**IS : 1720 - 1978**
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# *Indian Standard*
## SPECIFICATION FOR
## COTTON SEWING THREADS

## *( First Revision )*

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**BUREAU OF INDIAN STANDARDS**
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**IS : 1720 - 1978**

# *Indian Standard*

## SPECIFICATION FOR COTTON SEWING THREADS

# ( *Second Revision* )

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# *Indian Standard*

## SPECIFICATION FOR
## COTTON SEWING THREADS

## *( Second Revision )*

## 0.   F O R E W O R D

**0.1** This Indian Standard ( Second Revision ) was adopted by the Indian Standards Institution on 15 November 1978, after the draft finalized by the Cotton and Cotton Products Sectional Committee had been approved by the Textile Division Council.

**0.2** This standard, originally published in 1960, was first revised in 1969. In the present revision the count of sewing thread has been expressed in cotton count and decitex to align with the international practice. In addition to the varieties of sewing threads generally required by the official agencies, such as Defence and the Directorate General of Supplies and Disposals, the other varieties used in the garment, hosiery and footwear industries have also been covered.

**0.3** Appendix A, which gives the general end uses of each variety of sewing thread to assist the users of this standard in the proper choice of sewing threads, has also been made up to date.

**0.4** Experiments are being carried out at the initiative of the technical committee to find out the substitutes for linen sewing threads and on successful completion of the same, the required information would be added to the standard.

**0.5** To familiarize the industry with International System of Units ( SI Units ), the basic SI Units as well as the recommended SI Units for use in the textile industry are given in Appendix C.

**0.5.1** Standards of Weights and Measures Act 1976 also stipulates use of SI Units.

**0.6** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated,

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expressing the results of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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## 1. SCOPE

**1.1** This standard prescribes constructional details and other particulars of 43 varieties of cotton sewing threads, unbleached, bleached or dyed.

**1.2** This standard does not specify the type of finish and feel of the sewing thread, nor does it specify the degree of whiteness of the bleached thread or the colour of the dyed threads.

## 2. MANUFACTURE

**2.1 Yarn** — Cotton yarn used in the manufacture of the sewing thread shall be evenly spun with suitable number of turns per metre so that a balanced thread is produced. It shall be reasonably free from spinning defects.

**2.2 Sewing Thread** — The sewing thread shall be reasonably free from knots, snarls and doubling defects.

**2.3 Direction of Twist** — Unless agreed otherwise, the direction of twist in the singles and the finished sewing thread shall be at the discretion of the manufacturer.

**2.4 Finish** — White sewing thread shall have a uniform bleached finish. The dyed sewing threads shall have the required shade and free from all dyeing defects.

   NOTE — Sulphur dyes shall not be used when specifically required by the buyer. In case of supplies to the Ministry of Defence establishments, the black shade shall not be obtained by using sulphur dyes.

   **2.4.1** The threads shall be finished soft, mercerized or polished as required. The finishing and dressing materials liable to cause subsequent tendering shall not be used.

**2.5 Working** — The sewing threads shall work satisfactorily on all appropriate types of hand and power driven sewing machines.

## 3. REQUIREMENTS

**3.1 Length ( m/kg ) and Breaking Load** — The sewing threads shall comply with the requirements given in Table 1.

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*Rules for rounding off numerical values ( *revised* ).

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## TABLE 1 REQUIREMENTS OF COTTON SEWING THREADS

( *Clause* 3.1 )

| VARIETY No. | NOMINAL COUNT | CONSTRUCTION | LENGTH, Min | SINGLE THREAD BREAKING LOAD, Min |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| | Cotton Count ( Decitex ) | | m/kg | Newtons (kgf) |
| 1 | 12s/2 ( 500 dtex × 2 ) | 2 ply ( 2 strands, each single ) | 9 530 | 16·2 ( 1·65 ) |
| 2 | 28s/2 ( 210 dtex × 2 ) | 2 ply ( 2 strands, each single ) | 22 020 | 6·9 ( 0·70 ) |
| 3 | 30s/2 ( 200 dtex × 2 ) | 2 ply ( 2 strands, each single ) | 24 560 | 6·4 ( 0·65 ) |
| 4 | 38s/2 ( 155 dtex × 2 ) | 2 ply ( 2 strands, each single ) | 31 340 | 6·7 ( 0·68 ) |
| 5 | 40s/2 ( 145 dtex × 2 ) | 2 ply ( 2 strands, each single ) | 33 030 | 6·4 ( 0·65 ) |
| 6 | 6s/3 ( 1 000 dtex × 3 ) | 3 ply ( 3 strands, each single ) | 3 100 | 68·6 ( 7·00 ) |
| 7 | 10s/3 ( 590 dtex × 3 ) | 3 ply ( 3 strands, each single ) | 5 220 | 40·2 ( 4·10 ) |
| 8 | 12s/3 ( 500 dtex × 3 ) | 3 ply ( 3 strands, each single ) | 6 340 | 27·0 ( 2·75 ) |
| 9 | 16s/3 ( 370 dtex × 3 ) | 3 ply ( 3 strands, each single ) | 8 200 | 20·1 ( 2·05 ) |
| 10 | 24s/3 ( 250 dtex × 3 ) | 3 ply ( 3 strands, each single ) | 12 900 | 15·7 ( 1·60 ) |
| 11 | 32s/3 ( 185 dtex × 3 ) | 3 ply ( 3 strands, each single ) | 16 940 | 13·7 ( 1·40 ) |
| 12 | 40s/3 ( 145 dtex × 3 ) | 3 ply ( 3 strands, each single ) | 21 510 | 9·8 ( 1·00 ) |
| 13 | 50s/3 ( 120 dtex × 3 ) | 3 ply ( 3 strands, each single ) | 27 100 | 7·6 ( 0·78 ) |
| 14 | 50s/3 ( 120 dtex × 3 ) mercerised | 3 ply ( 3 strands, each single ) | 27 100 | 8·8 ( 0·90 ) |

( *Continued* )

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**TABLE 1   REQUIREMENTS OF COTTON SEWING THREADS** — *Contd*

| Variety No. | Nominal Count | Construction | Length, Min | Single Thread Breaking Load, Min |
|---|---|---|---|---|
| (1) | (2)<br>Cotton Count<br>( Decitex ) | (3) | (4)<br>m/kg | (5)<br>Newtons (kgf) |
| 15 | 60s/3<br>( 100 dtex × 3 ) | 3 ply<br>( 3 strands, each single ) | 32 690 | 6·6 ( 0·67 ) |
| 16 | 80s/3<br>( 74 dtex × 3 ) | 3 ply<br>( 3 strands, each single ) | 43 520 | 5·1 ( 0 52 ) |
| 17 | 100s/3<br>( 59 dtex × 3 ) | 3 ply<br>( 3 strands, each single ) | 53 680 | 4·0 ( 0·41 ) |
| 18 | 6s/4<br>( 1 000 dtex × 4 ) | 4 ply<br>( 4 strands, each single ) | 2 330 | 98·0 ( 10·00 ) |
| 19 | 12s/4<br>( 500 dtex × 4 ) | 4 ply<br>( 4 strands, each single ) | 4 725 | 19·6 ( 2·00 ) |
| 20 | 24s/4<br>( 250 dtex × 4 ) | 4 cord<br>( 2 strands, each 2 fold ) | 9 310 | 20·6 ( 2·10 ) |
| 21 | 32s/4<br>( 185 dtex × 4 ) | 4 cord<br>( 2 strands, each 2 fold ) | 11 750 | 17·2 ( 1·75 ) |
| 22 | 40s/4<br>( 150 dtex × 4 ) | 4 cord<br>( 2 strands, each 2 fold ) | 15 120 | 12·7 ( 1·30 ) |
| 23 | 50s/4<br>( 120 dtex × 4 ) | 4 cord<br>( 2 strands, each 2 fold ) | 19 050 | 9·8 ( 1·00 ) |
| 24 | 60s/4<br>( 100 dtex × 4 ) | 4 ply<br>( 4 strands, each single ) | 24 200 | 8·8 ( 0·90 ) |
| 25 | 80s/4<br>( 74 dtex × 4 ) | 4 ply<br>( 4 strands, each single ) | 32 180 | 6·9 ( 0·70 ) |
| 26 | 6s/5<br>( 1 000 dtex × 5 ) | 5 ply<br>( 5 strands, each single ) | 1 780 | 113 ( 11·5 ) |
| 27 | 32s/6<br>( 185 dtex × 6 ) | 6 cord<br>( 3 strands, each 2 fold ) | 7 910 | 25·5 ( 2·60 ) |
| 28 | 36s/6<br>( 165 dtex × 6 ) | 6 cord<br>( 3 strands, each 2 fold ) | 9 070 | 22·1 ( 2·25 ) |
| 29 | 40s/6<br>( 145 dtex × 6 ) | 6 cord<br>( 3 strands, each 2 fold ) | 10 720 | 21·1 ( 2·15 ) |
| 30 | 50s/6<br>( 120 dtex × 6 ) | 6 cord<br>( 3 strands, each 2 fold ) | 13 550 | 16·7 ( 1·70 ) |

( *Continued* )

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**TABLE 1   REQUIREMENTS OF COTTON SEWING THREADS** — *Contd*

| VARIETY No. | NOMINAL COUNT | CONSTRUCTION | LENGTH, *Min* | SINGLE THREAD BREAKING LOAD, *Min* |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| | Cotton Count (Decitex) | | m/kg | Newtons (kgf) |
| 31 | 60s/6 (100 dtex × 6) | 6 cord (3 strands, each 2 fold) | 15 120 | 13·2 (1·35) |
| 32 | 80s/6 (74 dtex × 6) | 6 cord (3 strands, each 2 fold) | 21 170 | 10·8 (1·10) |
| 33 | 100s/6 (59 dtex × 6) | 6 cord (3 strands, each 2 fold) | 26 250 | 8·8 (0·90) |
| 34 | 6s/8 (1 000 dtex × 8) | 8 ply (8 strands, each single) | 1 100 | 165 (16·8) |
| 35 | 22s/9 (270 dtex × 9) | 9 cord (3 strands, each 3 fold) | 3 600 | 54·9 (5·60) |
| 36 | 24s/9 (250 dtex × 9) | 9 cord (3 strands, each 3 fold) | 4 050 | 49·0 (5·C0) |
| 37 | 32s/9 (185 dtex × 9) | 9 cord (3 strands, each 3 fold) | 5 250 | 40·2 (4·10) |
| 38 | 40s/9 (145 dtex × 9) | 9 cord (3 strands, each 3 fold) | 6 550 | 31·4 (3·20) |
| 39 | 50s/9 (120 dtex × 9) | 9 cord (3 strands, each 3 fold) | 8 280 | 26·0 (2·65) |
| 40 | 6s/10 (1 000 dtex × 27) | 10 ply (10 strands, each single) | 800 | 191 (19·5) |
| 41 | 20s/27 (300 dtex × 27) | 27 cord (3 strands, each 9 foid) | 1 130 | 169 (17·25) |
| 42 | 36s/27 (165 dtex × 27) | 27 cord (3 strands, each 9 fold) | 2 020 | 98·0 (10·0) |
| 43 | 24s/45 (250 dtex × 45) | 45 cord (3 strands, each 15 fold) | 805 | 255 (26·0) |
| METHOD OF TEST | — | — | B-3 | IS : 1670-1970* |

NOTE 1 — 1 dtex (Decitex) = 0·1 tex.

NOTE 2 — The values specified for length (m/kg) and breaking load are minimum for all sewing threads irrespective of the type of finish.

*Method for determination of breaking load, elongation at break and tenacity of yarns (*first revision*).

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**3.2 Colour Fastness** — The dyed threads shall conform to the following requirements:

| Sl No. | Agency | Rating | Method of Test, Ref to |
|---|---|---|---|
| i) | Light ( *see* Note ) | 5 or better | IS : 2454-1967* |
| ii) | Washing | 4 or better | IS : 765-1966† |
| iii) | Perspiration | 4 or better | IS : 971-1966‡ |

NOTE — In case of supplies to the Ministry of Defence establishments, the colour fastness to light shall be 6 or better.

**3.3 Cuprammonium Fluidity** — The cuprammonium fluidity of sewing thread shall not be more than 8 rhes when determined by the method given in IS : 244-1969§.

**3.4 Length/Mass of Sewing Thread** — The average length and mass of sewing thread in a tube, reel or cone shall not be less than that marked on the label. However, a tolerance of minus two percent shall be permitted on an individual package.

**3.4.1** The length/mass of sewing thread shall be determined by the method given in **B-4**.

**3.5 Special Proofed Threads** — In case the sewing threads are required to be used in the manufacture of ammunition, armaments, etc, these shall be specially proofed and shall comply with the additional requirements given in Table 2.

## 4. PACKAGING

**4.1** Sewing thread shall be compactly wound in the form of tubes, reels, cones or in any other form as required. The free end of the thread shall be securely fastened to prevent unravelling.

## 5. MARKING

**5.1** Each unit package of sewing thread shall be marked, preferably on a label, with the following information:

    a) Name of the material;

    b) Nominal count ( in the case of goods supplied to government agencies ) or TICKET NUMBER;

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*Method for determination of colour fastness of textile materials to artificial light ( xenon lamp ).

†Method for determination of colour fastness of textile materials to washing: Test 4.

‡Method for determination of colour fastness of textile materials to perspiration.

§Method for determination of viscosity ( or fluidity ) of solutions of cotton and regenerated cellulose in cuprammonium hydroxide ( *first revision* ).

c) Nominal length or mass;

d) Year of manufacture ( in the case of goods supplied to government agencies ); and

e) Manufacturer's name, initials or trade-mark, if any.

## TABLE 2 REQUIREMENTS OF SPECIAL PROOFED COTTON SEWING THREADS

( *Clause* 3.5 )

| Sl No. | Characteristic | Requirement | Method of Test, Ref to |
|---|---|---|---|
| (1) | (2) | (3) | (4) |
| | A) *Chemical Requirements* | | |
| i) | $p$H value of water extract | 5·5 to 7·5 | IS : 1390-1961* |
| ii) | Water soluble matter: | | IS : 3456-1966† |
| | a) Unproofed | 0·5 percent, *Max* | |
| | b) Proofed | 1·0 percent, *Max* | |
| iii) | Water soluble chlorides calculated as NaCl | 0·05 percent, *Max* | IS : 4202-1967‡ |
| iv) | Water soluble sulphates calculated as $Na_2So_4$ | 0·25 percent, *Max* | IS : 4203-1967§ |
| v) | Ash on incineration ( in excess of ash due to proofing agents ) | 0·20 percent, *Max* | IS : 199-1973‖ |
| | B) *Requirements Related to Proofing* | | |
| vi) | Salicylanide content ( for salicylanide processed ) | 0·1 percent, *Min* | IS : 3522 ( Part I )-1966¶ and IS : 3522 ( Part II )-1970** |
| vii) | Copper content ( for copper cutch processed ) | 0·7 percent, *Min* | |
| viii) | a) Chromium content } for chrome copper processed | 0·5 to 1·5 percent | |
| | b) Copper content | 0·2 percent, *Min* | |
| ix) | Chromium content ( for chrome processed ) | 0·7 to 1·0 percent | |
| x) | Chromium and iron | 1·5 percent, *Min* | |

*Methods for determination of $p$H value of aqueous extracts of textile materials.
†Method for determination of water soluble matter of textile materials.
‡Method for determination of chloride content of textile materials.
§Method for determination of sulphate content in textile materials.
‖Methods for estimation of moisture, total size or finish, ash and fatty matter in grey and finished cotton textile materials ( *second revision* ).
¶Method for estimation of common preservatives used in textile industry, Part I.
**Methods for estimation of common preservatives used in the textile industry, Part II.

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**5.1.1** Each unit package may also be marked with the Standard Mark.

**5.2** The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act,* 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

## 6. PACKING

**6.1** Unless otherwise specified, sewing threads shall be packed according to the method laid down in IS : 1066-1969*.

## 7. SAMPLING AND CRITERIA FOR CONFORMITY

**7.1 Lot** — The quantity of cotton sewing thread of the same variety delivered to a buyer against a despatch note shall constitute the lot.

**7.2** The conformity of the lot to the requirements of this standard shall be determined on the basis of tests carried out on the samples selected from the lot.

**7.3** Unless otherwise agreed to between the buyer and the seller, the number of packs to be selected at random from a lot shall be as follows:

| *Number of Packs in the Lot* | *Number of Packs to be Selected* |
|---|---|
| Up to  15 | 5 |
| 16 ,,  30 | 7 |
| 31 ,,  50 | 10 |
| 51 ,,  100 | 15 |
| 101 ,,  300 | 25 |
| 301 and above | 30 |

**7.4** One tube or reel shall be selected at random from each of the pack selected according to **7.3**.   The tube thus selected shall constitute the test sample for determining:

    a) length in m/kg,

    b) breaking load, and

    c) length per tube or reel ( subject to a minimum of 20 tubes or reels ).

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*Code for packaging of sewing threads.

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**7.4.1** For testing colour fastness, cuprammonium fluidity and requirements for special proofed threads, two specimens for a lot size of 30 packs or less and 3 specimens for a lot size of more than 30 packs shall be taken from the tubes drawn in accordance with **7.4** and tested individually.

**7.5 Criteria for Conformity** -– The lot shall be declared as conforming to the requirements of this standard if the following conditions are satisfied:

a) From the test results for lengths in m/kg or breaking load the average $\overline{X}$ and the range $R$ or average range $\overline{R}$ shall be calculated and the value of the expression $\overline{X} - kR$ or $\overline{X} - k\overline{R}$ is greater than or equal to the relevant value specified.

NOTE 1 — Averge $\overline{X}$ is the value obtained by dividing the sum of the observed values by the number of tests.

NOTE 2 — Range $\overline{R}$ is the difference between the maximum and the minimum in a set of observed values.

NOTE 3 — When the number of test results is 10 or more, they shall be grouped in groups of five. The mean range $\overline{R}$ is the value obtained by taking the average of the ranges of the groups.

NOTE 4 — The value of the constant $k$ is equal to 0·4.

b) All the test specimens tested for colour fastness and cuprammonium fluidity and requirements for special proofed threads satisfy the relevant requirements.

c) The average of the length/mass measurements is not less than the marked length.

# APPENDIX A

## ( *Clause* 0.3 )

### GENERAL END USES

| *Variety No.* | *General End Uses* |
|---|---|
| 1 | Embroidery of emblems, insignia, etc |
| 2 | Basting, hemming and stitching of light clothing and cables |
| 3 | do |
| 4 | Clothing and hosiery |
| 5 | Clothing, hosiery and cables |
| 6 | Heavy leather and canvas material, such as tarpaulins, canopies, ankle boot uppers, harness and saddlery, bag closing, harness for jacquard looms and page-cord |

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| *Variety No.* | *General End Uses* |
|---|---|
| 7 | Gloves, tents, harness and saddlery |
| 8 | Light leather materials and for repair work |
| 9 | Light leather materials, selvedge yarn in jute cloth |
| 10 | Woollen jerseys, woollen pullovers, caps, wool-cotton short-drawers and wool-cotton vests |
| 11 | Chappal uppers, shoes and book-binding |
| 12 | Clothing, towels, household linen and hosiery |
| 13 | do |
| 14 | Synthetic and blended fabrics |
| 15 | Clothing, handkerchiefs, towels and hosiery |
| 16 | do |
| 17 | Handkerchiefs, hosiery and clothing |
| 18 | Heavy leather, canvas, tarpaulin, canopies, boot uppers, harness and saddlery, bag closing and harness for jacquard looms |
| 19 | Hand stitching of tentage and repair of door curtains |
| 20 | Umbrellas, healds, fishnets, book-binding, carpets, and woven and knitted heavy fabrics |
| 21 | Umbrellas, book-binding, healds and bags |
| 22 | Umbrella, chappal uppers, bags, book-binding, clothing and healds |
| 23 | Clothing, umbrellas, chappal uppers and healds |
| 24 | Clothing |
| 25 | Clothing and jari trade |
| 26 | Boot uppers, sole and welt |
| 27 | Book-binding, bags, tents, carpets, fishnets, healds and selvedging |
| 28 | Book-binding, bags, tents, carpets, fishnets, healds, selvedging, canvas and footwear uppers |
| 29 | Leather footwear uppers |
| 30 | do |
| 31 | Leather footwear uppers, piece-end joining and clothing |
| 32 | Footwear and clothing |
| 33 | Clothing |
| 34 | Sole, welt and shoes uppers |

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| Variety No. | General End Uses |
|---|---|
| 35 | Boots and shoe uppers, sole and welt, sports and travel goods, upholstery, spindle tape, book-binding, jari-making, harness for jacquards and light tarpaulins |
| 36 | do |
| 37 | Leather and canvas material, spindle tape, upholstery, sports goods and jari |
| 38 | Shoe uppers, upholstery, light leather and canvas materials and book-binding |
| 39 | Book sewing, upholstery, spindle tape and light leather materials |
| 40 | Sole stitching of heavy boots |
| 41 | Healds, tarpaulins and canopies |
| 42 | do |
| 43 | Healds and meteorological radiosonde/Rawin baloons |

# APPENDIX B

( *Clause* 3.4.1, and *Table* 1 )

## METHODS OF TEST

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

**B-1.1** The test specimens shall be conditioned and tested in the standard atmosphere of $65 \pm 2$ percent relative humidity and $27 \pm 2°C$ temperature ( *see* IS : 6359-1971* ).

### B-2. APPARATUS

**B-2.1 Wrap Reel** — having a perimeter of $1 m \pm 0.4$ percent. Determine the actual perimeter of the reel with a strip of gummed paper passed tightly around the reel and secured by adhesion at the overlap. Cut the paper strip and measure its length to an accuracy of $0.1$ percent.

**B-2.2 Adjustable Yard Tensioning Device** — capable of giving a reeling tension that will result in skeins of the specified length when measured under a load of $0.5$ gf /tex.

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*Method for conditioning of textiles.

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**B-2.3 Weighing Balance** — capable of weighing skeins in grams and with a sensitivity of 1 part in 500.

## B-3. DETERMINATION OF LENGTH ( m/kg )

**B-3.1** Place the package constituting the test specimen on the wrap reel ( *see* **B-2.1** ) and wind 100 m of thread under a suitable reeling tension ( *see* **B-2.2** ). Remove the thread so wound from the wrap reel and determine the mass on the weighing balance ( *see* **B-2.3** ).

**B-3.2 Calculation** — Calculate the length, m/kg, by the following formula:

$$\text{Length, m/kg} = \frac{100 \times 1\,000}{W_1}$$

where

$W_1$ = mass in g of 100 m of sewing thread.

**B-3.3** Similarly determine the length ( m/kg ) of other test specimens.

## B-4. DETERMINATION OF LENGTH/MASS OF SEWING THREAD ON REEL/TUBE/CONE OR ANY PACKAGE

**B-4.1** Place the package constituting the test specimen on the wrap reel and wind it into skein till the whole test specimen is exhausted. Remove the skein and determine the mass on the weighing balance.

**B-4.2** Similarly determine the mass of other test specimens.

**B-4.3** Determine the length of sewing thread of reel/tube/cone or any package by the following formula:

$$\text{Length, m} = \frac{a \times W_2}{1\,000}$$

where

$a$ = Length in m/kg ( *see* **B-3.2** ), and
$W_2$ = mass of sewing thread on the package ( *see* **B-4.1** ).

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# APPENDIX C

## ( *Clause* 0.5 )

### SI UNITS

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#### TABLE 3   INTERNATIONAL SYSTEM OF UNITS

**Base Units**

| QUANTITY | UNIT | SYMBOL |
|---|---|---|
| Length | metre | m |
| Mass | kilogram | kg |
| Time | second | s |
| Electric current | ampere | A |
| Thermodynamic temperature | kelvin | K |
| Luminous intensity | candela | cd |
| Amount of substance | mole | mol |

**Supplementary Units**

| QUANTITY | UNIT | SYMBOL |
|---|---|---|
| Plane angle | radian | rad |
| Solid angle | steradian | sr |

**Derived Units**

| QUANTITY | UNIT | SYMBOL | CONVERSION |
|---|---|---|---|
| Force | newton | N | $1 \ N = 0 \cdot 101 \ 972 \ kgf$ |
| Energy | joule | J | $1 \ J = 1 \ N.m$ |
| Power | watt | W | $1 \ W = 1 \ J/s$ |
| Flux | weber | Wb | $1 \ Wb = 1 \ V.s$ |
| Flux density | tesla | T | $1 \ T = 1 \ Wb/m^2$ |
| Frequency | hertz | Hz | $1 \ Hz = 1 \ c/s \ ( s^{-1} )$ |
| Electric conductance | siemens | S | $1 \ S = 1 \ A/V$ |
| Pressure, stress | pascal | Pa | $1 \ Pa = 1 \ N/m^2$ |

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## TABLE 4 RECOMMENDED SI UNITS FOR TEXTILES

| Sl No. | Characteristic | SI Unit | | Application |
|---|---|---|---|---|
| | | Unit | Abbreviation | |
| (1) | (2) | (3) | (4) | (5) |
| 1) | Length | Millimetre | mm | Fibre |
| | | Millimetre, centimetre | mm, cm | Samples and test specimens ( as appropriate ) |
| | | Metre | m | Yarns, ropes and cordages, fabrics |
| 2) | Width | Millimetre | mm | Narrow fabrics |
| | | Centimetre | cm | Other fabrics |
| | | Millimetre, centimetre | mm, cm | Samples and test specimen ( as appropriate ) |
| | | Centimetre, metre | cm, m | Carpets, druggets, durries ( as appropriate ) |
| 3) | Thickness | Micrometre ( micron ) | μm | Delicate fabrics |
| | | Millimetre | mm | Other fabrics, carpets, felts |
| 4) | Linear density | Tex | tex | Yarns |
| | | Millitex | mtex | Fibres |
| | | Decitex | dtex | Filament and filament yarns |
| | | Kilotex | ktex | Slivers, ropes and cordages |
| 5) | Diameter | Micrometre ( micron ) | μm | Fibres |
| | | Millimetre | mm | Yarns, ropes, cordages |
| 6) | Circumference | Millimetre | mm | Ropes, cordages |
| 7) | Threads in cloth : | | | Woven fabrics ( as appropriate ) |
| | a) Length | Number per centimetre | ends/cm | |
| | | Number per decimetre | ends/dm | |
| | b) Width | Number per centimetre | picks/cm | |
| | | Number per decimetre | picks/dm | |
| 8) | Warp threads in loom | Number per centimetre | ends/cm | Reeds |
| 9) | Stitches in knitted cloth: | | | Knitted fabrics ( as appropriate ) |
| | a) Length | Courses per centimetre | courses/cm | |
| | | Courses per decimetre | courses/dm | |
| | b) Width | Wales per centimetre | wales/cm | |
| | | Wales per decimetre | wales/dm | |

( Continued )

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## TABLE 4   RECOMMENDED SI UNITS FOR TEXTILES — *Contd*

| SL No. | CHARACTERISTIC | SI Unit | | APPLICATION |
|---|---|---|---|---|
| | | Unit | Abbreviation | |
| (1) | (2) | (3) | (4) | (5) |
| 10) | Stitch length | Millimetre | mm | Knitted fabrics, made-up fabrics |
| 11) | Mass per unit area | Grams per square metre | $g/m^2$ | Fabrics |
| 12) | Mass per unit length | Grams per metre | g/m | Fabrics |
| 13) | Twist | Turns per centimetre<br>Turns per metre | turns/cm<br>turns/m | Yarns, ropes ( as appropriate ) |
| 14) | Test or gauge length | Millimetre, centimetre | mm, cm | Fibres, yarns and fabric specimens ( as appropriate ) |
| 15) | Breaking load | Millinewton | mN | Fibres, delicate yarns ( skeins or individual ) |
| | | Newton | N | Strong yarns ( individual or skeins ), ropes and cordages, fabrics |
| 16) | Breaking length | Kilometre | km | Yarns |
| 17) | Tenacity | Millinewton per tex | mN/tex | Fibres, yarns ( individual or skeins) |
| 18) | Twist factor or twist multiplier | Turns per centimetre $\times$ square root of tex<br>Turns per metre $\times$ square root of tex | turns/cm $\times \sqrt{tex}$<br>turns/m $\times \sqrt{tex}$ | Yarns ( as appropriate ) |
| 19) | Bursting strength | Newton per square centimetre | $N/cm^2$ | Fabrics |
| 20) | Tear strength | Millinewton | mN | Fabrics ( as appropriate ) |
| | | Newton | N | |
| 21) | Pile height | Millimetre | mm | Carpets |
| 22) | Pile density | Mass of pile yarn in grams per square metre per millimetre pile height | $g/m^2/mm$ pile height | Pile carpet |
| 23) | Elastic modulus | Millinewton per tex per unit deformation | mN/tex/unit deformation | Fibres, yarns, strands |

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( *Continued from page 2* )

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