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R 675

DETERMINATION OF DIMENSIONAL CHANGE IN WOVEN FABRICS SUBJECTED TO LAUNDERING NEAR THE BOILING POINT

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BRIEF HISTORY

The ISO Recommendation R 675, *Determination of dimensional change of woven fabrics subjected to laundering near the boiling point*, was drawn up by Technical Committee ISO/TC 38, *Textiles*, the Secretariat of which is held by the British Standards Institution (BSI).

Work on this question by the Technical Committee began in 1952 and led, in 1964, to the adoption of a Draft ISO Recommendation.

In February 1966, this Draft ISO Recommendation (No. 892) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Argentina	India	Spain
Australia	Iran	Sweden
Austria	Israel	Switzerland
Belgium	Japan	Turkey
Canada	Korea, Rep. of	U.A.R.
Chile	Norway	United Kingdom
Czechoslovakia	Poland	U.S.A.
Denmark	Romania	U.S.S.R.
Germany	South Africa, Rep. of	
Hungary		

Three Member Bodies opposed the approval of the Draft :

France
Italy
Netherlands

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council which decided, in February 1968, to accept it as an ISO RECOMMENDATION.

ISO Recommendation R 675 February 1968

DETERMINATION OF DIMENSIONAL CHANGE IN WOVEN FABRICS SUBJECTED TO LAUNDERING NEAR THE BOILING POINT

1. SCOPE

This ISO Recommendation describes a method of test for determining the dimensional change (shrinkage or stretch) of all types of woven fabrics normally subjected to commercial or home laundering near the boiling point.

NOTES

1. The test has been devised principally for cotton fabrics. If it is applied to other fabrics such as linen or rayon, clause 7.5 should be consulted.

2. The method is intended only for the assessment of dimensional changes undergone by a woven fabric subjected to a single laundering. When it is desired to determine the amount of progressive dimensional change, the test specimen may be washed repeatedly and the results reported so as clearly to indicate the amount of dimensional change in the laundered specimen as compared with the original dimensions of the unwashed specimen and the number of testing cycles to which the specimen has been subjected.

2. PRINCIPLE

A specimen is washed in a cylindrical reversing laundry machine under specified conditions. It is extracted and pressed without preliminary drying. Distances marked on the specimen in warp and weft (filling) directions are measured before and after it is laundered.

3. REAGENTS

3.1 *Detergent, soap*

A stock solution may be prepared by dissolving 0.5 kg (1 lb) of soap in 4 litres (1 gallon US) of hot water. When cooled, this solution forms a thick homogeneous jelly which may be used as required.

Soap meeting the following specification is satisfactory :

Moisture and volatile matter at 105 °C (221 °F)	10.0 % max.
Sum of free alkali, total matter insoluble in alcohol, and sodium chloride	4.0 % max.
Free alkali, calculated as NaOH	0.2 % max.
Matter insoluble in water	1.0 % max.
Titre of the mixed fatty acids prepared from the soap	39 °C min.
Anhydrous soap content	85.0 % min.

3.2 *Water*

Soft water (not more than 50 parts per million hardness) should be used (see Annex).

3.3 *Anhydrous sodium carbonate*

4. APPARATUS

4.1 *Wash wheel*

A horizontal cylindrical machine with rotating cage and reversing mechanism should be used. The cage should have a diameter between 40 cm (16 in) and 60 cm (24 in) and a peripheral speed of 50 to 55 m/min (164 to 180 ft/min). Other diameters may be used as a temporary measure, provided that the speed of rotation is adjusted to give an equivalent peripheral speed. For preference use three or four fins of "lifters" about 8 cm (3 in) wide, equally spaced around the interior of the cage and extending its full length. Either a single fin or two fins may be used, however, provided that equivalent results can be obtained.

The cage should turn at such a speed that the load is lifted by the fins and falls back into it. (A peripheral speed of 54 m/min (176 ft/min) has been found satisfactory.) The cage should make 5 to 10 revolutions before reversing its direction. The machine should be equipped with heating facilities, such as live steam, gas or electricity, and with an outlet large enough to permit discharge of all water from the machine in less than 2 minutes.

A thermometer in a suitable well, or equivalent equipment, should be provided to indicate the temperature of the water to within 1 °C during the washing and rinsing, and there should be an outside water gauge to indicate the level of the water in the wheel.

The load to be run in the machine should weigh between 8 and 50 kg of air-dry fabric per cubic metre (0.5 to 3.1 lb per cubic foot) of cage space, including the volume of the fins. It is made up of test specimens and as much other similar fabric as required. The quantity of water used should be sufficient to cover the load (from 1/7 to 1/3 of the inside diameter of the cage).

4.2 *Extractor*

A laundry-type centrifugal extractor with perforated basket, or equivalent apparatus which does not distort the specimen, should be used and should be capable of adjusting the moisture retention to a range between 50 and 100 % based on air-dry mass of the fabric.

NOTE. – Heavier fabrics of tight construction require a high moisture retention to ensure removal of wrinkles during pressing.

4.3 *Pressing equipment*

A flat bed press capable of pressing a specimen 60 cm x 60 cm (24 in x 24 in) is required and should be capable of providing a minimum pressure of 30 gf/cm^2 (6.8 ozf/in^2). The temperature of the press should be 150 ± 15 °C (300 ± 30 °F).

4.4 *Marking equipment*

See section 5.

4.5 *Measuring scale*

A rigid measuring rule, graduated in millimetres (or sixteenths of an inch) or directly in the amount of shrinkage, marked as a percentage of the original dimensions of the specimen (0.2% graduations), should be used.

5. SPECIMEN

The specimen * is preferably the full width of the cloth and at least 60 cm (24 in) long. Cut it, do not tear it, from the material to be tested so that its sides are parallel to the warp and weft (filling). Condition it by exposure to the standard atmosphere ** until in equilibrium with it. Lay it out without tension on a flat smooth surface, being careful to see that it is free from wrinkles and creases. Mark off three equal measured distances parallel to the warp yarns and three equal measured distances parallel to the weft (filling) yarns.

The distances parallel to the warp should be at least 50 cm (20 in) long and at least 5 cm (2 in) from any edge of the specimen. If the width of cloth permits, they should be at least 15 cm (6 in) apart.

The distances parallel to the weft (filling) should be as long as the width of the cloth permits and at least 5 cm (2 in) from any edge of the specimen. They should be at least 15 cm (6 in) apart.

If possible, the measuring marks should be staggered as shown in the Figure. The marks may be made with indelible ink and a fine-pointed pen, by sewing fine threads into the cloth, or by any other suitable method. A template or a mechanical device may be found helpful.

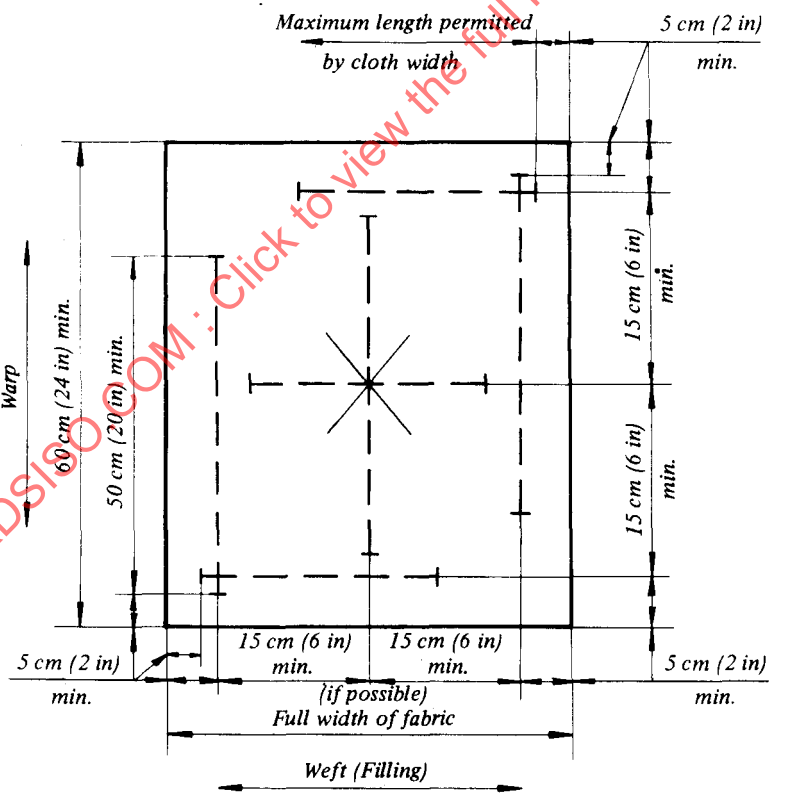

FIGURE – **Marking of specimen**

* Use specimens cut at least 1 m (1 yard) and preferably 3 m (3 yards) from the end of the roll of cloth.

** For the purposes of this ISO Recommendation the standard atmosphere in which physical tests on textile materials are performed has a relative humidity of 65 ± 2 % and a temperature of 20 ± 2 °C (68 ± 4 °F). In tropical and subtropical countries, the tropical atmosphere for testing has a relative humidity of 65 ± 2 % and a temperature of 27 ± 2 °C (81 ± 4 °F). See ISO Recommendation R 139-1967, *Standard atmospheres for conditioning and testing textiles.*

6. PROCEDURE

6.1 Washing and rinsing

Place the specimen or specimens individually in the machine with sufficient similar fabric to make up the proper dry load (see clause 4.1). Start the machine, noting the time. It should be kept running continuously for 60 minutes during which time the following operations should be carried out as indicated, each without delay.

6.1.1 Run water into the machine within 4 minutes to the proper level for washing (see clause 4.1) at such temperature that the machine will heat the liquor to boiling point within 10 minutes maximum.

6.1.2 Add approximately 2 g per litre (0.26 oz per gallon US) of sodium carbonate. Raise the temperature rapidly to 95 °C (203 °F). Add sufficient soap to give a good running suds. If more than 5 g per litre (0.66 oz per gallon) of soap is used, the amount and reasons for use should be reported (see clause 7.4). The temperature should be maintained at not less than 80 °C (176 °F).

6.1.3 When the machine has run for 40 minutes timed from the start of the test, drain off the soap solution quickly and fill the machine with water to the proper level for rinsing. Raise the temperature to 60 °C (140 °F) within 2 minutes.

6.1.4 When the machine has run for 45 minutes from the start of the test, drain off the water, fill again and heat to 60 °C (140 °F) as before.

6.1.5 At the end of 55 minutes from the start of the test, drain off the water quickly. Allow the machine to run without further additions to complete the full 60 minutes of operation. Stop the machine.

6.2 Extraction

Remove the specimen from the machine. Remove the excess water (see clause 4.2).

6.3 Pressing

Press each specimen, being careful to see that it is smoothed, without stretching, to remove wrinkles before pressing. Continue this operation until sufficient moisture has been extracted from the fabric to ensure conditioning from the dry side.