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Indian Standard

TEXTILES — DETERMINATION OF SPIRALITY AFTER LAUNDERING

PART 1 PERCENTAGE OF WALE SPIRALITY CHANGE IN KNITTED GARMENTS

ICS 59.080.01
NATIONAL FOREWORD

This Indian Standard (Part 1) which is identical with ISO 16322-1 : 2005 ‘Textiles — Determination of spirality after laundering — Part 1: Percentage of wale spirality change in knitted garments’ issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Physical Methods of Test Sectional Committee and approval of the Textile Division Council.

Since ISO 16322 has been published in three parts, this standard has also been published in three parts. Other parts in this series are:

- Part 2  Woven and knitted fabrics
- Part 3  Woven and knitted garments

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words ‘International Standard’ appear referring to this standard, they should be read as ‘Indian Standard’.

b) Comma (,) has been used as a decimal marker while in Indian Standards the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their respective places are listed below along with their degree of equivalence for the editions indicated:

<table>
<thead>
<tr>
<th>International Standard</th>
<th>Corresponding Indian Standard</th>
<th>Degree of Equivalence</th>
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<tbody>
<tr>
<td>ISO 139 Textiles — Standard atmospheres for conditioning and testing</td>
<td>IS 6359 : 1971 Method for conditioning of textiles</td>
<td>Technically Equivalent</td>
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</tbody>
</table>

The technical committee has reviewed the provisions of the following International Standards referred in this adopted standard and has decided that they are acceptable for use in conjunction with this standard:

<table>
<thead>
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<tr>
<td>ISO 4921</td>
<td>Knitting — Basic concepts — Vocabulary</td>
</tr>
<tr>
<td>ISO 8388</td>
<td>Knitted fabrics — Types — Vocabulary</td>
</tr>
</tbody>
</table>

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (revised)’. 
1 Scope

This part of ISO 16322 specifies a method of measuring the percentage of wale spirality change in weft-knitted jersey garments produced on knitting machines, following laundering.

The results obtained from different procedures may not be comparable.

The change in spirality is calculated from measurements on knitted garments before and after laundering.

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 139, Textiles — Standard atmospheres for conditioning and testing
ISO 4921, Knitting — Basic concepts — Vocabulary
ISO 6330, Textiles — Domestic washing and drying procedures for textile testing
ISO 8388, Knitted fabrics — Types — Vocabulary

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4921, ISO 8388 and the following apply.

3.1 wale spirality
distortion of a knitted fabric in which the wales follow a spiral path around the axis of a tube

4 Principle

The welt or hem of the body of a garment prior to laundering is tensioned until the top edge of the welt or hem is straight. The angle subtended by the wales with a line perpendicular to the top edge of the welt or hem is measured. This measurement is repeated after laundering and the change in spirality computed from the difference in results.
5 Apparatus

5.1 Calibrated metal straightedge or rule at least 20 cm in length, with 1 mm graduated marks.

5.2 Transparent plastic protractor, graduated from 0 °C to 180 °C, marked in 1 °C increments.

5.3 Two tensioning masses, each (1 ± 0,01) kg in mass and with a surface area of approximately 20 cm².

5.4 Hydroextractor, e.g. domestic spin dryer.

5.5 Automatic washing machine (as specified in ISO 6330).

6 Conditioning

Condition the garments in the standard atmosphere for testing in accordance with ISO 139, for a minimum of 4 h before measuring.

7 Test specimen

The test specimen consists of the body part of a finished garment.

8 Procedure

8.1 Place the garment on a flat surface with the technical face of the fabric upwards.

8.2 If necessary, place a tensioning mass on one side of the welt or hem. Pull the other side of the welt or hem until the line along the top of the welt or hem is straight and the wales in the welt or hem are at right angles to that line. Place the other mass on the other end of the welt or hem to keep it straight.

8.3 Using only the middle third of the garment width, place the ruler or straightedge parallel to the direction of the wales in the body of the garment. Choose one wale, and align the straight edge of the ruler with that wale at the intersection between the body of the garment and the welt or hem. Keeping that point fixed, rotate the straightedge until it crosses the same wale at a position (200 ± 1) mm from the top of the welt or hem.

8.4 Without moving the straightedge, place the protractor on the straightedge with the base line parallel to the top of the welt or hem. Measure the angle between the line of the straightedge and the bottom of the protractor which is parallel to the top of the welt (see Figure 1).

8.5 Repeat this procedure in three separate places on the front of the garment and three on the back of the garment, to give a total of six measurements.

8.6 Launder the garment to be measured by thoroughly wetting out using one of the following methods.

8.6.1 Dry-clean-only garment: static soak for 30 min in cold water and then hydroextract for 1 min.

8.6.2 Hand-washable garment: one simulated hand wash cycle according to ISO 6330.

8.6.3 Machine-washable garment: one cycle of the 7A wash cycle, or other appropriate cycles in ISO 6330, as agreed between parties.

8.7 Flat-dry the garment at ambient room temperature or in an oven not exceeding 60 °C.

8.8 After drying, lay the garment on a flat smooth surface, remove any major creases, and condition the garment in accordance with Clause 6.

8.9 Remeasure the spirality as described in 8.1 to 8.4.
9 Calculation of results

Calculate the arithmetic mean of the original six results and the six results after laundering of each garment, to the nearest degree.

Calculate the percent change in wale angle spirality from the original measurement as follows:

\[ S = \frac{\alpha - \beta}{\alpha} \times 100 \]

where

- \( S \) is the percent spirality change after laundering, expressed as a percentage of the original;
- \( \alpha \) is the original wale spirality angle, expressed in degrees (Figure 1);
- \( \beta \) is the wale spirality angle after laundering, expressed in degrees (Figure 2).

10 Test report

The test report shall contain the following:

a) reference to this part of ISO 16322, i.e. ISO 16322-1:2005;
b) details of the sample garment tested;
c) average angle of wale spirality of the original garment;
d) average angle of wale spirality of the garment after laundering;
e) percentage of wale spirality change between the original and laundered garment;
f) method of laundering.
Key
1 measurement before laundering, \( \alpha = 90 \) degrees in the formula in Clause 9

**Figure 1 — Panel before laundering**

Key
1 measurement after laundering, \( \beta = 76 \) degrees in the formula in Clause 9

**Figure 2 — Panel after laundering**
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Amendments Issued Since Publication

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BUREAU OF INDIAN STANDARDS

Headquarters:
Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 Website: www.bis.org.in

Regional Offices:

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002 2323 7617

Eastern : 1/14, C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi
KOLKATA 700054 2337 8499, 2337 8561

Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022
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Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113
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