INTERNATIONAL STANDARD ISO 3005

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Textiles — Determination of dimensional change of fabrics induced by free-steam

Textiles — Détermination de la variation, dans la vapeur saturante, des dimensions des étoffes

Second edition — 1978-09-01

UDC 677.017.635.2

Ref. No. ISO 3005-1978 (E)

Descriptors : textiles, wool, tests, dimensional stability, water vapour tests, steam.

Price based on 4 pages

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 3005 was developed by Technical Committee ISO/TC 38, *Textiles*. The first edition (ISO 3005-1975) had been approved by the member bodies of the following countries :

Australia	India	Romania
Brazil	Iran	South Africa, Rep. of
Bulgaria	Ireland	Spain
Canada	Israel	Sweden
Czechoslovakia	Italy	Switzerland
Denmark	Japan	Thailand
Egypt, Arab Rep. of	Netherlands	Turkey
Finland	New Zealand	United Kingdom
France	Norway	U.S.A.
Hungary	Poland	

The member bodies of the following countries had expressed disapproval of the document on technical grounds :

Belgium
Germany

This second edition, which supersedes ISO 3005-1975, incorporates the modifications which were circulated in October 1977 to the member bodies as Draft Amendment 1.

This draft amendment has been approved by the member bodies of the following countries :

Australia	Ghana	Romania
Bulgaria	Hungary	South Africa, Rep. of
Canada	India	Spain
Chile	Iran	Sweden
Czechoslovakia	Israel	Switzerland
Denmark	Japan	Thailand
Egypt, Arab Rep. of	Korea, Rep. of	United Kingdom
Finland	New Zealand	U.S.A.
France	Poland	U.S.S.R.

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Belgium
Italy

Printed in Switzerland

Textiles — Determination of dimensional change of fabrics induced by free-steam

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for determination of the dimensional change of fabrics when subjected to the action of free-steam. It does not deal with the consolidation and felting shrinkage of fabrics in wet treatments, or the mechanical effects of pressing.

2 REFERENCES

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

ISO 3759, *Textiles — Preparation, marking and measuring of fabric specimens and garments in tests for determination of dimensional change.*

3 PRINCIPLE

Measured and conditioned strips of fabric are placed on a fine wire frame. Because their heat capacity is very low, the wires cause negligible condensation on the cloth when the assembly is placed in steam. The assembly is inserted three times in a horizontal cylinder through which steam flows steadily at a prescribed rate from the back of the cylinder to the door at the front of the cylinder. No vacuum is used. After removal from the cylinder, the strips are allowed to cool on the frame before being conditioned, and remeasured. Initial and final lengths are measured at the same regain, both are recorded; the percentage dimensional change is calculated based on the initial length. The method requires the use of the conditioning atmosphere specified in clause 5, in order to minimize the differences between the initial and final regains.

4 APPARATUS

4.1 Marking and measuring equipment as described in ISO 3759.

4.2 Wire supporting frame as specified in annex A.

4.3 Jacketed steaming cylinder constructed and fitted as described in annex B.

4.4 Means of delivering steam to the cylinder at the rate of 70 g/min.

4.5 Means for producing the standard atmosphere for testing textiles.

5 CONDITIONING ATMOSPHERE

The standard atmosphere for testing textiles as specified in ISO 139 shall be used for pre-conditioning and conditioning.

6 TEST SPECIMENS

6.1 Cutting

Cut the specimens 300 mm long and 50 mm wide, with the longer sides in either the length or width direction of the fabric. Avoid selvedges and piece ends.

6.2 Preparation

Pre-condition each test specimen, placed on a flat screen, for not less than 4 h in the pre-conditioning atmosphere specified in clause 5. Then expose each test specimen to the standard atmosphere for testing textiles for 4 h or until equilibrium is obtained, remove the specimen and mark it for measurement on a smooth flat surface using a pair of suitable small indicators (see ISO 3759), 250 mm apart, symmetrically placed on the central axis of the specimen. Measure and record the distance between each pair of indicators.

6.3 Number

Unless otherwise agreed by the interested parties, test four specimens with their length parallel to the warp (or wale) direction and four specimens with their length parallel to the weft (or course) direction.

7 TEST PROCEDURES

7.1 Ensure that the steam flow is within 20 % of the specified value of 70 g/min, and thoroughly warm the cylinder by allowing steam to flow for at least 1 min, or longer if the cylinder was previously cool (see annex B).

7.2 Lay four conditioned specimens flat on the wire supporting frame, one specimen per layer.

7.3 Allow the steam to flow through the cylinder throughout the test; insert the frame while the steam is flowing and immediately close the door. Leave the specimens within the cylinder for 30 s; remove the frame from the cylinder for a period of 30 s. Perform this cycle three times in all, allowing no additional time between operations other than the prescribed 30 s.

7.4 At the end of the third cycle, allow the specimens to cool, turn the frame so that the specimens fall onto a flat screen, pre-condition and condition them as described in 6.2 on the screen and remeasure them on a smooth flat surface.

8 CALCULATION AND EXPRESSION OF RESULTS

Record the dimensional change (i.e. change in length) of each specimen, using a negative sign to indicate a decrease in length, record also the direction on the fabric [i.e. warp (or wale) or weft (or course)] in which the change in length has been measured. Record results as a percentage of the original length. Calculate the mean value and the range of the dimensional change for each set of replicates.

9 TEST REPORT

The test report shall include the following particulars :

a) a statement that the procedure was conducted in accordance with this International Standard;

b) the nature and origin of the sample;

c) the following information for both the warp (or wale) and weft (or course) directions;

1) the positions of the specimens in the fabric in relation to the ends of the piece;

2) the dimensional change of each specimen as a percentage of the original length;

3) the mean dimensional change of the replicates as a percentage of the original length;

4) the range of the individual dimensional change values.

ANNEX A

SUPPORTING FRAME FOR SPECIMENS

(See figures 1 and 2)

The supporting frame for specimens is constructed from hard-drawn stainless steel tubing, W, of diameter 1,8 mm, stainless steel angle, F, side 3,8 mm and thickness 0,6 mm, and hard-drawn stainless steel wire of diameter 0,15 mm. The overall dimensions are 300 mm long, 50 mm broad and 75 mm high, and the four shelves or layers are equally spaced. All joints are silver-soldered, and there are five equally spaced wire strands on each of the four layers. The individual layers are constructed and wired before the complete frame is assembled.

ANNEX B

STEAMING CYLINDER

(See figure 2)

B.1 Steam may be supplied from a steam generator specially built for this purpose or it may be obtained from an industrial line. When the latter is used, a wheel valve V and strainer S are fitted into the input steam line immediately before the orifice plate. The overall length of the steaming apparatus is 380 mm. Outer and inner sections are made from standard steam pipe, respectively 125 mm outside diameter, 4,9 mm wall, and 100 mm inside diameter, 3,7 mm wall. An aluminium liner, 0,25 mm thick, fits tightly inside the steaming chamber, and holds the copper gauze G of 80 mesh, wire diameter of 0,132 mm (39 SWG), through which the steam enters. Pipe D of 12 mm diameter is concentric with pipe E of 25 mm diameter. The end of the pipe D is raised slightly above the level of the cylinder wall, and passes through a circular hole in the liner. The whole unit shall be thermally insulated.

B.2 In order to maintain the steaming temperature at 100 °C, the internal pressure must remain equal to that of the atmosphere outside the apparatus. The door of the steaming chamber is secured by a magnetic catch, and opens if the excess pressure inside exceeds about 1 500 Pa*.

B.3 The steaming unit shall be mounted so that the front end is slightly lower than the back; this will facilitate the drainage of condensate from the outer jacket. Angles and trap in the input steam line shall be arranged so that the quantity of condensate impelled in the direction of the input orifice is minimized. The cylinder can be supported quite adequately by the lower pipe E by mounting this directly on a rigid drain in such a way that there is no possibility of pressure build-up in the drain. The steam-chamber door shall be left open after use so that the interior can dry.

B.4 The rate of steam flow (70 g/min) is controlled by orifice O which shall be of 1,90 mm diameter for a steam supply line at 4 atm gauge pressure. To check the flow rate, use the exhaust steam to raise the temperature of water or iron. For example, the temperature of the cylinder itself shall be raised from room temperature to 100 °C in approximately 2 min 30 s. Condensation, which supplies the heat and subsequently maintains the temperature at 100 °C, occurs almost exclusively in the outer jacket; drops of liquid water are thrown out against the black plate, so that in effect dry saturated steam enters the inner chamber through the gauze G.

Negligible condensation occurs on the liner. The steam escapes through pipe D and pipe E drains liquid from the outer jacket.

NOTE — Apparatus as described in annexes A and B is manufactured by Wira, Headingley Lane, Leeds, England, LS6 1BW.

* 1 Pa = 1 N/m^2

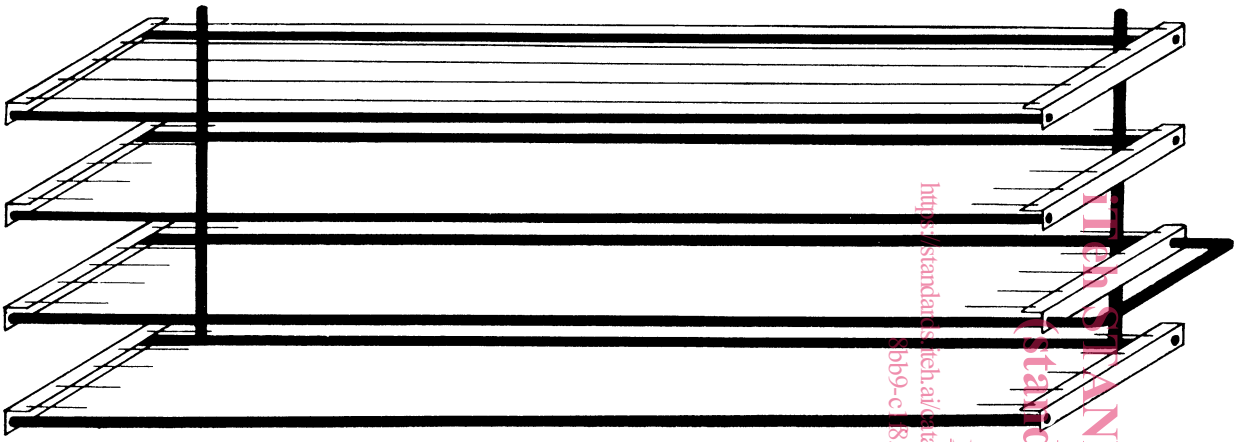

FIGURE 1 — **Diagrammatic representation of wire supporting frame**

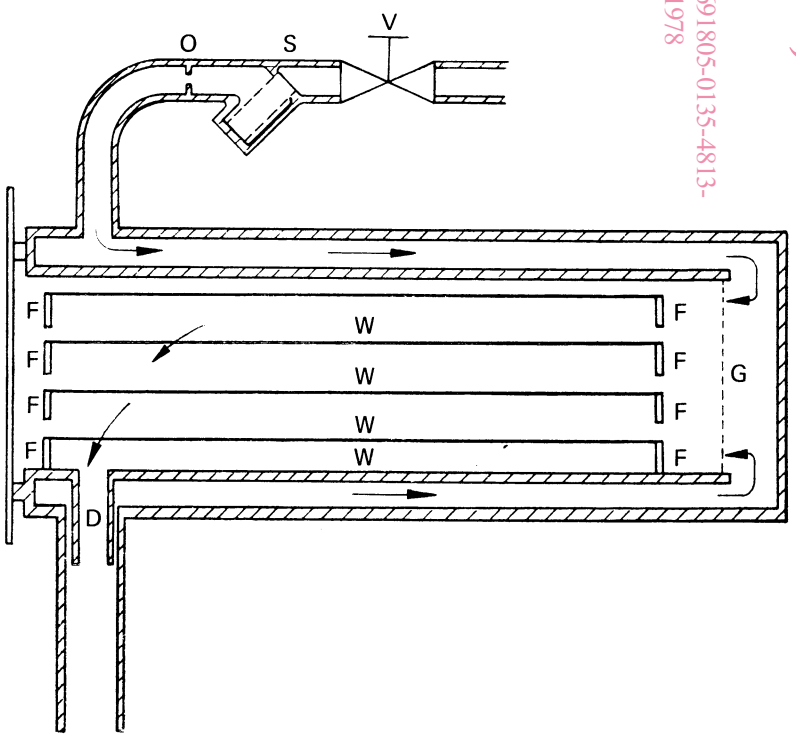

FIGURE 2 — **Steaming cylinder**

This page intentionally left blank

This page intentionally left blank