भारतीय मानक **IS 14190 : 2023**

Indian Standard

वस्त्रादि — मछली पकड़ने के प्रयोजनों के लिए संयोजित तार के रस्से — विशिष्टि

(पहला पुनरीक्षण)

Textiles — Combination Wire Ropes for Fishing Purposes — Specification

(First Revision)

ICS 65.150; 59.080.50

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June 2023 **Price Group 7**

Textile Material for Marine/Fishing Purposes Sectional Committee, TXD 18

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards after the draft was finalized by the Textile Material for Marine/Fishing Purposes Sectional Committee and approved by the Textiles Division Council.

The term 'Combination Rope' is exclusively used for ropes which are made up of fibre yarns and steel wires in such a way that the strands of rope are covered by a layer of fibre yarns over steel wires.

This standard was first published in 1995. This revision has been made in the light of experience gained since its publication and to incorporate the following major changes:

a) Requirement for identification of material has been incorporated;
b) Requirement for 'Conditioning of test specimens and atmospheric conditions for testing' have been incorporated;
c) Packing clause has been incorporated;
d) Marking clause has been modified; and
e) References to Indian standards have been updated.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

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.

Indian Standard

TEXTILES — COMBINATION WIRE ROPES FOR FISHING PURPOSES — SPECIFICATION

(First Revision)

1 SCOPE

This standard specifies the requirements for the rope made from a combination of wire and fibre of ordinary lay for deep sea trawling purposes. The following rope constructions and range of sizes are included in this standard:

Construction	*Strand*	*Core*	*Size,* mm
6 × 8 (8/f)	Round	Steel or Fibre core	12 to 21
6 × 12 (12/f)	-do-	-do-	13 to 23
6 × 15 (9/6/f)	-do-	-do-	14 to 22
6 × 18 (12/6/f)	-do-	-do-	15 to 23
6 × 21 (12/9/f)	-do-	-do-	16 to 24
6 × 24 (15/9/f)	-do-	-do-	18 to 26

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 listed in Annex A.

3 CONDITIONING OF TEST SPECIMENS AND ATMOSPHERIC CONDITIONS FOR TESTING

3.1 Conditioning of Test Specimens- Prior to the test, the test specimens shall be conditioned to moisture equilibrium in a standard atmosphere at (65 ± 2) percent relative humidity and 27 °C ± 2 °C temperature (*see also* IS 6359), unless otherwise provided for in an agreement between the buyer and the seller.

3.1.1 When the test specimens have been left in the standard atmosphere for 24 h in such a way as to expose, as far as possible, all portions of the specimens to the atmosphere, they shall be deemed to have reached moisture equilibrium.

3.2 All tests shall be carried out in standard atmospheric conditions (*see* **3.1**), unless otherwise provided for in an agreement between the buyer and the seller.

4 TERMINOLOGY

For the purpose of this standard, the terms and definitions as given in IS 2363, shall apply.

5 MATERIAL

5.1 The galvanized wire used for the manufacture of the rope shall conform to IS 1835. The tensile designation of wire, in N/mm^2 shall be any of the following:

1 230, 1 420 and 1 570.

5.2 Polypropylene fibrillated 2 mm to 3 mm diameter or flat tape single strand soft twisted having tensile strength of 70 N/mm^2 to 100 N/mm^2 and 15 percent to 20 percent elongation shall be used as cover for strands.

5.3 Main Core of Rope

The central or main core of the rope shall be of a size sufficient to give full support to the strands and shall be of steel wire or fibre construction as specified by the buyer.

5.3.1 *Steel Core*

5.3.1.1 The steel core shall have an independent steel wire rope construction (IWRC).

5.3.1.2 The diameter of the central fibre core shall be 1.7 times to 1.8 times the polypropylene cover.

NOTE — When a steel core is specified by a buyer, wires of tensile strength to that of wires used in the manufacture of the rope strand shall be used for the main core of the rope.

5.3.2 *Fibre Core*

The fibre core shall have a central core with covering on the same.

5.3.2.1 *Material for the central core*

Polypropylene fibrillated 4 mm to 8 mm diameter, or flat tape, soft twisted, 3 strands, 'S' twist, having breaking strength of 150 N/mm^2 to 200 N/mm^2 and 15 percent to 20 percent elongation.

5.3.2.2 *Material for covering*

Same as the cover for strands (*see* **5.2**).

6 SIZE AND LENGTH

6.1 Size

The size of the rope shall be expressed in terms of the nominal diameter and shall be in accordance with Table 1 to Table 6 as specified by the buyer.

6.1.1 The diameter of the rope shall be determined in accordance with the method prescribed in Annex A of IS 6594 and shall be subject to a tolerance of ± 4 percent.

Table 1 Breaking Load and Mass for 6 × 8 (8/f) Construction
(*Clauses* 6.1 and 9.1)

Sl No.	Nominal Diameter	Mass per 100 m (for Guidance Only)		Minimum Breaking Load of Rope corresponding to Tensile Designation of the wires of					
				1 230		1 420		1 570	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
	mm	kg	kg	kN	kN	kN	kN	kN	kN
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	12	17.90	21.05	12.80	20.65	14.90	24.12	15.51	25.10
ii)	14	23.20	26.90	16.80	27.25	19.70	31.80	22.00	36.00
iii)	16	30.10	35.10	23.25	35.55	27.15	43.85	30.55	49.35
iv)	18	41.30	47.90	30.25	48.85	35.30	57.00	40.25	65.00
v)	19	51.40	59.65	38.40	62.00	44.00	72.35	52.35	85.20
vi)	21	63.50	73.70	46.50	75.15	55.30	87.70	63.02	101.80

Table 2 Breaking Load and Mass for 6 × 12 (12/f) Construction
(*Clauses* 6.1 and 9.1)

Sl No.	Nominal Diameter	Mass per 100 m (for Guidance Only)		Minimum Breaking Load of Rope corresponding to Tensile Designation of the wires of					
				1 230		1 420		1 570	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
	mm	kg	kg	kN	kN	kN	kN	kN	kN
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	13	21.20	23.70	17.45	23.80	22.40	27.80	21.10	28.75
ii)	15	26.80	31.10	23.55	32.15	29.50	37.50	31.30	42.65
iii)	17	36.90	41.50	32.90	44.00	40.70	51.40	42.90	58.50
iv)	19	50.10	56.30	40.60	58.30	52.95	68.00	56.70	77.40
v)	21	63.30	71.15	54.10	73.80	67.20	86.10	72.00	98.20
vi)	23	78.40	88.90	67.20	91.65	81.45	107.10	89.45	122.00

Table 3 Breaking Load and Mass for 6 × 15 (9/6/f) Construction
(*Clauses* 6.1 and 9.1)

Sl No.	Nominal Diameter	Mass per 100 m (for Guidance Only)		Minimum Breaking Load of Rope corresponding to Tensile Designation of the wires of					
		Fibre Core	Steel Core	1 230		1 420		1 570	
				Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
	mm	kg	kg	kN	kN	kN	kN	kN	kN
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	14	30.20	33.70	26.40	34.60	30.80	40.35	34.00	45.00
ii)	16	40.10	44.80	35.80	47.25	42.00	55.10	47.80	62.75
iii)	18	54.15	60.55	63.00	63.00	56.25	74.80	64.00	83.62
iv)	20	69.90	70.70	62.00	80.55	72.30	94.00	82.55	107.10
v)	22	87.30	97.35	77.50	100.45	90.50	117.40	103.10	133.75

Table 4 Breaking Load and Mass for 6 × 18 (12/6/f) Construction
(*Clauses* 6.1 and 9.1)

Sl No.	Nominal Diameter	Mass per 100 m (for Guidance Only)		Minimum Breaking Load Rope corresponding to Tensile Designation of the wires of					
		Fibre Core	Steel Core	1 230		1 420		1 570	
				Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
	mm	kg	kg	kN	kN	kN	kN	kN	kN
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	15	33.10	38.60	32.30	39.65	37.65	46.30	41.80	51.75
ii)	17	50.30	55.20	44.10	54.20	51.40	63.20	58.55	72.00
iii)	19	63.00	69.40	58.90	72.20	68.70	84.25	78.15	95.85
iv)	21	80.95	88.90	75.20	92.20	88.10	107.60	102.15	122.60
v)	23	95.40	101.40	94.25	114.95	110.10	134.30	125.45	153.00

Table 5 Breaking Load and Mass for 6 × 21 (12/9/F) Construction
(*Clauses* 6.1 and 9.1)

Sl No.	Nominal Diameter	Mass per 100 m (for Guidance Only)		Minimum Breaking Load Rope corresponding to Tensile Designation of the wires of					
				1 230		1 420		1 570	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
	mm	kg	kg	kN	kN	kN	kN	kN	kN
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	16	38.85	42.35	36.65	43.40	42.55	50.65	47.85	56.25
ii)	18	51.85	56.25	50.00	59.25	58.30	69.15	66.35	78.70
iii)	20	69.60	76.00	66.75	79.20	78.15	92.35	88.90	105.10
iv)	22	89.80	97.80	76.15	94.40	100.55	118.30	114.55	131.85
v)	24	112.10	122.60	101.75	117.60	125.90	147.90	143.45	168.50

Table 6 Breaking Load and Mass for 6 × 24 (15/9/F) Construction
(*Clauses* 6.1 and 9.1)

Sl No.	Nominal Diameter	Mass per 100 m (for Guidance Only)		Minimum Breaking Load Rope corresponding to Tensile Designation of the wires of					
				1 230		1 420		1 570	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
	mm	kg	kg	kN	kN	kN	kN	kN	kN
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	18	43.75	47.25	42.55	48.50	49.65	56.55	54.90	63.00
ii)	20	58.10	62.80	58.00	66.20	67.70	77.25	79.10	87.95
iii)	22	78.50	84.85	77.65	88.40	90.60	103.15	103.10	117.30
iv)	24	101.05	109.05	99.70	123.10	116.30	131.90	132.55	150.35
v)	26	126.50	136.65	124.60	141.65	155.50	164.80	165.80	187.75

6.2 Length

6.2.1 The length of rope with plain end shall not be less than the specified length. However, a tolerance of + 5 percent shall be permitted for length up to 400 m. For lengths above 400 m, the permitted positive tolerance shall be 20 m for every 1 000 m of length or part thereof.

6.2.2 The length of the rope with fitted ends shall conform to the requirements of the order. The length shall be measured without tension.

7 CONSTRUCTION

7.1 Various constructions of the rope are shown in Fig. 1 to Fig. 6. The type of construction shall be as specified by the buyer.

FIG. 1 6 × 8 (8/f) COMBINATION WIRE ROPES

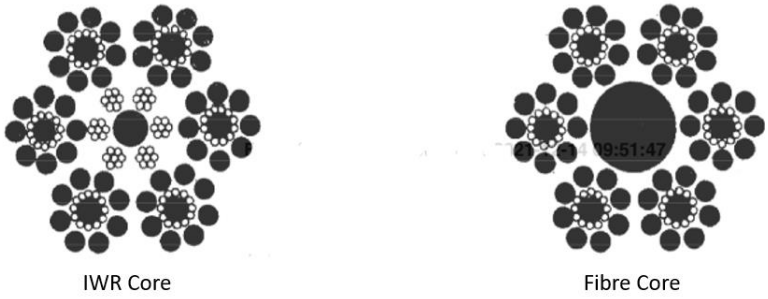

FIG. 2 6 × 12 (12/f) COMBINATION WIRE ROPES

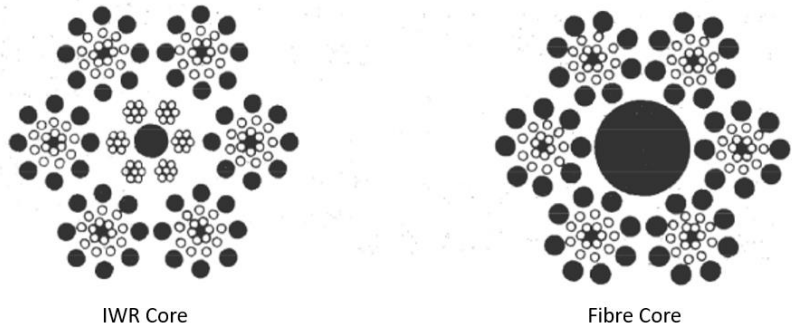

FIG. 3 6 × 15 (9/6/f) COMBINATION WIRE ROPES

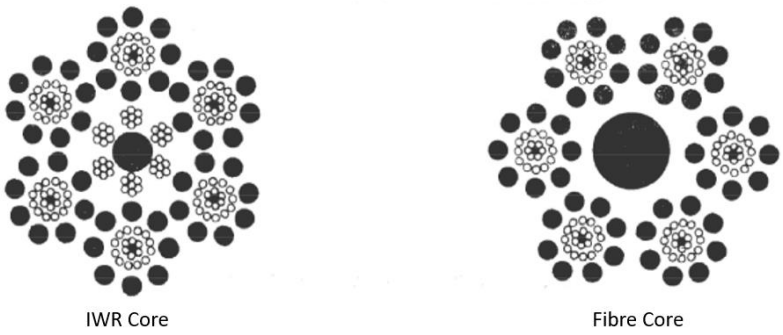

FIG. 4 6 × 18 (12/6/f) COMBINATION WIRE ROPES

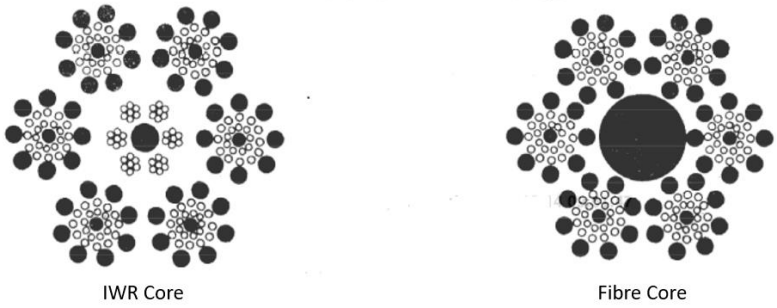

FIG. 5 6 × 21 (12/9/f) COMBINATION WIRE ROPES

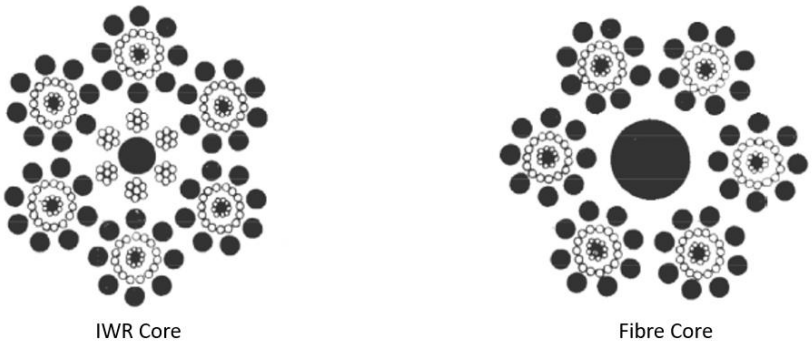

FIG. 6 6 × 24 (15/9/f) COMBINATION WIRE ROPES

7.2 The rope shall be of regular right-hand lay. The length of lay of the ropes shall not be more than 6.5 times the diameter of the rope.

NOTE — The construction of covered strands and uncovered strands are regular left-hand that of the central core and core strands are regular right-hand lay.

8 GENERAL REQUIREMENTS

8.1 Fibre Identification

The fibre of the rope (outer layer) shall be identified by the confirmatory test as specified in IS 667.

8.2 The ropes shall comply with the requirements laid down in IS 6594.

8.3 Joints

8.3.1 Joints in the wires shall be avoided as far as possible but where necessary, they shall be as wide apart as possible and in no case, more than one wire shall be joined in any length of 10 m (or less) of the strand.

8.3.2 All wire joints shall be either brazed or electrically welded. If the joint is brazed, it shall be properly scarfed; if welded, it shall be properly annealed.

8.4 Freedom from Defects

The completed rope shall be free from visible defects, loose, wires, open strands or other irregularities. It shall be evenly laid and shall remain in that condition when properly unwound from the reel or coil.

9 TESTS

9.1 Breaking Load

The minimum breaking load of the rope shall be as specified in Table 1 to Table 6 when tested by the method prescribed in Annex B of IS 6594.

9.1.1 The minimum breaking load shall be used as the basis of calculation for factors of safety, but in order to allow for vagaries of the tests to destruction, the breaking strength is subjected to an under-load tolerance of 5 percent.

9.2 Test on Wire

9.2.1 *Tensile Test*

Test samples of unstranded wires when tested in accordance with IS1608 (Part 1) shall conform to the requirements specified in IS 1835 subject to a

reduction of not more than 50 N/mm^2 in the minimum value for the particular size and tensile designation of the wire.

9.2.2 *Torsion Test*

Torsion test shall be carried out in accordance with IS 1717 and the unstranded wires shall comply with appropriate requirements of IS 1835 except that the minimum number of torsions may be 75 percent (to the nearest whole number specified). When the test length other than 100 times the diameter is used, the number of twists shall be proportional to the length.

10 SAMPLING AND CRITERIA OF CONFORMITY

10.1 Lot

The quantity of rope of the same size and construction manufactured from the same material under similar conditions and delivered to the buyer against one dispatch note shall constitute a lot.

10.2 For ascertaining to the conformity of the lot, the procedure for sampling and inspection as given in IS 2500 (Part 1) shall be followed.

10.2.1 For dimensions, a single sampling plan with inspection level IV and acceptance quality limit (AQL) of 2.5 percent as given in Table 1 and Table 2 of IS 2500 (Part 1) shall be followed.

10.2.2 For breaking load, a single sampling plan with inspection level IV and AQL of 2.5 percent as given in Table 1 and Table 2 of IS 2500 (Part 1) shall be followed.

10.3 When specified by the purchaser, inspection and testing of wires from the completed rope shall be carried out. In order to obtain samples of wires, a suitable length from one end of the coil shall be cut off and unstranded. The wires shall then be mixed together and 9 wires shall be drawn at random for tensile testing (*see* **10.2.1**) and 9 wires for torsion testing (*see* **10.2.2**). Where more than one size of wire is used in the rope, quantities of each size of wire taken for testing shall be proportional to their numbers in the rope.

10.3.1 All the individual test samples tested for tensile test and torsion test satisfy the specified requirement. However, in case of a failure of a test specimen drawn from a coil, another sample (*see* **10.3**) shall be retested from the same coil and the same shall satisfy the requirement.

11 PACKING

Unless otherwise agreed to between the buyer and the seller, the combination wire ropes shall be packed in accordance with IS 3256. Further, the rope shall be suitably protected to avoid damage in transit and corrosion. Ropes of ordinary lay may be supplied in coils or reels as required by the purchaser.

12 Marking

12.1 A tag securely attached to each coil of the rope shall be legibly and indelibly marked with the following information:

a) Construction of rope;
b) Lot Number;
c) Type of fibre;
d) Type of core;
e) Nominal diameter and length of rope; and
f) Indication of the source of manufacture.

12.2 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 products may be marked with the Standard Mark.

ANNEX A

(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No.	*Title*	*IS No.*	*Title*
IS 667 : 1981	Methods for identification of textile fibres (*first revision*)	IS 2363 : 2022	Glossary of terms relating to wire ropes (*second revision*)
IS 1608 (Part 1) : 2022	Metallic materials — Tensile testing: Part 1 Method of test at room temperature (*fifth revision*)	IS 2500 (Part 1) : 2000	Sampling procedures for inspection by attributes: Part 1 Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection (*third revision*)
IS 1717 : 2018	Metallic materials — Wire — Simple torsion test (*fourth revision*)	IS 3256 : 1980	Code for inland packaging of ropes and cordages (*first revision*)
IS 1835 : 1976	Specification for round steel wire for ropes (*third revision*)	IS 6359 : 2023	Method for conditioning of textiles (*first revision*)
IS 2266 : 2019	Steel wire ropes for general engineering purpose — Specification (*fifth revision*)	IS 6594 : 2018	Technical supply conditions for steel wire ropes and strands (*third revision*)

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

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Amendments Issued Since Publication

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