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IS 1410 (2001): Textile - Coir Ropes [TXD 9: Cordage]



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“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक
वस्त्रादि — नारियल-जट्टा की रस्सियाँ — विशिष्टि
(तीसरा पुनरीक्षण)

Indian Standard
TEXTILES — COIR ROPES — SPECIFICATION
(*Third Revision*)

ICS 59.060.10; 59.080.50

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Cordage Sectional Committee had been approved by the Textile Division Council.

This standard was originally published in 1959 and subsequently revised in 1973 and 1983. The present revision has been made in the light of the experience gained since its second revision and incorporate the following changes:

- a) Grading system has been removed.
- b) The tolerance on diameter has been specified.
- c) Linear density for oily rope has been removed.
- d) Requirements of No. of yarns/strand and linear density given in Tables 1, 2 and 3 have been modified.

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, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

TEXTILES — COIR ROPES — SPECIFICATION

(Third Revision)

1 SCOPE

1.1 This standard prescribes the requirements of the following types of coir ropes:

- a) Hawser-laid coir ropes of diameter 8 to 176 mm and with a linear density from 36 to 15 720 ktex;
- b) Shroud-laid coir ropes of diameter 24 to 176 mm and with a linear density from 321 to 17 170 ktex; and
- c) Cable-laid coir ropes of diameter 48 to 176 mm and with a linear density from 1 010 to 13 335 ktex.

1.2 This standard does not cover ropes intended for use for lifting purposes.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provision 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 below:

<i>IS No.</i>	<i>Title</i>
2 : 1960	Rules for rounding off numerical values (<i>revised</i>)
196 : 1966	Atmospheric conditions for testing (<i>revised</i>)
3256 : 1980	Code for inland packaging of ropes and cordages (<i>first revision</i>)
3871 : 1996	Textiles — Fibre ropes and cordage — Glossary of terms (<i>second revision</i>)
4145 : 1987	Code of practice for storage of ropes (<i>first revision</i>)
4575 : 1983	Code for handling of fibre ropes (<i>second revision</i>)
7071 (Parts 1 to 3) : 1989	Ropes and cordages — Methods of physical test (<i>first revision</i>)
7071 (Part 4) : 1986	Methods of physical test for ropes and cordages — Breaking load and elongation at break

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 3871 shall apply.

4 ATMOSPHERIC CONDITIONS FOR TESTING

The tests shall normally be carried out under prevailing atmospheric conditions. However, in case of dispute, test shall be carried out on samples which have been conditioned for 48 hours in standard atmosphere at 65 ± 2 percent relative humidity and $27 \pm 2^\circ\text{C}$ temperature (*see* IS 196). Where practicable, tests shall be made in the standard atmospheric conditions; otherwise, the tests shall be made as quickly as possible, but not exceeding 15 minutes, of removal of the test pieces from the conditioning atmosphere.

5 MANUFACTURE

5.1 Coir Fibre

The fibre used in the manufacture of ropes shall be coir, true to its type and shall be unadulterated and free from siliceous matter and shorts. The fibre shall be of the good quality, fineness and colour necessary to produce ropes having the characteristics specified in Tables 1 to 3.

5.2 Yarn

The yarn shall be well and evenly spun.

NOTE — All coir yarns are two-fold being formed by twisting together two single loosely twisted thread. They are all hand-made.

5.3 Strand

Strand of rope shall be well formed, free from grooves, kinks and sunken yarns and each strand shall contain an equal number of yarns. The number of yarns in each strand shall be as specified in Tables 1 to 3. The strand shall have S-lay.

5.4 Ropes

The ropes shall be well laid and free from defects and each coil shall be continuous throughout its length and shall not contain loose ends, splices or joints in the strands or in the rope. The number of strands in the rope and the lay of rope, unless otherwise specified, shall be as under:

<i>Construction</i>	<i>Number of Strands</i> (<i>see</i> Fig.1)	<i>Lay of Rope</i>
Hawser-laid	3	Z-lay
Shroud-laid	4	Z-lay
Cable-laid	9 (with 3 primary ropes twisted together)	Z-lay for primary rope and S-lay for final rope

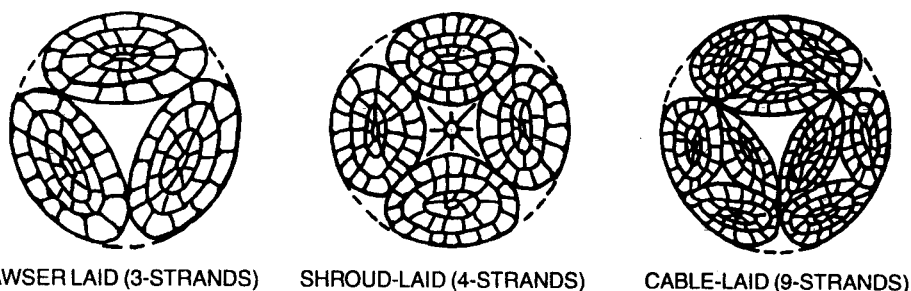


FIG. 1 STRANDS IN COIR ROPE

**Table 1 Requirements of Coir Ropes
Hawser-Laid (3-Strands)**

(Clauses 5.1, 5.3, 6.1, 6.4 and 6.5)

Nominal Diameter	No of Yarns/ Strands, <i>Min</i>	Linear Density ktex (g/m)	Breaking Strength, <i>Min</i> kN (kgf) ¹⁾
(1)	(2)	(3)	(4)
8	2	36	0.931 (95)
10	3	55	1.519 (155)
12	3	70	1.961 (200)
14	4	75	2.452 (250)
16	4	100	3.139 (320)
20	5	162	4.905 (500)
24	6	224	6.670 (680)
28	7	301	8.888 (905)
32	8	393	12.458 (1 270)
36	9	498	13.342 (1 360)
40	10	620	19.522 (1 990)
48	12	888	26.585 (2 710)
56	16	1 225	35.463 (3 615)
64	21	1 560	49.736 (5 070)
72	27	2 015	60.332 (6 150)
80	33	2 490	78.186 (7 970)
88	40	3 050	87.652 (8 935)
96	48	3 585	106.438 (10 850)
104	56	4 255	110.853 (11 300)
112	65	4 875	141.902 (14 465)
120	75	5 600	160.590 (16 370)
128	85	8 290	199.045 (20 290)
136	96	9 290	205.912 (20 990)
144	108	9 830	241.424 (24 610)
152	120	11 280	257.267 (26 225)
160	133	12 275	312.645 (31 870)
168	147	14 010	314.508 (32 060)
176	161	15 720	346.636 (35 335)

Tolerance	—	±5 per-cent	—
Method IS 7071 of Test (Parts 1 to 3)	—	IS 7071 (Parts 1 to 3)	IS 7071 (Part 4)

¹⁾ 1 kN = 101.97 kgf approximately.

**Table 2 Requirements of Coir Ropes
Shroud-Laid (4-Strands)**

(Clauses 5.1, 5.3, 6.1, 6.4 and 6.5)

Nominal Diameter	No of Yarns/ Strands, <i>Min</i>	Linear Density ktex (g/m)	Breaking Strength, <i>Min</i> kN (kgf) ¹⁾
(1)	(2)	(3)	(4)
24	3	321	5.788 (590)
28	4	428	7.760 (790)
32	5	564	10.448 (1065)
36	6	697	13.096 (1335)
40	8	877	17.020 (1735)
48	9	1285	23.152 (2360)
56	12	1695	30.116 (3070)
64	16	2265	41.398 (4220)
72	20	2810	52.680 (5370)
80	25	3350	62.490 (6370)
88	30	4290	75.390 (7685)
96	35	5120	90.301 (9205)
104	42	5965	104.967 (10700)
112	48	6790	120.761 (12310)
120	55	7915	141.509 (14425)
128	63	9050	159.020 (16210)
136	71	10145	179.032 (18250)
144	80	10735	201.056 (20495)
152	89	12320	224.796 (22915)
160	99	13405	248.144 (25295)
168	108	15290	273.512 (27890)
176	119	17170	301.608 (30745)

Tolerance	—	±5 per-cent	—
Method IS 7071 of Test (Parts 1 to 3)	—	IS 7071 (Parts 1 to 3)	IS 7071 (Part 4)

¹⁾ 1 kN = 101.97 kgf approximately.

5.5 Lubrication

Weighting or loading material shall not be used. For the purpose of dressing the fibre or for preservation of the rope, a lubricant shall be added. The quantity of dressing material applied to the fibre, when determined by extraction with petroleum ether or other suitable solvent, shall be not less than 10 nor more than 15 percent calculated on the mass of the finished rope.

**Table 3 Requirements of Coir Ropes
Cable-Laid (9-Strands)**
(Clauses 5.1, 5.3, 6.1, 6.4 and 6.5)

Nominal Diameter	No of Yarns/ Strands, <i>Min</i>	Linear Density ktex (g/m)	Breaking Strength, <i>Min</i> kN (kgf) ¹⁾
(1)	(2)	(3)	(4)
48	3	1010	15.058 (1535)
56	5	1360	20.454 (2085)
64	6	1770	26.388 (2690)
72	7	2240	33.894 (3455)
80	8	2760	41.398 (4220)
88	10	3340	50.325 (5130)
96	12	3945	60.332 (6150)
104	14	4630	69.749 (7110)
112	16	5410	81.717 (8330)
120	19	6190	93.195 (9500)
128	21	7070	105.654 (10770)
136	24	7990	120.123 (12245)
144	27	8945	135.035 (13765)
152	30	10445	150.485 (15340)
160	33	11060	166.476 (16970)
168	37	12200	181.926 (18545)
176	40	13335	199.339 (20320)
Tolerance	—	±5 per cent	—
Method of Test	IS 7071 (Parts 1 to 3)	IS 7071 (Parts 1 to 3)	IS 7071 (Part 4)

¹⁾ 1 kN = 101.97 kgf approximately.

6 REQUIREMENTS

6.1 Mass

The net mass of the coils of rope in a lot when determined in accordance with the method given in IS 7071 (Parts 1 to 3) shall not differ by more than ± 5 percent from the mass of the coils as calculated from the linear density as given in Tables 1 to 3 and length of the coils.

6.2 Pitch

The pitch of rope when determined by the method given in IS 7071 (Parts 1 to 3) shall conform to the following requirements :

Construction	Pitch X Diameter of Rope
Hawser-laid	Between 2.5 D and 3.7 D
Shroud-laid	Between 2.7 D and 3.5 D
Cable-laid	Between 2.2 D and 3.2 D

where D is the diameter of the rope.

6.3 Length of Coils

The length of rope in each coil shall not be less than 220 m or as agreed to between the buyer and the seller. Length of coil shall be determined by the method given in IS 7071 (Parts 1 to 3).

6.4 The diameter of the rope shall not be less than that specified in Tables 1 to 3 and shall not exceed by more than the following tolerances :

Diameter, mm	Tolerance, mm
Under 24	+1
24 and under 48	+2
48 and under 64	+3
64 and under 96	+4
96 and above	+5

6.5 Other Requirements

The Hawser-laid coir ropes shall conform to the requirements of Table 1, Shroud-laid coir ropes to the requirements of Table 2 and Cable-laid coir ropes to the requirements of Table 3, when tested in accordance with methods given in IS 7071 (Parts 1 to 3) and IS 7071 (Part 4).

7 FINISH

Unless specifically required by the buyer, no colouring agent shall be used. Weighting or loading material shall not be used. All ends shall be securely whipped or marled.

8 IDENTIFICATION

Ropes shall be marked for the purpose of identification as agreed to between the buyer and the seller.

9 PACKING

Unless otherwise specified, ropes shall be packed as specified in IS 3256.

10 MARKING

10.1 Each coil shall have at both ends labels securely attached on which the following shall be marked:

- Manufacturer's name or trade-mark,
- Length of rope in the coil,
- Diameter of the rope, and
- Any other marking required by the buyer.

10.2 BIS Certification Marking

Each coil may also be marked with the Standard Mark.

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

11 SAMPLING AND CRITERIA FOR CONFORMITY

11.1 Lot

The coils of rope of the same type linear density and dimensions, manufactured under similar conditions and delivered to a buyer against a despatch note shall constitute a lot.

11.2 The conformity of the lot shall be determined on the basis of tests carried out on the samples selected from it.

11.3 Sample Size

Sampling shall be as representative as possible of the lot subjected to the measurements and tests. Draw the samples at random at the rate shown by the following formula:

$$S = 0.4\sqrt{N}$$

where S is the number of coils to be selected as sample

and N is the size of the lot expressed as the number of coils. When S as calculated is not a whole number, round off the value in accordance with the requirements of IS 2. In case S is less than 1, draw one coil as sample.

11.4 For evaluating the length, diameter, linear density, breaking load and pitch, the number of coils selected according to 11.3 shall constitute the test sample.

11.5 For evaluating the net mass of the lot, all the coils in the lot shall constitute the test sample.

11.6 Criteria for Conformity

The lot shall be declared conforming to this standard if the conditions given below are satisfied:

- a) The length of each coil selected as sample is not less than the specified/declared length, and
- b) The average values of the test results in respect of other requirements conform to the requirements specified in the standard.

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Amendments Issued Since Publication

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