

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
METHODS OF TEST FOR TEXTILES

PART 4—COLOURFASTNESS TESTS

AS 2001.4.17
DETERMINATION OF COLOURFASTNESS TO
PERSPIRATION

PREFACE

This standard is one of a series for determining the colourfastness of textiles to various agencies.

The methods are largely based on the works of a technical committee of the International Organization for Standardization (ISO/TC 38/SC 1) whose procedures have been adapted to suit Australian conditions.

This standard supersedes AS L15, Part XVII—1969.

This standard requires reference to the following Australian standards:

- AS 2001.1* Methods of Test for Textiles — Conditioning Procedures
 AS 2001.4.1 Methods of Test for Textiles, Part 4 — Colourfastness Tests,
 Method 1 — Definitions and General Requirements

*Revision of AS 1090 in course of preparation.

METHOD

1 SCOPE. This standard sets out two alternative procedures for determining the colourfastness of textiles to perspiration.

2 APPLICATION. This method applies to textiles in all forms.

3 PRINCIPLE. Two specimens in contact with undyed cloths are separately immersed in warm test solutions (simulating the action of perspiration) for a stated time. The specimens may or may not then be rinsed depending on their end-use. After drying, the change in colour of the specimens and the degree of staining of the undyed cloths are assessed.

NOTE: Staining onto the undyed cloths may be persistent or temporary in character, the significant factor being the end-use of the textile under test.

4 REAGENTS. Prepare two test solutions as follows:

- (a) *An alkaline test solution* of distilled or deionized water containing —
- (i) 0.5 g/L L-histidine monohydrochloride monohydrate;
 - (ii) 5.0 g/L sodium chloride (NaCl);
 - (iii) 5.0 g/L disodium hydrogen orthophosphate dodecahydrate ($\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$); and

- (iv) 0.2 g/L nonionic wetting agent. The wetting agent shall be a polyalkylene derivative of synthetic alcohol.

If required, adjust pH value to 8.0 ± 0.2 using 0.1 mol/L sodium hydroxide solution.

- (b) *An acidic test solution* of distilled or deionized water containing —

- (i) 0.5 g/L L-histidine monohydrochloride monohydrate;
- (ii) 5.0 g/L sodium chloride (NaCl);
- (iii) 2.2 g/L sodium dihydrogen orthophosphate dihydrate ($\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$); and
- (iv) 0.2 g/L nonionic wetting agent. The wetting agent shall be a polyalkylene derivative of synthetic alcohol.

If required adjust pH value to 5.5 ± 0.2 using 0.1 mol/L sodium hydroxide solution.

NOTES:

1. L-histidine monohydrochloride decomposes in solution. The test solutions are to be used within 24 h of preparation.
2. Teric BLB produced by ICI Australia Ltd is a suitable wetting agent.

5 APPARATUS. Dependent upon the method selected, the following apparatus is required:

- (a) A perspiration tester as described in Appendix A.
- (b) Perspex plates approximately 100 mm × 60 mm × 6 mm.
- (c) Small flat-bottomed glass dish for each specimen. A Petri dish, 100 mm diameter is suitable.
- (d) Oven to operate at $40 \pm 2^\circ\text{C}$ throughout the chamber.
- (e) Smooth glass plate for each specimen, large enough to cover the specimen and having a mass of 50 ± 5 g.
- (f) Two undyed clothes (see AS 2001.4.1) each 50 mm × 50 mm. One cloth shall have similar dyeing characteristics to the textile to be tested, or to the predominating fibre of a blended textile. The second cloth shall have dissimilar dyeing characteristics to those of the first piece.
- (g) Grey Scales for assessing change in colour and staining (see AS 2001.4.1)

6 COMPOSITE SPECIMENS.

6.1 Number of Specimens. Two composite specimens are required (one for each of the test solutions given in Clause 4).

6.2 Fabric. When testing fabric, place a specimen 50 mm × 50 mm between the two undyed cloths of the same size and sew along one side to form a composite specimen.

6.3 Yarn. When testing yarn, either knit it into fabric and treat as in Clause 6.1 or form a layer of parallel lengths of it between the two undyed cloths and sew along one side so as to keep the yarn in place and to form a composite specimen.

6.4 Fibre. When testing loose fibre, comb and compress sufficient to form a sheet 50 mm × 50 mm have approximately half the total mass of the two undyed cloths. Place the sheet between the two undyed cloths and sew around all four sides to form a composite specimen.

NOTE: The sewing yarn (see AS 2001.4.1) is to be undyed and free of optical brightening agents.

7 PROCEDURE. The procedure shall be as follows:

- (a) Place one composite specimen in a flatbottomed glass dish and cover with the alkaline test solution preheated to $40 \pm 2^\circ\text{C}$. Place the second composite specimen in a flat-bottomed glass dish and cover with the acidic test solution preheated to $40 \pm 2^\circ\text{C}$.
- (b) Place a smooth glass plate on each composite

specimen and press lightly with the fingers to remove air bubbles.

- (c) Allow to stand for 15 min, pour off excess solution and proceed according to either step (d) or step (e).
- (d) *Test A—Perspiration tester test method.* Remove the composite specimen from the dish and squeeze it lightly, preferably through rollers, to remove excess solution. Place each composite specimen between Perspex plates between the base and pressure plate of the perspiration tester. Several composite specimens may be tested concurrently provided each is separated by a Perspex plate. Position the helical springs and the top plate over the columns of the tester. Place the 5 kg weight on the top plate, tighten the thumb screws and remove the weight. Place the tester in an oven at $40 \pm 2^\circ\text{C}$ for 4 h.
- (e) *Test B—Dish test method.* Without removing the glass plates, place each dish in an oven at $40 \pm 2^\circ\text{C}$ for 4 h.
- (f) Remove the dish or the tester from the oven. Remove the composite specimen and rinse it in filtered cold running water, if this is appropriate to its end-use, for approximately 2 min.
- (g) Squeeze the composite specimen lightly, preferably through rollers, to remove excess water and dry in air not exceeding 60°C . Fabric and yarn specimens shall be hung in such a way that the two undyed cloths fall free of the specimen. Composite specimens containing fibre shall be separated and the specimen and undyed cloths dried apart.
- (h) Allow the specimen and undyed cloths to return to equilibrium with ambient conditions before assessing the change in colour of the specimen and the staining of the undyed cloths.

Where differences in temperature or moisture content of the specimens, or undyed cloths, will influence the results, the assessment shall be made after 4 h under standard conditions as prescribed in AS 2001.1, i.e. in equilibrium with air having a temperature $20 \pm 2^\circ\text{C}$ and a relative humidity of 65 ± 2 percent.

8 REPORT. The following information shall be reported:

- (a) The numerical rating for colour change of the specimen.
- (b) The numerical rating for staining of each undyed cloth.
- (c) Whether or not rinsing was employed.
- (d) Whether Test A or Test B was used.
- (e) The number of this Australian standard, i.e. AS 2001.4.17.