quantity of water in the cooker is not critical, but water to a depth of 3 cm is suggested.

Expel air from the pressure cooker for 2 min before raising the pressure.

4.3 Two adjacent fabrics each measuring 10 cm × 4 cm, made of the same kind of fibre as that of the textile to be tested or as otherwise specified. In the case of blends, two different adjacent fabrics are required corresponding to the two predominant fibres of the specimen or as otherwise specified.

4.4 Grey scales for assessing change in colour and staining (see clause 3).

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5 TEST SPECIMEN

5.1 If the textile to be tested is fabric, place a specimen of it 10 cm × 4 cm between the two adjacent fabrics (4.3) and sew along one side to form a composite specimen.

5.2 If the textile to be tested is yarn, knit it into fabric and treat it as in 5.1, or form a layer of parallel lengths of it between the two adjacent fabrics (4.3), the amount of yarn taken being approximately equal to half the combined mass of the adjacent fabrics. Sew along one side to hold the yarn in place and to form a composite specimen.

5.3 If the textile to be tested is loose fibre, comb and compress an amount approximately equal to half the combined mass of the adjacent fabrics (4.3) into a sheet 10 cm × 4 cm. Place the sheet between the two adjacent fabrics and sew along all four sides to hold the fibre in place and to form a composite specimen.

6 PROCEDURE

6.1 Mount the composite specimen in the holder as shown in figure 1.

6.2 Place the holder containing the composite specimen in a jacketed steamer or pressure cooker (4.2).

6.3 Steam under one of the following sets of conditions :

Test	Maximum duration of heating up period min	Duration of time at specified temperature min	Pressure kPa	Temperature °C
Mild	5	5	135	108
Intermediate	8	10	170	115
Severe	15	20	270	130

The severe test is intended primarily for wholly synthetic textiles such as those made from polyamide and polyester fibres; it should not be used for textiles containing wool.

6.4 When steaming is complete, release the pressure over a period not exceeding 2 min.

6.5 Open out the composite specimen and dry it by hanging it in air at a temperature not exceeding 60 °C with the three parts in contact only at one line of stitching. Condition at 20 ± 2 °C and 65 ± 2 % relative humidity for 4 h.

6.6 Assess the change in colour of the specimen and the staining of the adjacent fabrics with the grey scales.

6.7 Specimens which liberate formaldehyde under steam pleating conditions should be tested separately.

7 TEST REPORT

Report which test has been used, the numerical ratings for the change in colour of the test specimen and for the staining of each kind of adjacent fabric used; if the cloths were identical and showed different amounts of staining, only the heavier should be reported.

8 NOTES

8.1 If wool is used as one of the adjacent fabrics (see 4.3) it may have an adverse effect on the dye in the specimen, particularly under alkaline conditions.

8.2 It should be noted that the papers used in commercial pleating occasionally contain reducing agents which with certain colouring matters can produce a much greater change in colour than occurs under the test conditions.

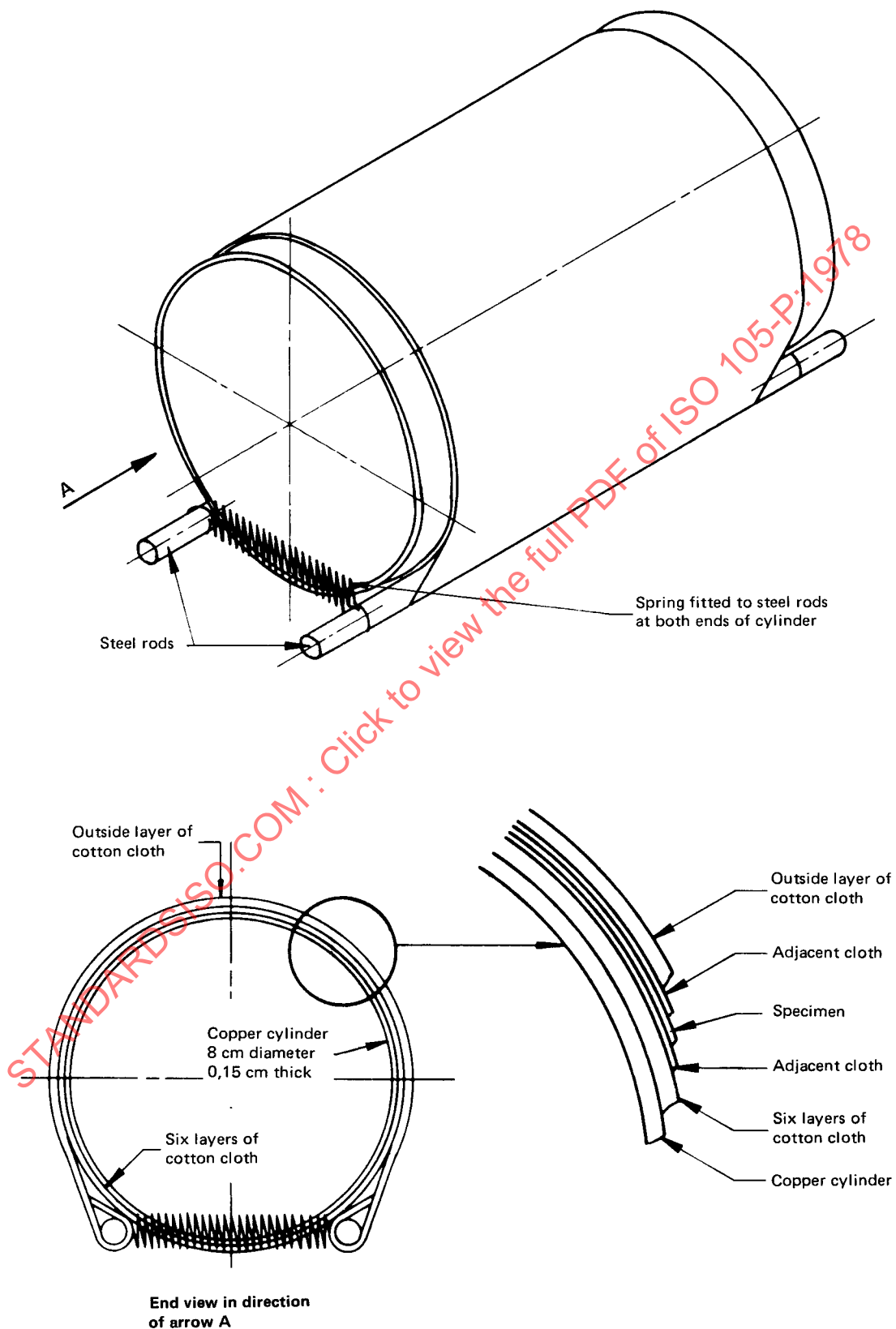


FIGURE 1 — Specimen holder