

6.4 Wax Finishing

6.4.1 Where wax finishing of the thread is required, bees wax substitute micro-crystalline hydrocarbon wax shall be used and the mass added by the wax finishing shall be 20 percent \pm 5 percent.

6.4.1.1 Prior to waxing, the threads shall have been rot-proofed in accordance with 6.2.

6.5 Surface Finish

Thread supplied in accordance with 6.1 (a) or 6.1 (c) shall have a soft and smooth finish but substances which may promote microbiological growth (for example, starch or modified starch) shall not be applied.

6.6 Residual Alkali Solubility

The residual alkali solubility of the sewing thread, when determined according to method given in Annex C, shall not exceed 10 percent.

6.7 pH of Aqueous Extract

The pH of the aqueous extract of the thread when

tested according to IS 1390 shall be 6.0 to 8.5.

7 CONSTRUCTION AND OTHER REQUIREMENTS

7.1 The thread shall comply with the requirements given in Table 2 unless vat dyed thread is supplied in which case the minimum breaking strengths given in Table 2 shall be reduced by 10 percent.

7.2 Balance of Twist

When approximately 1.5 m length of sewing thread is extended between the hands and the ends brought together slowly, the loop so formed shall not kink, double or re-twist. A maximum of 5 turns in the loop shall, however, be permissible.

8 SEALED SAMPLE

If, in order to illustrate or specify, the type of finish, feel, etc, of sewing thread, a sample as agreed upon between the buyer and the seller shall be sealed, the supply shall be in conformity with the sample in such respects.

Table 1 Colour Fastness Ratings

(Clause 6.3.4 ~~as is~~)

SI No. (1)	Characteristic (2)	Requirement (3)	Method of Test, Ref to (4)
i)	Colour fastness to:	5 or better	IS/ISO 105-B02
	a) Light		
	b) Washing, test C (3)	4 or better	IS/ISO 105-C10

Table 2 Constructional Particulars of Linen (Flax) Sewing Thread for Aerospace Purposes

(Clause 7.1) and D-5)

Sl No.	Variety No (see Note 1)	Universal Count in Tex (or Linen Count)	Direction of Twist	Length, in m/kg of Finished Thread	Breaking Strength, on 50 cm Test Length of Finished Thread, N, Min	
					Unwaxed	Waxed
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	1 or 1R	92 tex × 3 (or 18s/3)	S/Z	3 620 ± 170	75	60
ii)	2 or 2R	42 tex × 3 (or 40s/3)	S/Z	7 940 ± 340	36	30
iii)	3 or 3R	92 tex × 8 (or 18s/8)	Z/S	1 360 ± 80	225	190
Tolerance		± 10 percent	—	—	—	
Method of Test, Ref to		IS 1315 for universal count (for linen count see Note 2)	—	<u>Annex D</u>	IS 1670	

NOTES

1 The suffix R indicates that the thread has been rot-proofed.

2 For converting universal count in tex to linen count divide 1 654 by the value obtained for universal count in tex.

9 IDENTIFICATION

The thread shall be identified for ordering purposes by the number of this Indian Standard together with the finish and, if required, dyed the colour. This identification may be codified. For example, thread required dyed khaki and rot-proofed may be identified as Indian Standard 2196/ Khaki/PCPL.

10 PACKAGING

Linen sewing thread shall be compactly wound in the form of reels, cheeses, etc, as agreed to between the buyer and the seller in lengths of 500 m.

11 MARKING

11.1 All packages shall be wrapped in kraft paper and marked with the following information:

- Name of the material;
- Variety No.;
- Length;
- Colour fastness ratings in the case of dyed thread;

- Manufacturer's name, initials or trade-mark; and
- Month and year of manufacture.

11.2 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 there under, and the products may be marked with the Standard Mark.

11.3 For sewing threads supplied in packages of 250 g and above, the marking shall be on each individual package. Packages less than 250 g shall be boxed and the markings shall be on the outside of the box.

12 PACKING

12.1 Unless otherwise agreed to between the buyer and the seller, the sewing threads shall be packed as given in 12.2.

12.2 The packages shall be packed in cardboard cartons or wooden cases of suitable size. The weight of a cardboard carton or wooden case, when packed, shall not exceed 50 kg.

13 SAMPLING

13.1 Lot

The quantity of linen sewing thread of the same variety and quality delivered to a buyer against one despatch note shall constitute a lot.

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

13.3 Unless otherwise agreed to between the buyer and the seller, the number of reels, cheeses, etc, to be selected at random from the lot shall be in accordance with col (2) of Table 3.

13.4 The reels, cheeses, etc., selected according to 13.3 shall constitute the test sample for all the requirements except colour fastness. One test specimen shall be selected from each of the reels, cheeses, etc, selected for carrying out the test for each requirement.

13.5 The number of test specimens to be selected at random for testing colour fastness from the test sample shall be 3.

14 CRITERIA FOR CONFORMITY

The lot shall be considered to be in conformity with the requirements of this standard, if the following conditions are satisfied:

- a) None of the test specimens is found defective when tested for the requirement mentioned in ~~7.2~~ 7.2
- b) None of the test specimens tested for colour fastness shall fail to satisfy the corresponding requirements.

- c) From the results in respect of any of the requirements, namely, count, length per kilogram, breaking strength, wax finishing, rot-proofing, pH of aqueous extract and residual alkali, the average \bar{x} and the range R or the mean range \bar{R} are calculated and the applicable condition(s) from amongst those given below is/are satisfied:

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- 1) The value of the expression $\bar{X} + k\bar{R}$ or $\bar{x} + kR$ is less than or equal to U where the upper specification limit U is given.
- 2) The value of the expression $\bar{X} - k\bar{R}$ or $\bar{x} - kR$ is greater than or equal to L where the lower specification limit L is given.
- 3) If both the upper and lower specification limits U and L are given, the conditions (1) and (2) as well as the following conditions are satisfied.

The value of the expression

$$\frac{R}{U-L} \text{ or } \frac{\bar{R}}{U-L} \leq B$$

NOTES

- 1 The constant k and B shall be as given below:

Sl No.	No. of Test Result	k	B
	(n)		
(1)	(2)	(3)	(4)
i)	less than 10	0.6	0.8
ii)	10 or 15	0.7	0.6

- 2 Average \bar{X} s the value obtained by dividing the turn of the observed values by the number of tests.
- 3 Range R is the difference between the maximum and the minimum in a set of observed values.
- 4 When the number of test results is 10 or 15, they shall be grouped in groups of 5. The mean range \bar{R} is the value obtained by taking the average of the groups.

ANNEX D

(Table 2)

METHOD FOR DETERMINATION OF LENGTH IN METRES PER KILOGRAM

D-1 TEST SPECIMENS

For the purpose of this test, all reels, cheeses, etc, in the sample under test (see 13.4) shall constitute the test specimens.

D-2 CONDITIONING OF TEST SPECIMENS

Prior to test, specimens shall be conditioned in a standard atmosphere of 65 percent \pm 2 percent relative humidity and 27 °C \pm 2 °C temperature (see IS 6359) for 24 h.

D-3 APPARATUS

D-3.1 Wrap Reel — equipped with a dial showing the number of revolutions and to wind precisely one metre per revolution.

D-3.2 Analytical Balance**D-4 PROCEDURE**

D-4.1 Place one reel, cheese, etc, constituting the test

specimen on the wrap reel and wind 100 m of sewing thread. Apply sufficient tension on the thread during winding so as to keep it tight without stretching it. Remove the thread so wound from the wrap reel and determine its weight in grams.

D-4.2 Calculate the length in metres per kilogram by the following formula:

$$\text{Length, in m per kg} = \frac{100 \times 1\,000}{W}$$

where

W = mass, in g, of 100 m of sewing thread.

D-4.3 Repeat the test with the remaining reels, cheeses, etc, in the test specimen.

D-5 REPORT

Report the lot to be conformity with the relevant requirement of Table 2 if the test value satisfies the conditions prescribed in 14(c) (1), (2) and (3).