भारतीय मानक **IS 2266 : 2024**

Indian Standard

सामान्य इंजीनियरिंग प्रयोजनों में प्रयुक्त इस्पात वायर रस्सियाँ — विशिष्टि

(छठा पुनरीक्षण)

Steel Wire Ropes for General Engineering Purpose — Specification

(Sixth Revision)

ICS 53.020.30; 77.140.65

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

September 2024 **Price Group 11**

Wire Ropes and Wire Products Sectional Committee, MED 10

FOREWORD

This Indian Standard (Sixth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Wire Ropes and Wire Products Sectional Committee had been approved by the Mechanical Engineering Division Council.

This standard was first published in 1963 and subsequently revised in 1970, 1977, 1989, 2002 and 2019. The standard is being revised again for incorporating the modifications found necessary as a result of experience gained with the use of this standard. Also, the major changes in the standard in this revision are given below:

a) The scope of the standard has been modified;
b) Provision for rope size and tolerance has been modified;
c) Requirements for minimum breaking force of wire has been modified in **5**;
d) Wire construction, core and galvanization requirement has been modified in **7**, **8** and **10** respectively;
e) Tables for rope construction have been modified; and
f) Clause **13** packing requirements has also been modified.

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

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 : 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

STEEL WIRE ROPES FOR GENERAL ENGINEERING PURPOSE — SPECIFICATION

(Sixth Revision)

1 SCOPE

This standard covers general requirements for steel wire ropes used in cranes, excavators and other engineering applications. Most common rope constructions and rope types are given in following table. Common rope grades, cores and size ranges are identified by 'x' mark however, other sizes, intermediate grades (up to including 2160 grade) and core may be supplied as agreed between manufacturer and purchaser.

Specially developed constructions may be supplied to fulfil specific requirement of purchaser.

Class	*Construction*	*Type*	*Rope Grade*				*Core*		*Size Range* (*Diameter,* in mm)	*Ref to Table*
			1570	1770	1960	2160	Fibre	Steel		
4 × 19	4 × 19S (9-9-1)	Round	x	x	x	-	x	-	8 to 48	15
	4 × 25F (12-6F-6-1)		x	x	x	-	x	-	8 to 48	15
	4 × 26SW (10-5+5-5-1)		x	x	x	-	x	-	8 to 48	15
4 × 36	4 × 31SW (12-6+6-6-1)		x	x	x	-	x	-	8 to 48	15
	4 × 36SW (14-7+7-7-1)		x	x	x	-	x	-	8 to 48	15
	4 × 41SW (16-8+8-8-1)		x	x	x	-	x	-	8 to 48	15
6 × 7	6 × 7 (6-1)		x	x	x	-	x	x	2 to 12	1
6 × 19M	6 × 19 M (12/6-1)		x	x	x	-	x	x	3 to 52	2
6 × 37M	6 × 37 M (18/12/6-1)		x	x	x	-	x	x	6 to 64	3
6 × 19	6 × 17 S(8-8-1)		x	x	x	x	x	x	8 to 52	4
	6 × 19 S (9-9-1)		x	x	x	x	x	x	8 to 52	4
	6 × 21 F (10-5F-5-1)		x	x	x	x	x	x	8 to 64	5
	6 × 25 F (12-6F-6-1)		x	x	x	x	x	x	8 to 64	5
	6 × 29F (14-7F-7-1)		x	x	x	x	x	x	8 to 64	5
	6 × 26 SW (10-5+5-5-1)		x	x	x	x	x	x	8 to 52	6
6 × 36	6 × 31 SW (12-6+6-6-1)		x	x	x	x	x	x	8 to 52	6
	6 × 36 SW (14-7+7-7-1)		x	x	x	x	x	x	8 to 76	6

Class	*Construction*	*Type*	*Rope Grade*				*Core*		*Size Range* (*Diameter,* in mm)	*Ref to Table*
			1570	1770	1960	2160	Fibre	Steel		
	6 × 41 SW (16-8+8-8-1)		x	x	x	x	x	x	32 to 92	6
	6 × 46SW (18-9+9-9-1)		x	x	x	x	x	x	45 to 92	6
	6 × 52SW (18-9+9-9/6-1)		x	x	x	x	x	x	45 to 92	6
	6 × 49 SWS (16-8+8-8-8-1)		x	x	x	x	x	x	45 to 92	6
	6 × 55 SWS (16-8+8-8-8/6-1)		x	x	x	x	x	x	52 to 92	6
	6 × 37SF (12-12-6F-6-1)		x	x	x	x	x	x	25 to 92	6
	6 × 41SF (16-8F-8-8-1)		x	x	x	x	x	x	25 to 92	6
	6 × 43SF (14-14-7F-7-1)		x	x	x	x	x	x	25 to 92	6
	6 × 49SF (16-16-8F-8-1)		x	x	x	x	x	x	25 to 92	6
	6 × 50SFS (14-14-7F-7-7-1)		x	x	x	x	x	x	25 to 92	6
	6 × 55SF (18-18-9F-9-1)		x	x	x	x	x	x	25 to 92	6
	6 × 57SFS (16-16-8F-8-8-1)		x	x	x	x	x	x	25 to 92	6
8 × 19	8 × 19S (9-9-1)		x	x	x	x	x	x	8 to 52	7
	8 × 25F (12-6F-6-1)		x	x	x	x	x	x	8 to 52	8
	8 × 26SW (10-5+5-1)		x	x	x	x	x	x	16 to 68	9
8 × 36	8 × 31SW (12-6+6-6-1)		x	x	x	x	x	x	16 to 68	9
	8 × 36SW (14-7+7-7-1)		x	x	x	x	x	x	16 to 68	9
	8 × 41SW (16-8+8-8-1)		x	x	x	x	x	x	28 to 68	9
	8 × 46SW (18-9+9-9-1)		x	x	x	x	x	x	28 to 68	9
	8 × 52SW (18-9+9-9/6-1)		x	x	x	x	x	x	28 to 68	9
	8 × 37SF (12-12-6F-6-1)		x	x	x	x	x	x	16 to 68	9
	8 × 43SF (14-14-7F-7-1)		x	x	x	x	x	x	19 to 68	9

Class	*Construction*	*Type*	*Rope Grade*				*Core*		*Size Range* (*Diameter,* in mm)	*Ref to Table*
			1570	1770	1960	2160	Fibre	Steel		
	8 × 49SF (16-16-8F-8-1)		x	x	x	x	x	x	28 to 68	9
	8 × 50SFS (14-14-7F-7-7-1)		x	x	x	x	x	x	28 to 68	9
	8 × 55SF (18-18-9F-9-1)		x	x	x	x	x	x	28 to 68	9
	8 × 57SFS (16-16-8F-8-8-1)		x	x	x	x	x	x	28 to 68	9
18 × 7	17 × 7 [11 × 7(6-1): 6 × 7(6-1)]		x	x	x	x	x	x	6 to 40	10
	18 × 7[12 × 7(6-1): 6 ×7(6-1)]		x	x	x	x	x	x	6 to 40	10
34(M) × 7	34 × 7[17 × 7(6-1): 11 × 7(6-1)/6 × 7(6-1)]		x	x	x	x	x	x	12 to 56	11
	36 × 7[18 × 7(6-1): 12 × 7(6-1)/6 × 7(6-1)]		x	x	x	x	x	x	12 to 56	11
15 × 7	15 × 7 (6-1)		x	x	x	x	-	x	8 to 20	14
	16 × 7 (6-1)		x	x	x	x	-	x	8 to 20	14
35(W) × 7	28 × 7 [16 (6-1) : 4 (6-1) + 4 (6-1) – 4 (6-1)]		x	x	x	x	-		8 to 20	14
	29 × 7 [16 (6-1) : 6F (6-1) – 6 (6-1) – 1 (6-1)]		x	x	x	x	-	x	8 to 60	14
	35 × 7 [16 (6-1) :6 (6-1) + 6 (6-1) – 6 (6-1) – 1 (6-1)]		x	x	x	x	-	x	8 to 60	14
	40 × 7 [18 (6-1) : 7 (6-1) + 7 (6-1) – 7 (6-1)-1 (6-1)]		x	x	x	x	-	x	8 to 60	14
35(W) x 19	35 × 19S [16 (9-9-1) : 6 (9-9-1) + 6 (9-9-1) – 6 (9-9-1) – 1 (9-9-1)]		x	x	x	x	-	x	40 to 60	14
	12 × 6 (6-0): 3 × 24 (15/9-Fibre)	Oval	x	x	x	-	x	x	8 to 40	12

Class	*Construction*	*Type*	*Rope Grade*				*Core*		*Size Range (Diameter,* in mm)	*Ref to Table*
			1570	1770	1960	2160	Fibre	Steel		
	6 × V25 (12/12-Δ)	Flattened strand	x	x	x	-	x	x	12 to 48	13

2 REFERENCES

The standards given below 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 edition of these standards:

IS No.		*Title*
IS 1804 2004	:	Steel wire ropes — Fibre main cores (*fourth revision*)
IS 1835 1976	:	Specification for round steel wires for ropes (*third revision*)
IS 6594 2018	:	Technical supply conditions for steel wire ropes and strands (*third revision*)

3 TERMINOLOGY

For the purpose of this standard the terms given in IS 2363 shall apply.

4 ROPE SIZE AND TOLERANCE

Purchaser shall specify the size of the rope designated as 'Nominal Diameter'. The most common rope sizes are given in Table 1 to Table 15, however other sizes may be supplied as agreed between manufacturer and purchaser. The actual diameter of the rope as supplied shall be within following percent of the nominal diameter.

Sl No.	*Nominal Diameter of Rope* 'd' mm	*Tolerance as Percentage of Nominal Diameter*
(1)	(2)	(3)
i)	$2 \leq d < 4$	- 0, + 8
ii)	$4 \leq d < 6$	- 0, + 7
iii)	$6 \leq d < 8$	- 0, + 6
iv)	$d \geq 8$	- 0, + 5

NOTE — Some specific applications of wire ropes may require specific rope diameter tolerances, for example, plastic valley filled ropes and combination ropes for fishing application, swaged ropes for logging application and wire ropes for marble cutting application hence such specific ropes applications may have rope diameter tolerances different to the mentioned in table above and agreed between manufacturer and purchaser.

5 MINIMUM BREAKING FORCE

The values of minimum breaking force:

a) Shall not be less than as specified in Table 1 to Table 15, given for more common construction and sizes and grades. For intermediate rope diameters, the values shall not be less than those obtained using formula in **6.6** of IS 6594.

or

b) As agreed between manufacture and purchaser (for the constructions not covered in Table 1 to Table 13 and other specially developed wire ropes for example, competed ropes, cushion core ropes. Plastic valley filled wire ropes, swaged ropes and combination ropes etc).

NOTE — Rope grade shall be 1570, 1770, 1960, 2160 or intermediate grades as agreed between manufacturer and purchaser.

6 GENERAL REQUIREMENT

The wire rope shall conform to IS 6594 and shall meet the following requirements.

7 CONSTRUCTION

The rope construction may be chosen from **1**. However, considering wide range of engineering application other varieties of construction may be developed, manufactured and supplied with the consent of users.

Special developed ropes like compacted ropes, cushion core ropes, plastic valley filled ropes, swaged ropes, combination rope, parallel closed etc. may also be supplied to fulfil special requirement of the customer as agreed between manufacture and supplier.

8 CORE

Cores of single layer stranded rope shall normally be of steel or fibre, although other types such as composites (for example, steel plus fibre or steel plus polymers) or solid polymer may also be

supplied if agreed between manufacturer and purchaser.

8.1 Fibre Core

Fibre core shall be as per IS 1804.

8.2 Steel Core

Steel core shall be as per IS 6594.

NOTE — Other type cores such as composite core, cushion core or solid polymer cores shall be as agreed between manufacturer and supplier.

9 JOINTS

Tucked joints in wires during rope making are permitted for wires of 0.5 mm diameter and smaller.

10 GALVANIZING

When galvanizing is required it shall conform to any of the Type (A, AB or B) of IS 1835 as may be specified by the purchaser. Zn-Al alloy coating may also be supplied for improved corrosion resistance as agreed between manufacturer and purchaser.

11 SAMPLING PLAN

11.1 Lot

Steel wire ropes of same size manufactured using the same set of strands and same type of core under identical condition of production shall constitute a lot.

NOTE — Manufacturer shall provide evidence of the tractability of the individual rope lengths to the parent rope to establish that those represent the lot as defied above.

11.2 For ascertaining the conformity of a lot. The following sampling plan shall be made:

a) Dimensional checking — 100 percent; and

b) Breaking force test — One sample from a lot.

12 MARKING

12.1 The size, construction, rope grade, lay, core coating and length of wire rope, reel/coil number along with the order number of purchaser and any other marking which may be specified by the purchaser shall be legibly mentioned on a suitable tag securely attached when wire ropes are supplied in coils. In case wire ropes are supplied in reels, the information may be stenciled on both sides of the reels or stenciled on one side of the reel and a suitable tag giving the same information may be attached on the other side of the reel.

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.

13 PACKING

The ropes shall be protected suitably to avoid damage in transit and corrosion.

Table 1 Mass and Breaking Force for 6 × 7(6-1) Construction Ropes

(*Clauses* 1, 4 *and* 5)

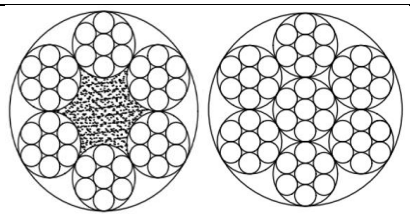
Typical Cross Section	Typical Construction	
	Rope Construction	Strand Construction
 WITH FIBRE CORE (CF) WITH STEEL CORE (CWS)	6 × 7	6 to 1

Table 1A Non-compacted Ropes

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
				1570		1770		1960	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	2	1.43	1.57	2.1	2.3	2.4	2.5	2.6	2.8
ii)	3	3.22	3.54	4.7	5.1	5.3	5.7	5.9	6.3
iii)	4	5.72	6.29	8.3	9.0	9.4	10.2	10.4	11.3
iv)	5	8.94	9.83	13.0	14.1	14.7	15.9	16.3	17.6
v)	6	12.9	14.2	18.8	20.3	21	23	23	25
vi)	7	17.5	19.3	25.6	27.6	29	31	32	34
vii)	8	22.9	25.2	33	36	38	41	42	45
viii)	9	28.9	31.8	42	46	48	51	53	57
ix)	10	35.7	39.3	52	56	59	64	65	70
x)	11	43.2	47.6	63	68	71	77	79	85
xi)	12	51.5	56.6	75	81	85	91	94	101

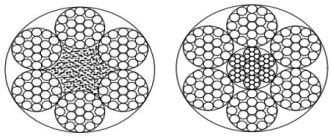
NOTE — To calculate the aggregate breaking force multiply the figures given in col (6), (8) and (10) by 1.111 and in (5), (7) and (9) by 1.193. Wire strand core (CWS) may be used for rope diameter 12 mm and below.

Table 1B Compacted Ropes

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
				1570		1770		1960	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN
i)	2	1.64	-	2.36	-	2.66	-	2.94	-
ii)	3	3.69	-	5.3	-	5.97	-	6.62	-
iii)	4	6.56	-	9.42	-	10.6	-	11.8	-
iv)	5	10.3	-	14.7	-	16.6	-	18.4	-
v)	6	14.8	-	21.2	-	23.9	-	26.5	-
vi)	7	20.1	-	28.8	-	32.5	-	36	-
vii)	8	26.2	-	37.7	-	42.5	-	47	-
viii)	9	33.2	-	47.7	-	53.8	-	59.5	-
ix)	10	41	-	58.9	-	66.4	-	73.5	-
x)	11	49.6	-	71.2	-	80.3	-	88.9	-
xi)	12	59	-	84.8	-	95.6	-	106	-

Table 2 Mass and Breaking Force for 6 × 19 M(12/6-1) Construction Ropes

(*Clauses* 1, 4 *and* 5)

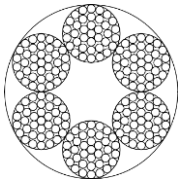
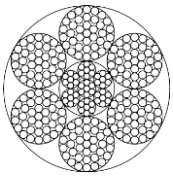
Typical Cross Section	Typical Construction	
	Rope Construction	Strand Construction
 WITH FIBRE CORE (CF) WITH STEEL CORE (CWR)	6 × 19M	12/6-1

Sl No.	Nominal Diameter	Approximate Mass		Minimum Braking Force Corresponding to Rope Grade of					
				1570		1770		1960	
		Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN
i)	3	3.11	3.43	4.3	4.7	4.9	5.3	5.4	5.9
ii)	4	5.54	6.09	7.7	8.3	8.7	9.4	9.6	10.4
iii)	5	8.65	9.52	12.1	13	13.6	14.7	15.1	16.3
iv)	6	12.5	13.7	17.4	18.8	19.6	21	22	23
v)	7	17	18.6	23.6	25.5	27	29	30	32
vi)	8	22.1	24.4	31	33	35	38	39	42
vii)	9	28	30.8	39	42	44	48	49	53
viii)	10	34.6	38.1	48	52	54	59	60	65
ix)	11	41.9	46.1	58	63	66	71	73	79
x)	12	49.8	54.8	69	75	78	85	87	94
xi)	13	58.5	64.3	82	88	92	99	102	110
xii)	14	67.8	74.6	95	102	107	115	118	128
xiii)	16	88.6	97.4	124	133	139	150	154	167
xiv)	18	112	123	156	169	176	190	195	211
xv)	19	125	137	174	188	196	212	217	235
xvi)	20	138	152	193	208	218	235	241	260
xvii)	22	167	184	234	252	263	284	292	315
xviii)	24	199	219	278	300	313	338	347	375
xix)	25	216	238	302	326	340	367	376	407
xx)	26	234	257	326	352	368	397	407	440
xxi)	28	271	298	378	409	426	461	472	510
xxii)	32	354	390	494	534	557	602	617	666
xxiii)	36	448	493	625	675	705	761	781	843
xxiv)	38	500	550	697	752	785	848	870	939
xxv)	40	554	609	772	834	870	940	964	1 041
xxvi)	44	670	737	934	1 009	1 053	1 137	1 166	1 259
xxvii)	48	797	877	1 112	1 201	1 253	1 354	1 388	1 499
xxviii)	52	936	1 029	1 305	1 409	1 471	1 588	1 629	1 759

NOTE — To calculate the aggregate breaking force multiply the figures given in col (5), (7) and (9) by 1.212 and in col (6), (8) and (10) by 1.302 Wire strand core (CWS) may be used for rope diameter 12 mm and below.

Table 3 Mass and Breaking Force for 6 × 37 M (18/12/6-1) Construction Ropes

(*Clauses* 1, 4 *and* 5)

Typical Cross Section	Typical Construction	
	Rope Construction	Strand Construction
 WITH FIBRE CORE (CF)  WITH STEEL CORE (CWR)	6 x 37M	18/12/6-1

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
				1570		1770		1960	
		Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN
i)	6	12.5	13.7	16.7	18	18.8	20	21	22
ii)	7	17	18.6	22.5	24.5	26	28	28	31
iii)	8	22.1	24.4	30	32	33	36	37	40
iv)	9	28	30.8	37	40	42	46	47	51
v)	10	34.6	38.1	46	50	52	56	58	62
vi)	11	41.9	46.1	56	60	63	68	70	76
vii)	12	49.8	54.8	67	72	75	81	83	90
viii)	13	58.5	64.3	78	84	88	95	98	105
ix)	14	67.8	74.6	91	98	102	110	113	122
x)	16	88.6	97.4	118	128	134	144	148	160
xi)	18	112	123	150	162	169	183	187	202
xii)	19	125	137	167	180	188	203	209	225
xiii)	20	138	152	185	200	209	225	231	250
xiv)	22	167	184	224	242	253	273	280	302
xv)	24	199	219	267	288	301	325	333	359
xvi)	25	216	238	289	312	326	352	361	390
xvii)	26	234	257	313	338	353	381	391	422
xviii)	28	271	298	363	392	409	442	453	489
xix)	32	354	390	474	512	534	577	592	639
xx)	36	448	493	600	648	676	730	749	809
xxi)	38	500	550	668	722	753	814	834	901
xxii)	40	554	609	741	800	835	902	924	999
xxiii)	44	670	737	896	968	1 010	1 091	1 119	1 208
xxiv)	48	797	877	1 066	1 152	1 202	1 298	1 331	1 438

Table 3 (*Concluded*)

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
				1570		1770		1960	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN
xxv)	52	936	1 029	1 252	1 352	1 411	1 524	1 562	1 687
xxvi)	56	1 085	1 194	1 451	1 568	1 636	1 767	1 812	1 957
xxvii)	60	1 246	1 370	1 666	1 800	1 878	2 029	2 080	2 247
xxviii)	64	1 417	1 559	1 896	2 048	2 137	2 308	2 367	2 556
NOTE — To calculate the aggregate breaking force multiply the figures given in col (5), (7) and (9) by 1.212 and in col (6), (8) and (10) by 1.302 wire strand core (CWS) may be used for rope diameter 12 mm and below.									

Table 4 Mass and Breaking Force for 6 × 19 Class Seale Construction Ropes

(*Clauses* 1, 4 *and* 5)

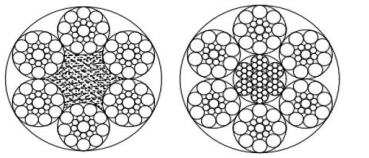
Typical Cross Section	Typical Construction	
	Rope Construction	Strand Construction
 WITH FIBRE CORE (CF) WITH STEEL CORE (CWR)	6 x 17S	8-8-1
	6 x 19S	9-9-1

Table 4A (Non Compacted Ropes)

Sl No.	Nominal Diameter	Approximate Mass		Minimum Braking Force Corresponding to Rope Grade of							
				1570		1770		1960		2160	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN	kN	kN
i)	8	23.8	26.2	33	36	37	40	42	45	46	49
ii)	9	30.2	33.2	42	45	47	51	53	57	58	63
iii)	10	37.3	41	52	56	59	63	65	70	71	77
iv)	11	45.1	49.6	63	68	71	77	78	85	87	93
v)	12	53.7	59	75	81	84	91	93	101	103	111
vi)	13	63	69.3	88	95	99	107	110	118	121	130
vii)	14	73	80.3	102	110	115	124	127	137	140	151
viii)	16	95.4	105	133	144	150	162	166	179	183	198
ix)	18	121	133	168	182	190	205	210	227	232	250
x)	19	135	148	188	203	211	228	234	253	258	279

Table 4A (*Concluded*)

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of							
				1570		1770		1960		2160	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN	kN	kN
xi)	20	149	164	208	224	234	253	260	280	286	309
xii)	22	180	198	252	272	284	306	314	339	346	374
xiii)	24	215	236	299	323	337	364	374	403	412	445
xiv)	25	233	256	325	351	366	395	405	438	447	482
xv)	26	252	277	351	379	396	428	439	474	483	522
xvi)	28	292	321	407	440	459	496	509	549	561	605
xvii)	32	382	420	532	575	600	648	664	717	732	791
xviii)	36	483	531	673	727	759	820	841	908	927	1 000
xix)	38	538	592	750	810	846	913	937	1 012	1 032	1 115
xx)	40	596	656	831	898	937	1012	1 038	1 121	1 144	1 235
xxi)	44	721	794	1 006	1 086	1 134	1 225	1 256	1 356	1 384	1 495
xxii)	48	858	944	1 197	1 293	1 350	1 458	1 495	1 614	1 647	1 779
xxiii)	52	1 008	1 108	1 405	1 517	1 584	1 711	1 754	1 894	1 933	2 087

NOTE — To calculate the aggregate breaking force multiply the figures given in col (5), (7), (9) and (11) by 1.163 and in col (6), (8), (10) and (12) by 1.25. Wire strand core (CWS) may be used for rope diameter 12 mm and below.

Table 4B (Compacted Ropes)

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
				1570		1770		1960	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN
i)	8	27.2	30.5	37.5	41.2	42.3	46.4	46.8	51.4
ii)	9	34.4	38.6	47.4	52.1	53.5	58.8	59.2	65.1
iii)	10	42.5	47.7	58.6	64.4	66	72.6	73.1	80.4
iv)	11	51.4	57.7	70.9	77.9	79.9	87.8	88.5	97.2
v)	12	61.2	68.7	84	93	95	105	105	116
vi)	13	71.8	80.6	99	109	112	123	124	136
vii)	14	83.3	93.5	115	126	129	142	143	158
viii)	16	109	122	150	165	169	186	187	206
ix)	18	138	155	190	209	214	235	237	260
x)	19	153	172	211	232	238	262	264	290
xi)	20	170	191	234	257	264	290	292	321
xii)	22	206	231	283	312	320	351	354	389

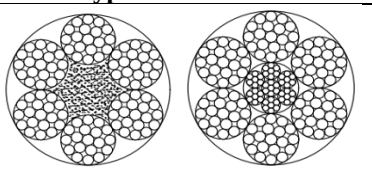
Table 4B (*Concluded*)

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
				1570		1770		1960	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN
xiii)	24	245	275	337	371	380	418	421	463
xiv)	25	266	298	366	402	413	454	457	502
xv)	26	287	322	396	435	446	491	494	543
xvi)	28	333	374	459	505	518	569	573	630
xvii)	32	435	488	600	659	676	743	749	823
xviii)	36	551	618	759	834	856	941	947	1 041
xix)	38	614	689	846	930	953	1 048	1 056	1 160
xx)	40	680	763	937	1 030	1 056	1 161	1 170	1 286
xxi)	44	823	923	1 134	1 246	1 278	1 405	1 415	1 556
xxii)	48	979	1 099	1 349	1 483	1 521	1 672	1 684	1 851
xxiii)	52	1 149	1 290	1583	1 741	1 785	1 962	1 977	2 173

Table 5 Mass and Breaking Force for 6 × 19 Class Filler Construction Ropes

(*Clauses* 1, 4 *and* 5)

Typical Cross Section	Typical Construction	
	Rope Construction	Strand Construction
	6 × 21F	10-5F-5-1
	6 × 25F	12-6F-6-1
	6 × 29F	14-7F-7-1



Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of							
				1570		1770		1960		2160	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN	kN	kN
i)	8	24.3	26.8	34	37	38	41	42	46	47	50
ii)	9	30.8	33.9	43	46	48	52	54	58	59	64
iii)	10	38	41.8	53	57	60	65	66	71	73	79
iv)	11	46	50.6	64	69	72	78	80	86	88	95
v)	12	54.7	60.2	76	82	86	93	95	103	105	113
vi)	13	64.3	70.7	90	97	101	109	112	121	123	133

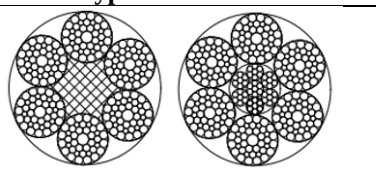
Table 5 (*Concluded*)

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of							
				1570		1770		1960		2160	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN	kN	kN
vii)	14	74.5	82	104	112	117	127	130	140	143	154
viii)	16	97.3	107	136	147	153	165	169	183	187	202
ix)	18	123	135	172	186	194	209	214	232	236	255
x)	19	137	151	191	207	216	233	239	258	263	284
xi)	20	152	167	212	229	239	258	265	286	292	315
xii)	22	184	202	257	277	289	312	320	346	353	381
xiii)	24	219	241	305	330	344	372	381	412	420	454
xiv)	25	238	261	331	358	374	403	414	447	456	492
xv)	26	257	283	358	387	404	436	447	483	493	533
xvi)	28	298	328	416	449	469	506	519	560	572	618
xvii)	32	389	428	543	586	612	661	678	732	747	807
xviii)	36	493	542	687	742	775	837	858	926	945	1 021
xix)	38	549	604	766	827	863	932	956	1032	1 053	1 138
xx)	40	608	669	848	916	956	1 033	1 059	1 144	1 167	1 260
xxi)	44	736	810	1 026	1 109	1 157	1 250	1 281	1 384	1 412	1 525
xxii)	48	876	964	1 222	1 319	1 377	1 487	1 525	1 647	1 681	1 815
xxiii)	52	1 028	1 131	1 434	1 548	1 616	1 745	1 790	1 933	1 972	2 130
xxiv)	56	1 192	1 311	1 663	1 796	1 874	2 024	2 076	2 242	2 287	2 470
xxv)	60	1 369	1 506	1 909	2 061	2 152	2 324	2 383	2 573	2 626	2 836
xxvi)	64	1 557	1 713	2 172	2 345	2 448	2 644	2 711	2 928	-	-

NOTE — To calculate the aggregate breaking force multiply the figures given in col (5), (7), (9) and (11) by 1.163 and in col (6), (8), (10) and (12) by 1.25. Wire strand core (CWS) may be used for rope diameter 12 mm and below.

Table 6 Mass and Breaking Force for 6 × 36 Class and 6 × 26 SW Construction Ropes

(*Clauses* 1, 4 *and* 5)

Typical Cross Section	Typical Construction	
	Rope Construction	Strand Construction
 WITH FIBRE CORE (CF) WITH STEEL CORE (CWR)	6 × 26SW	10-5+5-5-1
	6 × 31 SW	12-6 + 6-6-1
	6 × 36 SW	14-7 + 7-7-1
	6 × 41 SW	16-8 + 8-8-1
	6 × 46SW	18-9+9-9-1
	6 × 52SW	18-9+9-9/6-1
	6 × 49 SWS	16-8 + 8-8-8-1
	6 × 55 SWS	16-8 + 8-8-8/6-1
	6 × 37SF	12-12-6F-6-1
	6 × 41SF	16-8F-8-8-1
	6 × 43SF	14-14-7F-7-1

Typical Cross Section	Typical Construction	
	6 × 49SF	16-16-8F-8-1
	6 × 50SFS	14-14-7F-7-7-1
	6 × 55SF	18-18-9F-9-1
	6 × 57SFS	16-16-8F-8-8-1

Table 6A Non-Compacted Ropes

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of							
				1570		1770		1960		2160	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN	kN	kN
i)	8	24.3	26.8	33	36	37	40	41	45	46	49
ii)	9	30.8	33.9	42	45	47	51	52	57	58	62
iii)	10	38	41.8	52	56	58	63	65	70	71	77
iv)	11	46	50.6	63	68	71	76	78	85	86	93
v)	12	54.7	60.2	75	81	84	91	93	101	103	111
vi)	13	64.3	70.7	88	95	99	107	109	118	120	130
vii)	14	74.5	82	102	110	114	124	127	137	140	151
viii)	16	97.3	107	133	143	149	161	166	179	182	197
ix)	18	123	135	168	181	189	204	209	226	231	249
x)	19	137	151	187	202	211	228	233	252	257	278
xi)	20	152	167	207	224	234	252	259	279	285	308
xii)	22	184	202	251	271	283	305	313	338	345	372
xiii)	24	219	241	298	322	336	363	372	402	410	443
xiv)	25	238	261	324	350	365	394	404	436	445	481
xv)	26	257	283	350	378	395	426	437	472	482	520
xvi)	28	298	328	406	439	458	494	507	548	559	603
xvii)	32	389	428	530	573	598	646	662	715	730	788
xviii)	36	493	542	671	725	757	817	838	905	924	997
xix)	38	549	604	748	808	843	911	934	1008	1 029	1 111
xx)	40	608	669	829	895	934	1 099	1 035	1 117	1 140	1 231
xxi)	44	736	810	1 003	1 083	1 130	1 221	1 252	1 352	1 380	1 490
xxii)	48	876	964	1 193	1 289	1 345	1 453	1 490	1 609	1 642	1 773
xxiii)	52	1 028	1 131	1 401	1 513	1 579	1 705	1 748	1 888	1 927	2 081
xxiv)	56	1 192	1 311	1 624	1 754	1 831	1 978	2 028	2 190	2 235	2 413
xxv)	60	1 369	1 506	1 865	2 014	2 102	2 270	2 328	2 514	2 565	2 771
xxvi)	64	1 557	1 713	2 121	2 291	2 392	2 583	2 648	2 860	-	-
xxvii)	68	1 758	1 934	2 395	2 587	2 700	2 916	2 990	3 229	-	-
xxviii)	70	1 863	2 049	2 538	2 741	2 861	3 090	3 168	3 422	-	-
xxix)	72	1 971	2168	2 685	2 900	3 027	3 269	3 352	3 620	-	-
xxx)	76	2 196	2 416	2 992	3 231	3 373	3 643	3 435	4 034	-	-

Table 6A (*Concluded*)

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of							
				1570		1770		1960		2160	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN	kN	kN
xxxi)	80	2 433	2 676	3 315	3 580	3 737	4 036	4 138	4 469	-	-
xxxii)	84	2 683	2 951	3 655	3 947	4 120	4 450	4 562	4 928	-	-
xxxiii)	86	2 812	3 093	3 831	4 137	4 319	4 664	4 782	5 165	-	-
xxxiv)	88	2 944	3 239	4 011	4 332	4 522	4 884	5 007	5 408	-	-
xxxv)	92	3 218	3 540	4 384	4 735	4 942	5 338	5 473	5 911	-	-

NOTE — To calculate the aggregate breaking force multiply the figures given in col (5), (7), (9) and (11) by 1.19 and in col (6), (8), (10) and (12) by1.28. Wire strand core (CWS) may be used for rope diameter 12 mm and below.

Table 6B Compacted Ropes

Sl No.	Nominal Diameter	Approximate Mass		Minimum Braking Force Corresponding to Rope Grade of			
				1770		1960	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN
i)	8	27.2	30.5	42.3	46.4	46.8	51.4
ii)	9	34.4	38.6	53.5	58.8	59.2	65.1
iii)	10	42.5	47.7	66	72.6	73.1	80.4
iv)	11	51.4	57.7	79.9	87.8	88.5	97.2
v)	12	61.2	68.7	95	105	105	116
vi)	13	71.8	80.6	112	123	124	136
vii)	14	83.3	93.5	129	142	143	158
viii)	16	109	122	169	186	187	206
ix)	18	138	155	214	235	237	260
x)	19	153	172	238	262	264	290
xi)	20	170	191	264	290	292	321
xii)	22	206	231	320	351	354	389
xiii)	24	245	275	380	418	421	463
xiv)	25	266	298	413	454	457	502
xv)	26	287	322	446	491	494	543
xvi)	28	333	374	518	569	573	630
xvii)	32	435	488	676	743	749	823

Table 6B (*Concluded*)

Sl No.	Nominal Diameter	Approximate Mass		Minimum Braking Force Corresponding to Rope Grade of			
				1770		1960	
		Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN
xviii)	36	551	618	856	941	947	1 041
xix)	38	614	689	953	1 048	1 056	1 160
xx)	40	680	763	1 056	1 161	1 170	1 286
xxi)	44	823	923	1 278	1 405	1 415	1 556
xxii)	48	979	1 099	1 521	1 672	1 684	1 851
xxiii)	52	1 149	1 290	1 785	1 962	1 977	2 173
xxiv)	56	1 333	1 496	2 070	2 276	2 293	2 520
xxv)	60	1 530	1 717	2 377	2 613	2 632	2 893

Table 7 Mass and Breaking Force for 8 × 19 S (9-9-1) Construction of 8 × 19 Class Ropes
(*Clauses* 1, 4 *and* 5)

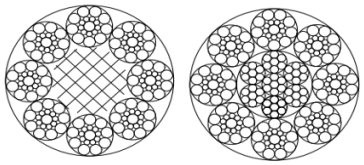
Typical Cross Section	Typical Construction	
	Rope Construction	Strand Construction
 WITH FIBRE CORE (CF) WITH STEEL CORE (CWR)	8 × 19S	9-9-1

Table 7A Non-compacted Ropes

Sl No.	Nominal Diameter	Approximate Mass		Minimum Braking Force Corresponding to Rope Grade of							
				1570		1770		1960		2160	
		Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN	kN	kN
i)	8	22.3	27.2	29	34	33	38	36	42	40	47
ii)	9	28.2	34.4	36	43	41	49	46	54	50	59
iii)	10	34.9	42.5	45	53	51	60	56	66	62	73
iv)	11	42.2	51.4	55	64	61	73	68	80	75	88
v)	12	50.2	61.2	65	77	73	86	81	96	89	105
vi)	13	58.9	71.8	76	90	86	101	95	112	105	124
vii)	14	68.3	83.3	88	104	100	117	110	130	122	143
viii)	16	89.2	109	115	136	130	153	144	170	159	187

Table 7A (*Concluded*)

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of							
				1570		1770		1960		2160	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN	kN	kN
ix)	18	113	138	146	172	165	194	182	215	201	237
x)	19	126	153	163	192	183	216	203	240	224	264
xi)	20	139	170	180	213	203	240	225	265	248	293
xii)	22	169	206	218	257	246	290	272	321	300	354
xiii)	24	201	245	260	306	293	345	324	382	357	421
xiv)	25	218	266	282	332	317	375	352	415	387	457
xv)	26	236	287	305	359	343	405	380	449	419	494
xvi)	28	273	333	353	417	398	470	441	520	486	573
xvii)	32	357	435	461	544	520	614	576	680	635	749
xviii)	36	452	551	584	689	658	777	729	860	803	948
xix)	38	503	614	651	768	734	865	812	958	895	1 056
xx)	40	558	680	721	851	813	959	900	1 062	992	1 170
xxi)	44	675	823	872	1029	983	1 160	1 089	1 285	1 200	1 416
xxii)	48	803	979	1 038	1 225	1 170	1 381	1 296	1 529	1 428	1 685
xxiii)	52	942	1 149	1 218	1 437	1 374	1 621	1 521	1 795	1 676	1 978

NOTE — To calculate the aggregate breaking force multiply the figures given in col (5), (7), (9) and (11) by 1.19 and in col (6), (8), (10) and (12) by 1.332. Wire strand core (CWS) may be used for rope diameter 12 mm and below.

Table 7B (Compacted Ropes)

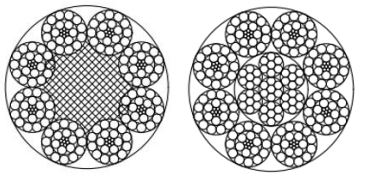
Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of			
				1770		1960	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN
i)	8	25.9	31.7	37.4	46.4	41.4	51.4
ii)	9	32.8	40.1	47.3	58.8	52.4	65.1
iii)	10	40.5	49.5	58.4	72.6	64.7	80.4
iv)	11	49	59.9	70.7	87.8	78.3	97.2
v)	12	58.3	71.3	84.1	105	93.1	116
vi)	13	68.4	83.7	98.7	123	109	136
vii)	14	79.4	97.0	114	142	127	158
viii)	16	104	127	150	186	166	206
ix)	18	131	160	189	235	210	260
x)	19	146	179	211	262	233	290

Table 7B (*Concluded*)

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of			
				1770		1960	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN
xi)	20	162	198	234	290	259	321
xii)	22	196	240	283	351	313	389
xiii)	24	233	285	336	418	373	463
xiv)	25	253	309	365	454	404	502
xv)	26	274	335	395	491	437	543
xvi)	28	318	388	458	569	507	630
xvii)	32	415	507	598	743	662	823
xviii)	36	525	642	757	941	838	1 041
xix)	38	585	715	843	1 048	934	1 160
xx)	40	648	792	935	1 161	1 035	1 286
xxi)	44	784	958	1 131	1 405	1 252	1 556
xxii)	48	933	1 140	1 346	1 672	1 490	1 851
xxiii)	52	1 095	1 338	1 579	1 962	1 749	2 173

Table 8 Mass and Breaking Force for 8 × 25 F (12-6 F- 6-1) Construction of 8 × 19 Class Ropes

(*Clauses* 1, 4 *and* 5)

Typical Cross Section	Typical Construction	
	Rope Construction	Strand Construction
 WITH FIBRE CORE (CF) WITH STEEL CORE (CWR)	8 × 25F	12-6F-6-1

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of							
				1570		1770		1960		2160	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Fibre Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CF)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(8)	(8)	(9)	(10)	(11)	(12)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN	kN	kN
i)	8	22.8	27.8	30	35	33	39	37	43	41	48
ii)	9	28.9	35.2	37	44	42	50	47	55	51	61
iii)	10	35.7	43.5	46	54	52	61	58	68	63	75
iv)	11	43.1	52.6	56	66	63	74	70	82	77	91
v)	12	51.3	62.6	66	78	75	88	83	98	91	108

Table 8 (*Concluded*)

Sl No.	Nominal Diameter	Approximate Mass		Minimum Braking Force Corresponding to Rope Grade of							
				1570		1770		1960		2160	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Fibre Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CF)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(8)	(8)	(9)	(10)	(11)	(12)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN	kN	kN
vi)	13	60.2	73.5	78	92	88	104	97	115	107	126
vii)	14	69.9	85.2	90	107	102	120	113	133	124	147
viii)	16	91.3	111	118	139	133	157	147	174	162	192
ix)	18	116	141	149	176	168	199	186	220	205	242
x)	19	129	157	166	196	188	221	208	245	229	270
xi)	20	143	174	184	218	208	245	230	272	254	299
xii)	22	173	210	223	263	252	297	279	329	307	362
xiii)	24	205	251	266	313	299	353	331	391	365	431
xiv)	25	223	272	288	340	325	383	360	424	396	468
xv)	26	241	294	312	368	351	414	389	459	429	506
xvi)	28	279	341	361	426	407	481	451	532	497	587
xvii)	32	365	445	472	557	532	628	589	695	649	766
xviii)	36	462	564	597	705	673	795	746	880	822	970
xix)	38	515	628	666	785	750	885	831	980	916	1 080
xx)	40	570	696	738	870	831	981	921	1 086	1 015	1 197
xxi)	44	690	842	892	1 053	1 006	1 187	1 114	1 314	1 228	1 449
xxii)	48	821	1 002	1 062	1 253	1 197	1 413	1 326	1 564	1 461	1 724
xxiii)	52	964	1 176	1 246	1 471	1 405	1 658	1 556	1 836	1 715	2 023

NOTE — To calculate the aggregate breaking force multiply the figures given in col (5), (7), (9) and (11) by 1.19 and in col (6), (8), (10) and (12) by 1.332. Wire strand core (CWS) may be used for rope diameter 12 mm and below.

Table 9 Mass and Breaking Force for 8 × 36 Class and 8 × 26SW Construction Ropes

(*Clauses* 1, 4 *and* 5)

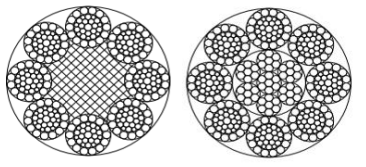
Typical Cross Section	Typical Construction	
	Rope Construction	Strand Construction
 WITH FIBRE CORE (CF) WITH STEEL CORE (CWR)	8 x 26SW	10-5+5-5-1
	8 × 31 SW	12-6 + 6-6-1
	8 × 36 SW	14-7 + 7-7-1
	8 × 41 SW	16-8 + 8-8-1
	8 × 46 SW	18-9+9-9-1
	8 × 52 SW	18-9+9-9/6-1
	8 × 49 SWS	16-8 + 8-8-8-1
	8 × 55 SWS	16-8 + 8-8-8/6-1
	8 × 37SF	12-12-6F-6-1
	8 × 43SF	14-14-7F-7-1
	8 × 49SF	16-16-8F-8-1
	8 × 50SFS	14-14-7F-7-7-1
	8 × 55SF	18-18-9F-9-1
	8 × 57SFS	16-16-8F-8-8-1

Table 9A Non-compacted Ropes

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of							
				1570		1770		1960		2160	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN	kN	kN
i)	16	91.3	111	115	136	130	153	144	170	158	187
ii)	18	116	141	146	172	164	194	182	215	201	237
iii)	19	129	157	162	192	183	216	203	239	223	264
iv)	20	143	174	180	212	203	239	225	265	248	292
v)	22	173	210	218	257	246	290	272	321	300	354
vi)	24	205	251	259	306	292	345	324	382	357	421
vii)	25	223	272	281	332	317	374	351	414	387	457
viii)	26	241	294	304	359	343	405	380	448	418	494
ix)	28	279	341	353	416	398	469	440	520	485	573
x)	32	365	445	461	544	519	613	575	679	634	748
xi)	36	462	564	583	688	657	776	728	859	802	947
xii)	38	515	628	650	767	733	864	811	957	894	1 055
xiii)	40	570	696	720	850	812	958	899	1 061	990	1 169
xiv)	44	690	842	871	1 028	982	1 159	1 088	1 283	1 198	1 414
xv)	48	821	1002	1037	1 223	1 169	1 379	1 294	1 527	1 426	1 683
xvi)	52	964	1 176	1 217	1 436	1 372	1 619	1 519	1 792	1 674	1 975
xvii)	56	1 118	1 364	1 411	1 665	1 591	1 877	1 762	2 079	1 941	2 291
xviii)	60	1 283	1 566	1 620	1 912	1 826	2 155	2 022	2 386	2 229	2 630
xix)	64	1 460	1 781	1 843	2 175	2 078	2 452	2 301	2 715	-	-
xx)	68	1 648	2 011	2 081	2 455	2 346	2 768	2 597	3 065	-	-

NOTE — To calculate the aggregate breaking force multiply the figures given in col (5), (7), (9) and (11) by 1.220 and in col (6), (8), (10) and (12) by 1.364

Table 9B (Compacted Ropes)

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of			
				1770		1960	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN
i)	16	104	127	150	186	166	206
ii)	18	131	160	189	235	210	260
iii)	19	146	179	211	262	233	290
iv)	20	162	198	234	290	259	321

Table 9B (*Concluded*)

Sl No.	Nominal Diameter	Approximate Mass		Minimum Braking Force Corresponding to Rope Grade of			
				1770		1960	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN
v)	22	196	240	283	351	313	389
vi)	24	233	285	336	418	373	463
vii)	25	253	309	365	454	404	502
viii)	26	274	335	395	491	437	543
ix)	28	318	388	458	569	507	630
x)	32	415	507	598	743	662	823
xi)	36	525	642	757	941	838	1 041
xii)	38	585	715	843	1 048	934	1 160
xiii)	40	648	792	935	1 161	1 035	1 286
xiv)	44	784	958	1 131	1 405	1 252	1 556
xv)	48	933	1 140	1 346	1 672	1 490	1 851
xvi)	52	1 095	1 338	1 579	1 962	1 749	2 173
xvii)	56	1 270	1 552	1 832	2 276	2 028	2 520
xviii)	60	1 458	1 782	2 103	2 613	2 328	2 893

Table 10 Mass and Breaking Force for 18 × 7 Class Ropes

(*Clauses* 1, 4 *and* 5)

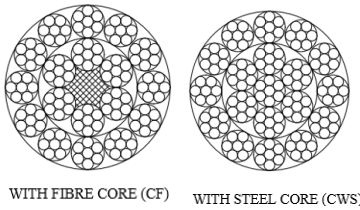
Typical Cross Section	Typical Construction	
	Rope Construction	**Strand Construction**
	17 × 7 (11×7:6 × 7-FC)	6-1
	17 × 7 (11 x 7 : 6 × 7 -1 × 7)	6-1
	18 × 7 (12 × 7 : 6 × 7-FC)	6-1
	18 × 7 (12 × 7 : 6 × 7-1 × 7)	6-1
	18 × 19S (12 × 19S : 6 × 19S - FC)	9-9-1
	18 × 19S (12 × 19S : 6 × 19S – 1 × 19S)	9-9-1

Table 10A Non-compacted Ropes

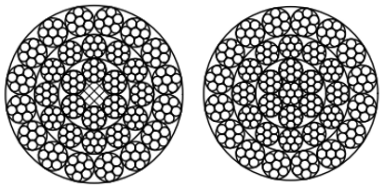
Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of							
				1570		1770		1960		2160	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN	kN	kN
i)	6	13.8	14.5	-	-	20	21	22	23	25	26
ii)	7	18.8	19.7	-	-	28	28	31	32	34	35
iii)	8	24.5	25.7	32	33	36	37	40	41	44	45
iv)	9	31	32.6	41	42	46	47	51	52	56	57
v)	10	38.3	40.2	50	52	56	58	62	64	69	71
vi)	11	46.3	48.6	61	62	68	70	76	78	83	86
vii)	12	55.1	57.9	72	74	81	84	90	93	99	102
viii)	13	64.7	67.9	85	87	95	98	106	109	116	120
ix)	14	75	78.8	98	101	111	114	122	126	135	139
x)	16	98	103	128	132	144	149	160	165	176	181
xi)	18	124	130	162	167	183	188	202	208	223	230
xii)	19	138	145	181	186	204	210	225	232	248	256
xiii)	20	153	161	200	206	226	232	250	257	275	283
xiv)	22	185	195	242	249	273	281	302	311	333	343
xv)	24	220	232	288	297	325	335	360	370	396	408
xvi)	25	239	251	313	322	352	363	390	402	430	443
xvii)	26	259	272	338	348	381	393	422	435	465	479
xviii)	28	300	315	392	404	442	455	490	504	540	556
xix)	32	392	412	512	527	577	595	639	659	705	726
xx)	36	496	521	648	668	731	753	809	833	892	918
xxi)	38	553	580	722	744	814	839	902	929	994	1 023
xxii)	40	612	643	800	824	902	929	999	1 029	1 101	1 134

NOTE — To calculate the aggregate breaking force multiply the figures given in col (5), (7), (9) and (11) by 1.282 and in col (6), (8), (10) and (12) by 1.319.

Table 10B Compacted Ropes

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of			
				1770		1960	
		Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN
i)	6	15.4	16.9	22.3	23.6	24.7	26.1
ii)	7	20.9	23.0	30.4	32.1	33.6	35.5
iii)	8	27.3	30.1	39.6	41.9	43.9	46.4
iv)	9	34.6	38.1	50.2	53	55.6	58.7
v)	10	42.7	47.0	62	65.5	68.6	72.5
vi)	11	51.7	56.9	75	79.2	83	87.7
vii)	12	61.5	67.7	89.2	94.3	98.8	104
viii)	13	72.2	79.4	105	111	116	123
ix)	14	83.7	92.1	121	128	134	142
x)	16	109	120	159	168	176	186
xi)	18	138	152	201	212	222	235
xii)	19	154	170	224	236	248	262
xiii)	20	171	188	248	262	274	290
xiv)	22	207	227	300	317	332	351
xv)	24	246	271	357	377	395	418
xvi)	25	267	294	387	409	429	453
xvii)	26	289	318	419	443	464	490
xviii)	28	335	368	486	513	538	569
xix)	32	437	481	634	671	702	743
xx)	36	553	609	803	849	889	940
xxi)	38	617	679	895	946	991	1 047
xxii)	40	683	752	991	1 048	1 098	1 160

Table 11 Mass and Breaking Force for 34(M) × 7 Class Ropes
(*Clauses* 1, 4 *and* 5)

Typical Cross Section	Typical Construction	
	Rope Construction	Strand Construction
 WITH FIBRE CORE (CF) WITH STEEL CORE (CWS)	34 × 7 (17 × 7 : 11 × 7/6 × 7 - FC)	6-1
	34 × 7 (17 × 7 : 11 × 7/6 x 7 - 1 × 7)	6-1
	36 × 7 (18 × 7 : 12 × 7/6 × 7 - FC)	6-1
	36 × 7 (18 × 7 : 12 × 7/6 × 7 – 1 × 7)	6-1

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
		Fibre Core	Steel Core	1570		1770		1960	
				Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN
i)	12	56.2	57.9	71	72	80	81	88	90
ii)	13	65.9	67.9	83	84	93	95	103	105
iii)	14	76.5	78.8	96	98	108	110	120	122
iv)	16	99.9	103	125	128	141	144	157	160
v)	18	126	130	159	162	179	183	198	202
vi)	19	141	145	177	180	199	203	221	225
vii)	20	156	161	196	200	221	225	245	250
viii)	22	189	195	237	242	267	273	296	302
ix)	24	225	232	282	288	318	325	352	359
x)	25	244	251	306	312	345	352	382	390
xi)	26	264	272	331	338	374	381	414	422
xii)	28	306	315	384	392	433	442	480	489
xiii)	32	400	412	502	512	566	577	627	639
xiv)	36	506	521	635	648	716	730	793	809
xv)	38	563	580	708	722	798	814	884	901
xvi)	40	624	643	784	800	884	902	979	999
xvii)	44	755	778	949	968	1 070	1 091	1 185	1 208
xviii)	48	899	926	1 129	1 152	1 273	1 298	1 410	1 438
xix)	52	1055	1087	1 325	1 352	1 794	1 524	1 655	1 687
xx)	56	1224	1261	1 537	1 568	1 733	1 767	1 919	1 957

NOTE — To calculate the aggregate breaking force multiply the figures given in col (5), (7) and (9) by 1.33 and in col (6), (8) and (10) by 1.346.

Table 12 Mass and Breaking Force for 12 × 6 (6-0) : 3 × 24 (15/9-Fibre) Construction Ropes

(*Clauses* 1, 4 *and* 5)

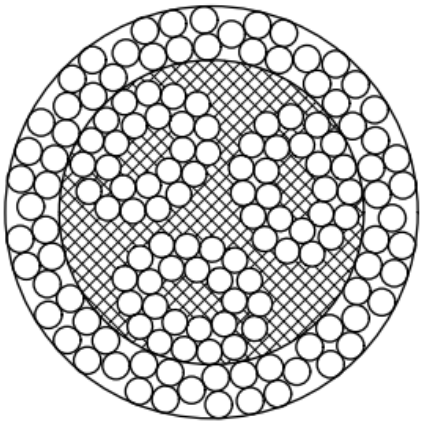
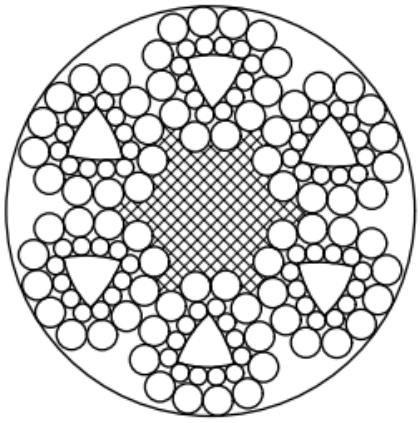


Table 12 (*Concluded*)

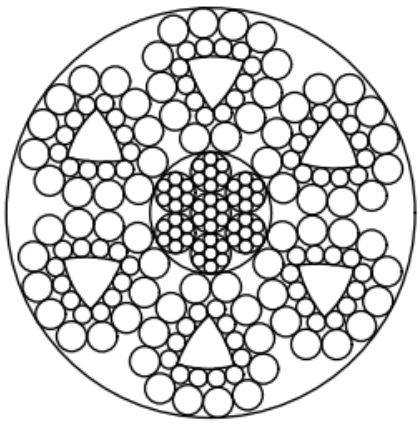
Sl No.	Nominal Diameter	Approximate Mass	Minimum Breaking Force Corresponding to Rope Grade of		
			1570	1770	1960
(1)	(2)	(3)	(4)	(5)	(6)
	mm	kg/100 m	kN	kN	kN
i)	8	23.2	30	34	38
ii)	9	29.3	38	43	48
iii)	10	36.2	47	53	59
iv)	11	43.8	57	64	71
v)	12	52.1	68	76	85
vi)	13	61.2	80	90	99
vii)	14	71	92	104	115
viii)	16	92.7	121	136	151
ix)	18	117	153	172	191
x)	19	131	170	192	212
xi)	20	145	188	212	235
xii)	22	175	228	257	285
xiii)	24	209	271	306	339
xiv)	25	226	294	332	368
xv)	26	245	318	359	397
xvi)	28	284	369	416	461
xvii)	32	371	482	544	602
xviii)	36	469	610	688	762
xix)	38	523	680	767	849
xx)	40	579	754	850	941

NOTE — To calculate the aggregate breaking force multiply the figures given in col (5), (7) and (9) by 1.283.

Table 13 Mass and Breaking Force for 6 × V 25(12/12 - Δ) Construction Ropes
(*Clauses* 1, 4 *and* 5)



WITH FIBRE CORE (CF)



WITH STEEL CORE (CWR)

Table 13 (*Concluded*)

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
		Fibre Core	Steel Core	1570		1770		1960	
				Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN
i)	13	69.3	75.5	93	99	105	111	116	123
ii)	14	80.4	87.6	108	114	122	129	135	143
iii)	16	105	114	141	150	159	169	176	187
iv)	18	133	145	179	189	201	213	223	236
v)	19	148	161	199	211	224	238	248	263
vi)	20	164	179	220	234	249	263	275	292
vii)	22	198	216	267	283	301	319	333	353
viii)	24	236	257	317	336	358	379	396	420
ix)	25	256	279	344	365	388	412	430	456
x)	26	277	302	373	395	420	445	465	493
xi)	28	321	350	432	458	487	516	539	572
xii)	32	420	458	564	598	636	674	704	747
xiii)	36	531	579	714	757	805	853	892	945
xiv)	38	592	645	796	843	897	951	993	1 053
xv)	40	656	715	882	934	994	1054	1 101	1 167
xvi)	44	794	865	1 067	1 131	1 203	1 275	1 332	1 412
xvii)	48	945	1 030	1 270	1 346	1 431	1 517	1 585	1 680

NOTE — To calculate the aggregate breaking force multiply the figures given in col (5), (7) and (9) by 1.177 and in col (6), (8) and (10) by 1.25. In case of Δ wire, 3 or more round wires may be used.

Table 14 Mass and Breaking Force for 35(W) × 7 Class and 15 × 7 Class Ropes

(*Clauses* 1, 4 *and* 5)

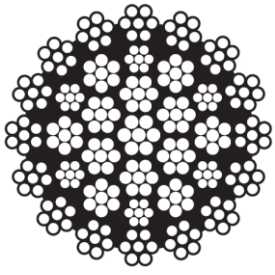
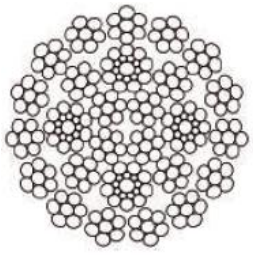
Typical Cross Section	Typical Construction	
	Rope Construction	Strand Construction
 WITH STEEL CORE (CWS)  WITH STEEL CORE (CWR)	28 × 7 (16 × 7 : 4 × 7 + 4 × 7 - 4 × 7)	6-1
	29 × 7 (16 × 7 : 6F × 7 – 6 × 7 – 1 × 7)	6-1
	35 × 7 (16 ×7 : 6 × 7 + 6 × 7 – 6 x 7 – 1 × 7)	6-1
	40 × 7 [18 × 7 : 7 × 7 + 7 × 7 - 7 × 7 – 1 × 7)	6-1
	35 × 19S (16 × 19S : 6 × 19S + 6 × 19S - 6 × 19S - 1 × 19S)	9-9-1
	15 × 7 : IWRC	6-1
	16 × 7 : IWRC	6-1

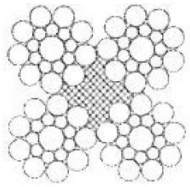
Table 14A Non-compacted Ropes

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of							
				1570		1770		1960		2160	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN	kN	kN
i)	8	-	29.1	-	36.2	-	40.8	-	45.2	-	49.8
ii)	10	-	45.4	-	56.5	-	63.7	-	70.6	-	77.8
iii)	11	-	54.9	-	68.4	-	77.1	-	85.4	-	94.1
iv)	12	-	65.4	-	81.4	-	91.8	-	102	-	112
v)	13	-	76.7	-	95.5	-	108	-	119	-	131
vi)	14	-	89	-	111	-	125	-	138	-	152
vii)	16	-	116	-	145	-	163	-	181	-	199
viii)	18	-	147	-	183	-	206	-	229	-	252
ix)	19	-	164	-	204	-	230	-	255	-	281
x)	20	-	182	-	226	-	255	-	282	-	311
xi)	22	-	220	-	274	-	308	-	342	-	376
xii)	24	-	262	-	326	-	367	-	406	-	448
xiii)	25	-	284	-	353	-	398	-	441	-	486
xiv)	26	-	307	-	382	-	431	-	477	-	526
xv)	28	-	356	-	443	-	500	-	553	-	610
xvi)	29	-	382	-	475	-	536	-	593	-	654
xvii)	30	-	409	-	509	-	573	-	635	-	700
xviii)	32	-	465	-	579	-	652	-	723	-	796
xix)	34	-	525	-	653	-	737	-	816	-	899
xx)	35	-	556	-	692	-	781	-	864	-	953
xxi)	36	-	588	-	732	-	826	-	914	-	1 008
xxii)	38	-	656	-	816	-	920	-	1 019	-	1 123
xxiii)	40	-	726	-	904	-	1 020	-	1 129	-	1 244
xxiv)	42	-	801	-	997	-	1 124	-	1 245	-	1 372
xxv)	44	-	879	-	1 094	-	1 234	-	1 366	-	1 505
xxvi)	45	-	919	-	1 145	-	1 290	-	1 429	-	1 575
xxvii)	46	-	961	-	1 196	-	1 348	-	1 493	-	1 645
xxviii)	48	-	1 046	-	1 302	-	1 468	-	1 626	-	1 792
xxix)	50	-	1 135	-	1 413	-	1 593	-	1 764	-	1 944
xxx)	51	-	1 181	-	1 470	-	1657	-	1 835	-	2 023
xxxi)	52	-	1 228	-	1 528	-	1 723	-	1 908	-	2 103
xxxii)	54	-	1 324	-	1 648	-	1 858	-	2 058	-	2 267
xxxiii)	55	-	1 373	-	1 710	-	1 928	-	2 134	-	2 352
xxxiv)	56	-	1 424	-	1772	-	1 998	-	2 213	-	2 439
xxxv)	58	-	1 527	-	1 901	-	2 144	-	2 374	-	2 616
xxxvi)	60	-	1 634	-	2 035	-	2 294	-	2 540	-	2 799

Table 14B Compacted Ropes

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of			
				1770		1960	
		Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN
i)	10	-	51	-	72.6	-	80.4
ii)	11	-	61.7	-	87.8	-	97.2
iii)	12	-	73.4	-	105	-	116
iv)	13	-	86.2	-	123	-	136
v)	14	-	100	-	142	-	158
vi)	16	-	131	-	186	-	206
vii)	18	-	165	-	235	-	260
viii)	19	-	184	-	262	-	290
ix)	20	-	204	-	290	-	321
x)	22	-	247	-	351	-	389
xi)	24	-	294	-	418	-	463
xii)	25	-	319	-	454	-	502
xiii)	26	-	345	-	491	-	543
xiv)	28	-	400	-	569	-	630
xv)	29	-	429	-	610	-	676
xvi)	30	-	459	-	653	-	723
xvii)	32	-	522	-	743	-	823
xviii)	34	-	590	-	839	-	929
xix)	35	-	625	-	889	-	984
xx)	36	-	661	-	941	-	1 041
xxi)	38	-	736	-	1 048	-	1 160
xxii)	40	-	816	-	1 161	-	1 286
xxiii)	42	-	900	-	1 280	-	1 418
xxiv)	44	-	987	-	1405	-	1 556
xxv)	45	-	1 033	-	1 470	-	1 627
xxvi)	46	-	1 079	-	1 536	-	1 700
xxvii)	48	-	1 175	-	1 672	-	1 851
xxviii)	50	-	1 275	-	1 814	-	2 009
xxix)	51	-	1 327	-	1 888	-	2 090
xxx)	52	-	1 379	-	1 962	-	2 173
xxxi)	54	-	1 487	-	2 116	-	2 343
xxxii)	55	-	1 543	-	2195	-	2 431
xxxiii)	56	-	1 599	-	2 276	-	2 520
xxxiv)	58	-	1 716	-	2 441	-	2 703
xxxv)	60	-	1 836	-	2 613	-	2 893

Table 15 Mass and Breaking Force for 4 × 19 Class and 4 × 36 Class Ropes
(*Clauses* 1, 4 *and* 5)

Typical Cross Section	Typical Construction	
	Rope Construction	Strand Construction
 WITH FIBRE CORE (CF)	4 × 19S	9-9-1
	4 × 25F	12-6F-6-1
	4 × 26SW	10-5+5-5-1
	4 × 31SW	12-6+6-6-1
	4 × 36SW	14-7+7-7-1
	4 × 41SW	16-8+8-8-1

Sl No.	Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
				1570		1770		1960	
		Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
		(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	mm	kg/100 m	kg/100 m	kN	kN	kN	kN	kN	kN
i)	8	26.2	-	36.2	-	40.8	-	45.2	-
ii)	9	33.2	-	45.8	-	51.6	-	57.2	-
iii)	10	41	-	56.5	-	63.7	-	70.6	-
iv)	11	49.6	-	68.4	-	77.1	-	85.4	-
v)	12	59	-	81.4	-	91.8	-	102	-
vi)	13	69.3	-	95.5	-	108	-	119	-
vii)	14	80.4	-	111	-	125	-	138	-
viii)	16	105	-	145	-	163	-	181	-
ix)	18	133	-	183	-	206	-	229	-
x)	20	164	-	226	-	255	-	282	-
xi)	22	198	-	274	-	308	-	342	-
xii)	24	236	-	326	-	367	-	406	-
xiii)	25	256	-	353	-	398	-	441	-
xiv)	26	277	-	382	-	431	-	477	-
xv)	28	321	-	443	-	500	-	553	-
xvi)	29	345	-	475	-	536	-	593	-
xvii)	30	369	-	509	-	573	-	635	-
xviii)	32	420	-	579	-	652	-	723	-
xix)	34	474	-	653	-	737	-	816	-
xx)	36	531	-	732	-	826	-	914	-
xxi)	38	592	-	816	-	920	-	1 019	-
xxii)	40	656	-	904	-	1 020	-	1 129	-
xxiii)	42	723	-	997	-	1 124	-	1 245	-
xxiv)	44	794	-	1 094	-	1 234	-	1 366	-
xxv)	45	830	-	1 145	-	1 290	-	1 429	-
xxvi)	48	945	-	1 302	-	1 468	-	1 626	-

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Wire Ropes and Wire Products Sectional Committee, MED 10

Organization	*Representative(s)*
Directorate General of Mines Safety, Dhanbad	SHRI D. B. NAIK **(*Chairperson*)** SHRI VIJAY BARAPATRE (*Alternate*)
Bharat Heavy Electrical Limited, New Delhi	SHRI BHASKARJIT BARUA SHRI RAMAN BHARIHOKE (*Alternate*)
Bharat Wire Ropes Limited, Mumbai	SHRI MAHENDER SINGH ARORA SHRI MAYANK MITTAL (*Alternate*)
Central Institute of Mining and Fuel Research, Dhanbad	DR MANOJ KUMAR SINGH DR DEBASISH BSSAK (*Alternate*)
Directorate General Factory Advice Service and Labour Institutes, Mumbai	SHRI SAMIR PANDEY SHRI N. VARADHARAJAN (*Alternate*)
Maccaferri Environment Solutions Pvt Limited, Navi Mumbai	SHRIMATI MINIMOL KORULLA SHRI RUDRA BUDDHABHATTI (*Alternate*)
Ministry of Ports, Shipping and Waterways, New Delhi	SHRI ANIL PRUTHI SHRI RAMJI SINGH (*Alternate*)
Nanda and Miller Co, Kolkata	SHRI J. P. GOENKA
National Test House, Kolkata	SHRI SURESH PARWAL SHRI ANGAD VERMA (*Alternate*)
Oil and Natural Gas Corporation Limited, New Delhi	SHRI RITUJIT HAZARIKA SHRI RAKESH KUMAR SRIVASTAVA (*Alternate*)
Orient Wire Ropes, Indore	SHRI RUSHIKESH AKARTE
Otis Elevator Company (India) Limited, Bengaluru	SHRI SHRIHARI VISPUTE SHRI PRAVEENA SIDDARAMANNA (*Alternate*)
Schindler India Private Limited, Mumbai	SHRI NITIN VITHAL KADAM SHRI KETAN KSHIRSAGAR (*Alternate*)
TK Elevator India Private Limited, Navi Mumbai	SHRI VISHNU PARASHAR SHRI DEEPAK BALANI (*Alternate*)
Usha Martin Industries Limited, Ranchi	SHRI TUSHAR MUKHERJEE SHRI SANDEEP JAISWAL (*Alternate* I) SHRI SUBRATA DUTTA (*Alternate* II)
Vedanta Limited, Mumbai	SHRI RAKESH SINGHIV
BIS Directorate General	SHRI K. V. RAO, SCIENTIST 'F'/SENIOR DIRECTOR AND HEAD (MECHANICAL ENGINEERING) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary
SHRI SANDEEP KESHAV
SCIENTIST 'C'/DEPUTY DIRECTOR
(MECHANICAL ENGINEERING), BIS

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

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.

This Indian Standard has been developed from Doc No.: MED 10 (25706).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: 601/A, Konnectus Tower -1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	2323 7617
Eastern	: 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	2367 0012 2320 9474
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	265 9930
Southern	: C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	2254 1442 2254 1216
Western	: 5th Floor/MTNL CETTM, Technology Street, Hiranandani Gardens, Powai Mumbai 400076	2570 0030 2570 2715

Branches : AHMEDABAD, BENGALURU, BHOPAL, BHUBANESHWAR, CHANDIGARH, CHENNAI, COIMBATORE, DEHRADUN, DELHI, FARIDABAD, GHAZIABAD, GUWAHATI, HARYANA (CHANDIGARH), HUBLI, HYDERABAD, JAIPUR, JAMMU, JAMSHEDPUR, KOCHI, KOLKATA, LUCKNOW, MADURAI, MUMBAI, NAGPUR, NOIDA, PARWANOO, PATNA, PUNE, RAIPUR, RAJKOT, SURAT, VIJAYAWADA.

Published by BIS, New Delhi