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BUREAU OF INDIAN STANDARDS

Draft Indian Standard

TEXTILES — FABRIC, COTTON, INTERLOCK KNITTED – SPECIFICATION

(*First Revision of IS 13003*)

ICS 59.060.10, 59.080.30

Last date for receipt of comment is **20 November 2022**

FOREWORD

(Formal clause will be added later)

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Hosiery Sectional Committee had been approved by the Textile Division Council.

Interlock fabric is a double 1 × 1 rib-knitted fabric with crossed sinker wales. The wales on one side of the fabric are immediately behind the wales of the other side of the fabric. The appearance of this fabric is same on both the sides.

The standard on interlock knitted cotton vest was first published as IS 4965:1968 covering the requirements of the tailored vests. This standard was revised in 1975 and published in two parts— Part 1 covering the requirements of interlock knitted fabric and Part 2 covering the requirements of tailored vest. The requirements of interlock knitted cotton vest are being covered separately in IS 4965:1990, as this fabric is used for fabricating other garments such as T-shirt, underwear etc. in addition to vest.

This standard supersedes IS 4965 (Part 1):1975. The requirements of interlock knitted fabric have been specified and, in this revision, it is further classified with designation Coarse and Medium as Coarse/Medium 'A' and Coarse 'B'/Medium 'B/C'. The revised standard provides for use of only combed yarn for Medium 'C', Fine and Superfine fabrics. The requirements of scouring loss have been deleted and dimensional change (due to relaxation) have been specified based on the actual performance of interlock knitted fabrics. The opportunity has also been availed to cover printed interlock knitted fabric, as also coloured fabric obtained by knitting dyed yarn.

The code of bleaching and processing and cotton knitted fabrics would serve as a guide to the small processors in proper bleaching of cotton knitted goods (*see* IS 10590 Code of practice for manual bleaching and processing of cotton knitted fabric).

This standard, first published in 1975, and subsequently revised in 1987 & 1991.This standard has

been revised again to incorporate the following major changes:

a) Title of the standard has been modified.
b) All the amendments are incorporated.
c) References to Indian Standard given in Annex A has been updated.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (second revision)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1 SCOPE

1.1 This standard prescribes the requirements of grey, scoured, bleached, dyed or printed interlock fabric knitted on circular machines.

1.1.1 This standard also covers coloured interlock knitted fabric obtained by knitting with dyed yarn.

1.2 This standard does not specify the general appearance, feel, lustre of whiteness or shade of the knitted fabric (*see* also 5.4).

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 3596 shall apply (*see* also SP 45).

4 MANUFACTURE

4.1 The tubular fabric shall be evenly knitted on interlock machine. The width of the tubular fabric shall be uniform throughout and shall correspond to the diameter of the knitting machine. The fabric shall not be over boarded or pulled in length while calendaring. If required by the buyer, the bleached fabric may also be treated with blueing/optical whitening agents.

4.2 The fabric shall be reasonably free from knitting defects such as ladders, dropped stitches, holes, cuts and mends and chemical defects such as defective bleaching in case of bleached fabric or streaks, stains and uneven dyeing in case of dyed fabric and defective printing in case of printed fabric.

5 REQUIREMENTS

5.1 The yarn used in knitting the fabric shall conform to IS 834. Medium 'C', Fine and Superfine fabrics (*see* Table 1) shall be knitted from combed yarn only.

5.2 The construction requirements of the fabric shall be as specified in Table 1.

5.3 The fabric shall also conform to the requirements specified in Table 2.

Table 1 Construction Requirements of Interlock Knitted Cotton Fabric

(*Clauses* 5.1 and 5.2)

Sl No.	Designation	Gauge of Machine (*see* Note)	Nominal Count of Yarn Cotton Count, Ne (Tex)	Wales/dm, *Min*	Courses/dm, *Min*
(1)	(2)	(3)	(4)	(5)	(6)
i)	Coarse 'A'	18	18s (33), 20s (30)	9	102
ii)	Coarse 'B'	20	22s (27), 24s (25) 26s (22.5)	106	110
iii)	Medium 'A'	20	28s (21), 30s (20), 34s (17.5)	114	118
iv)	Medium 'B'	20	34s (17.5), 36s (16.5), 38s (15.5), 39s (15), 40s (14.5)	122	134
v)	Medium 'C'	22	40s (14.5), 42s (14), 44s (13.5),45s (13), 50s (12)	138	164
vi)	Fine	24	50s to 60s (12 to 9.8)	152	180
vii)	Superfine	26	60s to 80s (9.8 to 7.4)	168	196
	Method of Test	-	-	B-2	B-2

NOTE — As determined by the number of needles per 2.5 cm.

Table 2 Requirements of Interlock Knitted Cotton Fabric

(*Clause* 5.3)

Sl No.	Characteristics	Requirements	Method of Test
(1)	(2)	(3)	(4)
i)	Length	As agreed to between the buyer and the seller	IS 1954
ii)	Width		
	a) Grey fabric b) Scoured, bleached, dyed or printed fabric	± 2 cm of the size (*see* Note) ± 1 cm of the size (*see* Note)	IS 1954
iii)	Dimensional change (due to relaxation) percent, *Max*		B-3
	a) Grey fabric b) Scoured, bleached, calendared, dyed or printed fabric	Wales direction – 10.0 Courses direction –12.0 Wales direction – 5.0 Courses direction –10.0	
iv)	*p*H value	6 to 10	IS 1390
v)	Minimum colour fastness rating of dyed or printed fabric:		
	a) Light b) Washing: Test 1 i) Change in colour ii) Staining of adjacent fabric c) Perspiration: i) Change in colour ii) Staining of adjacent fabric	5 4 4 3 3	IS/ISO 105-B01 or IS/ISO 105-B02 IS/ISO 105-C10 IS/ISO 105-E04

NOTE — Diameter of the knitting machine.

5.4 Sealed Sample — In order to illustrate or specify the indeterminable characteristics such as general appearance, degree of whiteness, colour, shade or print design of fabric, a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in such respects.

5.4.1 The custody of the sealed sample shall be a matter of prior agreement between the buyer and the seller.

6 MARKING

6.1 Each roll of fabric shall be marked with the following information:

a) Count of yarn and type (carded or combed);

b) Designation of fabric (*see* 5.2);

c) 100 percent cotton, if required by the buyer;

d) Diameter of the knitting machine;

e) Indication of the source of manufacture and;

f) Any other information/instruction provided by the manufacturer/required under law.

6.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

7 PACKING

7.1 The fabric shall be well packed and supplied in a clean and dry state free from stains, greases, etc. preferably, in accordance with IS 3086 or IS 3325 as the case may be.

8 SAMPLING AND CRITERIA FOR CONFORMITY

8.1 The sampling procedure detailed in 8.2 to 8.4 shall give desired protection to the buyer and the seller, provided the lot submitted for inspection is homogeneous. To achieve this, the manufacturer shall maintain a system of process control at all stages of manufacture ensuring the rolls tendered by him for inspection comply with the requirements of this standard in all respects.

NOTE — For effective process control the use of statistical quality control technique is recommended and helpful guidance may be obtained in this respect from IS 397 (Part 1) and IS 397 (Part 2).

8.2 Lot

In any consignment all rolls knitted of a particular diameter of knitting machine of the same designation and of the same quality (type) and count of yarn and delivered to a buyer against one dispatch note shall constitute a lot.

8.2.1 The conformity of a lot to the requirements of this specification shall be determined on the basis of the tests carried out on the samples selected from the lot.

8.3 Unless otherwise agreed to between the buyer and the seller, a number of rolls depending upon the size of the lot shall be selected at random from the lot to constitute the gross sample. The number of rolls so selected shall be in accordance with col 2 of Table 3.

8.4 The number of rolls to be tested and criteria for conformity for each of the characteristics shall be as follows:

Sl No.	Characteristics	Number of rolls to be Tested	Criterion for Conformity
a)	**Physical**		
	Visual inspection, construction and width/diameter	*See* col 2 of Table 3	Non-conforming rolls not to exceed the corresponding number given in col 3 of Table 3
b)	*Other Requirements*		
	Dimensional change and *p*H value	*See* col 4 of Table 3	Rolls to satisfy the requirements
	Colour fastness	1 specimen each of the same colour, shade and/or print for lot size up to 150 and 2 above 150	All the test satisfies the Requirements specimens relevant

Table 3 Sample Size and Permissible Number of Non-Conforming Rolls

(*Clauses* 8.3 *and* 8.4)

Sl No.	Number of Rolls in the Lot	Physical Characteristics		Number of Rolls to be Tested
		Number of Rolls be Inspected	Permissible Number of Non -Conforming Rolls	
(1)	(2)	(3)	(4)	(5)
i)	Up to 50	3	0	2
ii)	51 to 100	5	0	2
iii)	101 to 150	8	0	3
iv)	151 to 300	13	1	3
v)	301 and above	20	1	5

ANNEX A
(*Clause* 2.1)
LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
394 : 1985	Specification for ink, cloth marking (*second revision*)
397 : 2003 (Part 1)	Method for statistical quality control during production: Part 1 Control charts for variables (*second revision*)
397 : 2003 (Part 2)	Method for statistical quality control during production: Part 2 Control charts for attributes (*third revision*)
834 : 2006	Cotton yarn, grey, for hosiery (*fifth revision*)
1390 : 2022	Methods for determination of pH value of aqueous extract of textile materials*(third revision*)
1954 : 1990	Determination of length and width of woven fabrics — Methods (*second revision*)
3086 : 1965	Code for seaworthy packaging of cotton hosiery yarn and goods
3325 : 1965	Code for inland packaging of cotton hosiery yarn and goods
3596 : 1967	Glossary of terms relating to hosiery
6359 : 1971	Method for conditioning of textiles
SP 45 : 1988	BIS Handbook on glossary of textile terms
IS/ISO 105-B01 : 2014	Textiles – Tests for colour fastness – Part B01 Colour fastness to light: Daylight
IS/ISO 105-C10 : 2006	Textiles — Tests for colour fastness— Part C10 : Colour fastness to washing with soap or soap and soda
IS/ISO 105-B02 : 2014	Textiles — Tests for colour fastness — Part B02 : Colour fastness to artificial light: Xenon arc fading lamp test
IS/ISO 105-E04 : 2013	Method for determination of colour fastness of textile materials to perspiration (*first revision*)

ANNEX B
[*Table*s 1 *and* 2]
METHODS OF TEST

B-1 CONDITIONING OF TEST SPECIMENS AND ATMOSPHERIC CONDITIONS FOR TESTING

B-1.1 The test specimens shall be tested in prevailing atmospheric conditions. In case of dispute, the samples shall be conditioned and tested in standard atmosphere as given in IS 6359.

B-2 WALES AND COURSES

B-2.1 Take one of the rolls and lay it flat on a table. Remove all creases and wrinkles without distorting it. On one side of the test specimen, count with the help of a pick glass or magnifying glass, the number of wales and courses in 10 cm at three different places in the roll and calculate the average number of wales and courses per dm.

NOTE — In case of vests, the wales and courses shall be determined in the similar manner as for rolls of knitted fabric.

B-3 DIMENSIONAL CHANGE (DUE TO RELAXATION)

B-3.1 Marking of Test Specimens

Take one of the rolls from the lot (*see* Note 1). Cut a piece measuring approximately 30 cm in length × full width. Mark centrally on it by means of indelible ink (*see* IS 394 and Note 2) an area 15 × 15 cm with two of its sides in the direction of wales and the other two in the direction of courses. Spread this test specimen on a flat smooth surface, carefully removing by hand all creases and wrinkles. Within this area, mark six pairs of marks, three pairs each in the wales and courses direction in such a way that the distance between each pair of marks is the same.

NOTES
1 In case of vest the piece may not be cut and the marking shall be made on the vest itself.
2 If marking ink is not available, dyed cotton sewing thread having a minimum colour fastness rating as given in Table 2 SI No. (v) (b) may be used.

B-3.2 Procedure

Take the test specimen and spread it on a flat smooth surface. Carefully remove by hand all creases and wrinkles without stretching the test specimen.

B-3.2.1 Measure correct to the nearest mm the distance between each pair of marks separately.

B-3.2.2 Lay the test specimen flat in a watertight tray of suitable size, having depth of minimum 10 cm. Soak it under a head of 25 mm of water containing 0.5 percent suitable wetting agent at 30 to 35°C for 2 hours. Drain out the water and remove the test specimen carefully so that it is not stretched and lay it flat on a smooth surface. Remove the excess of water by absorbent material and dry it at room temperature.

B-3.2.3 After drying, condition the test specimen to moisture equilibrium in a standard atmosphere, if needed (*see* B-1.1). Place it on the glass plate, carefully remove all wrinkles and creases and place the other glass

plate on the test specimen. Measures correct to the nearest mm, the distance between each pair of marks separately.

B-3.2.4 Calculate, separately, the percentage of dimensional change both in the direction of wales and courses by the following formula:

$$S = \frac{100 \times (a - b)}{100}$$

where

S = dimensional change, percent;

a = the distance between a pair of marks (along the wales of courses, as the case may be) before soaking; and

b = the distance between the same pair of marks after soaking.

B-3.2.5 Calculate separately the dimensional change of all the three lines in the direction of wales and in the direction of courses and calculate average dimensional change in each direction.