भारतीय मानक

सामान्य इंजीनियरी कार्यों के लिए इस्पात तार के रस्से — विशिष्टि

(चौथा पुनरीक्षण)

Indian Standard

STEEL WIRE ROPES FOR GENERAL ENGINEERING PURPOSES — SPECIFICATION

(Fourth Revision)

ICS 53.020.30; 77.140.65

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

September 2002

Price Group 8

FOREWORD

This Indian Standard (Fourth 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, revised in 1970, 1977 and 1989. The first revision was taken up to align the standard with the corresponding ISO standard, ISO 2408 : 1975 'Steel wire ropes for general purposes — Characteristics'.

In the second revision, published in 1977, certain changes in the list of constructions were made. In the third revision, the construction 6 × 19 (12/6/1) with steel core (CWR) was added and the requirement of galvanizing was modified.

The experience gained in implementation of the standard necessitated this revision and certain changes that are necessary are incorporated in this revision.

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 or analysis, 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

STEEL WIRE ROPES FOR GENERAL ENGINEERING PURPOSES — SPECIFICATION

(Fourth Revision)

1 SCOPE

This standard covers general requirements for steel wire ropes for use in cranes, excavators and other general engineering purposes. The following rope constructions, types, rope grades, cores and range of sizes are covered as identified by x mark :

Construction	*Type*	*Rope Grade*			*Core*		*Size Range*	*Ref to Table*
		1570	1770	1960	Fibre	Steel	*(Dia. in mm)*	
6 × 7 (6-1)	Round	x	x	x	x	x	8 to 12	1
6 × 19 M (12/6-1)		x	x	x	x	–	8 to 52	2
6 × 19 M (12/6-1)		x	x	x	–	x	8 to 40	2
6 × 37 M (18/12/6-1)		x	x	x	x	–	8 to 64	3
6 × 37 M (18/12/6-1)		x	x	x	–	x	8 to 52	3
6 × 17 S (8-8-1)		x	x	x	x	x	8 to 52	4
6 × 19 S (9-9-1)		x	x	x	x	x	8 to 52	4
6 × 21 F (10-5F-5-1)		x	x	x	x	x	8 to 64	5
6 × 25 F (12-6F-6-1)		x	x	x	x	x	8 to 64	5
6 × 26 SW (10-5+5-5-1)		x	x	x	x	x	8 to 52	6
6 × 31 SW (12-6+6-6-1)		x	x	x	x	x	8 to 52	6
6 × 36 SW (14-7+7-7-1)		x	x	x	x	x	8 to 76	6
6 × 41 SW (16-8+8-8-1)		x	x	x	x	x	32 to 92	6
6 × 49 SWS (16-8+8-8-8-1)		x	x	x	x	x	45 to 92	6
6 × 55SWS (16-8+8-8-8/6-1)		x	x	x	x	x	52 to 92	6
8 × 19 S (9-9-1)		x	x	x	x	x	8 to 52	7
8 × 25 F (12-6F-6-1)		x	x	x	x	x	8 to 52	8
8 × 36 SW (14-7+7-7-1)		x	x	x	x	x	16 to 68	9
8 × 37 SF (12-12-6F-6-1)		x	x	x	x	x	16 to 68	9
17 × 7 [11 × 7(6-1) : 6 × 7(6-1)]		x	x	x	x	x	8 to 40	10
18 × 7 [12 × 7(6-1) : 6 × 7(6-1)]		x	x	x	x	x	8 to 40	10
34 × 7 [17 × 7(6-1) : 11 × 7(61)/6 × 7(6-1)]		x	x	x	x	x	12 to 56	11
36 × 7 [18 × 7(6-1) : 12 × 7(61)/6 × 7(6-1)]		x	x	x	x	x	12 to 56	11
12 × 6(6-0) : 3 × 24 (15/9-Fibre)	Oval	x	x	x	x	x	8 to 40	12
6 × V 25 (12/12-Δ)	Flattened strand	x	x	x	x	x	13 to 48	13

2 REFERENCES

The following Indian Standards 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 indicated below :

IS No.	*Title*
1835 : 1976	Round steel wire for ropes (*third revision*)
2365 : 1977	Glossary of terms relating to wire ropes (*first revision*)

IS No.	*Title*
6594 : 2001	Technical supply conditions for steel wire ropes and strands (*second revision*)
1804 : 1996	Steel wire ropes — Fibre main cores (*third revision*)

3 TERMINOLOGY

For the purpose of this standard the terms given in IS 2365 shall apply.

4 ROPE SIZE AND TOLERANCE

The size of the rope designated as 'nominal diameter' shall be one of those given in Tables 1 to 13. The actual diameter of the rope as supplied shall be within $^{+4}_{-1}$ percent of the nominal diameter.

5 MINIMUM BREAKING FORCE

The minimum breaking force shall be as given in Tables 1 to 13.

6 GENERAL REQUIREMENT

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

7 CONSTRUCTION

The rope construction shall be chosen from 1. However considering wide range of engineering application other varieties of construction in Seale Warrington/ Seale Warrington Seale group (SW/SWS) given in Table 6 can be developed, manufactured and supplied with the consent of users as per the guidelines given in foot note under Table 2 of IS 6594.

8 CORE

8.1 Fibre Core

Fibre core shall be as per IS 1804.

8.2 Steel Core

Steel core shall be as per IS 6594.

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 Types (A, AB or B) of IS 1835 as may be specified by the purchaser.

11 SAMPLING PLAN

11.1 Lot

Steel wire rope 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 for the tractability of the individual rope lengths to the parent rope to establish that those represent the lot as defined above.

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

a) *Dimensional checking* — 100 percent
b) *Breaking force test* — one sample from a lot.

12 MARKING

12.1 The size, construction, rope grade, lay, core, coating and length or 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

12.2.1 The product may also be marked with the Standard Mark.

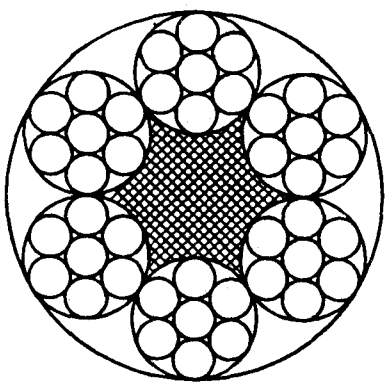
12.2.2 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which a license for the use of the Standard Mark may be granted to the manufacturers or the producers may be obtained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

13 PACKING

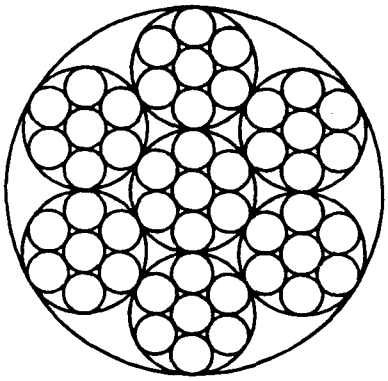
The ropes shall be protected suitably to avoid damage in transit and corrosion.

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

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



With Fibre Core (CF)



With Steel Core (CWR)

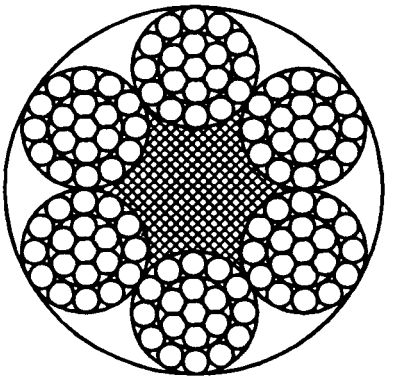
Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100 m		kN	kN	kN	kN	kN	kN
8	22.9	25.2	33	36	38	41	42	45
9	28.9	31.8	42	46	48	51	53	57
10	35.7	39.3	52	56	59	64	65	70
11	43.2	47.6	63	68	71	77	79	85
12	51.5	56.6	75	81	85	91	94	101

NOTE — To calculate the aggregate breaking force, multiply the figures given in col 4, 6 and 8 by 1.111 and in col 5, 7 and 9 by 1.193.

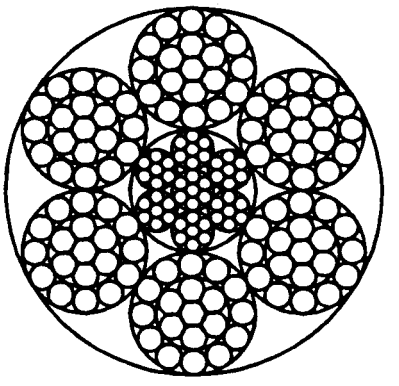
[1)] Wire strand core (CWS) may be used for rope diameter 12 mm and below.

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

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



8 to 52 mm
With Fibre Core (CF)



8 to 40 mm
With Steel Core (CWR)

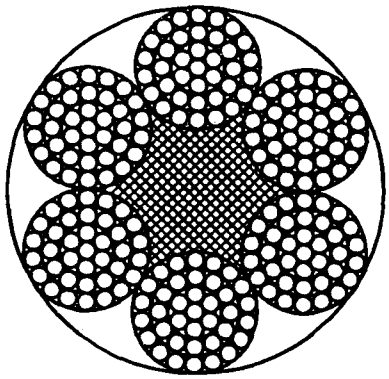
Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100 m		kN	kN	kN	kN	kN	kN
8	22.1	24.4	31	33	35	38	39	42
9	28.0	30.8	39	42	44	48	49	53
10	34.6	38.1	48	52	54	59	60	65
11	41.9	46.1	58	63	66	71	73	79
12	49.8	54.8	69	75	78	85	87	94
13	58.5	64.3	82	88	92	99	102	110
14	67.8	74.6	95	102	107	115	118	128
16	88.6	97.4	124	133	139	150	154	167
18	112	123	156	169	176	190	195	211
19	125	137	174	188	196	212	217	235
20	138	152	193	208	218	235	241	260
22	167	184	234	252	263	284	292	315
24	199	219	278	300	313	338	347	375
26	234	257	326	352	368	397	407	440
28	271	298	378	409	426	461	472	510
32	354	390	494	534	557	602	617	666
36	448	493	625	675	705	761	781	843
38	500	550	697	752	785	848	870	939
40	554	609	772	834	870	940	964	1 041
44	670	–	934	–	1 053	–	1 166	–
48	797	–	1 112	–	1 253	–	1 388	–
52	936	–	1 305	–	1 471	–	1 629	–

NOTE — To calculate the aggregate breaking force, multiply the figures given in col 4, 6 and 8 by 1.163 and in col 5, 7 and 9 by 1.25.

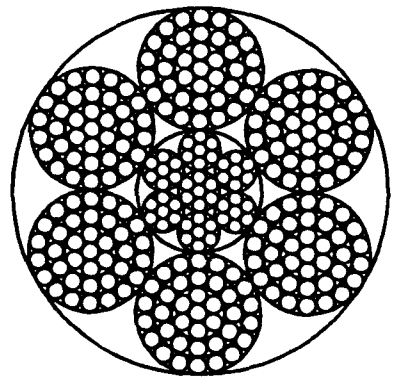
[1)] Wire strand core (CWS) may be used for rope diameter 12 mm and below.

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

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



8 to 64 mm
With Fibre Core (CF)



8 to 52 mm
With Steel Core (CWR)

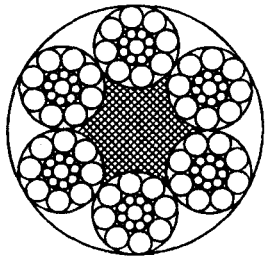
Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
	Fibre core (CF)	Steel core[1] (CWR)	Fibre core (CF)	Steel core[1] (CWR)	Fibre core (CF)	Steel core[1] (CWR)	Fibre core (CF)	Steel core[1] (CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100 m		kN	kN	kN	kN	kN	kN
8	22.1	24.4	30	32	33	36	37	40
9	28.0	30.8	37	40	42	46	47	51
10	34.6	38.1	46	50	52	56	58	62
11	41.9	46.1	56	60	63	68	70	76
12	49.8	54.8	67	72	75	81	83	90
13	58.5	64.3	78	84	88	95	98	105
14	67.8	74.6	91	98	102	110	113	122
16	88.6	97.4	118	128	134	144	148	160
18	112	123	150	162	169	183	187	202
19	125	137	167	180	188	203	209	225
20	138	152	185	200	209	225	231	250
22	167	184	224	242	253	273	280	302
24	199	219	267	288	301	325	333	359
26	234	257	313	338	353	381	391	422
28	271	298	363	392	409	442	453	489
32	354	390	474	512	534	577	592	639
36	448	493	600	648	676	730	749	809
38	500	550	668	722	753	814	834	901
40	554	609	741	800	835	902	924	999
44	670	737	896	968	1 010	1 091	1 119	1 208
48	797	877	1 066	1 152	1 202	1 298	1 331	1 438
52	936	1 029	1 252	1 352	1 411	1 524	1 562	1 687
56	1 085	–	1 451	–	1 636	–	1 812	–
60	1 246	–	1 666	–	1 878	–	2 080	–
64	1 417	–	1 896	–	2 137	–	2 367	–

NOTE — To calculate the aggregate breaking force, multiply the figures given in col 4, 6 and 8 by 1.212 and in col 5, 7 and 9 by 1.302

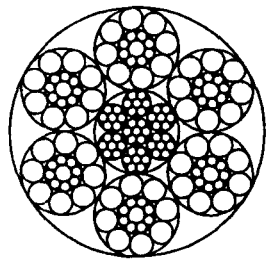
[1] Wire strand core (CWS) may be used for rope diameter 12 mm and below.

Table 4 Mass and Breaking Force for 6 × 17 S (8-8-1) and 6 × 19 S (9-9-1) Construction Ropes

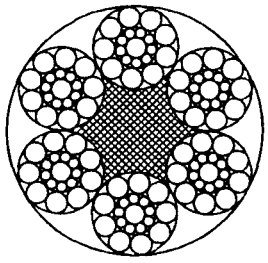
(*Clauses* 1, 4 *and* 5)



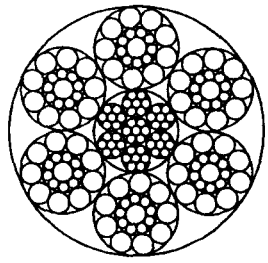
6x17 S (8-8-1)
With Fibre Core (CF)



6x17 S (8-8-1)
With Steel Core (CWR)



6x19 S (9-9-1)
With Fibre Core (CF)



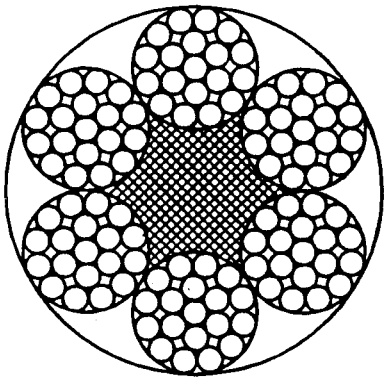
6x19 S (9-9-1)
With Steel Core (CWR)

Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100 m		kN	kN	kN	kN	kN	kN
8	23.8	26.2	33	36	37	40	42	45
9	30.2	33.2	42	45	47	51	53	57
10	37.3	41.0	52	56	59	63	65	70
11	45.1	49.6	63	68	71	77	78	85
12	53.7	59.0	75	81	84	91	93	101
13	63.0	69.3	88	95	99	107	110	118
14	73.0	80.3	102	110	115	124	127	137
16	95.4	105	133	144	150	162	166	179
18	121	133	168	182	190	205	210	227
19	135	148	188	203	211	228	234	253
20	149	164	208	224	234	253	260	280
22	180	198	252	272	284	306	314	339
24	215	236	299	323	337	364	374	403
26	252	277	351	379	396	428	439	474
28	292	321	407	440	459	496	509	549
32	382	420	532	575	600	648	664	717
36	483	531	673	727	759	820	841	908
38	538	592	750	810	846	913	937	1 012
40	596	656	831	898	937	1 012	1 038	1 121
44	721	794	1 006	1 086	1 134	1 225	1 256	1 356
48	858	944	1 197	1 293	1 350	1 458	1 495	1 614
52	1 008	1 108	1 405	1 517	1 584	1 711	1 754	1 894

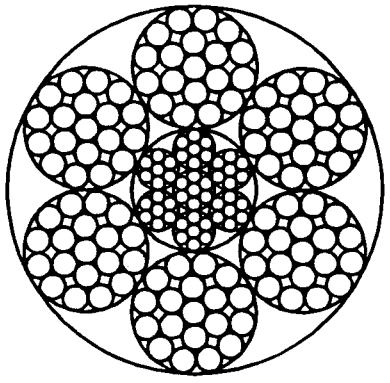
NOTE — To calculate the aggregate breaking force, multiply the figures given in col 4, 6 and 8 by 1.163 and in col 5, 7 and 9 by 1.25.

[1)] Wire strand core (CWS) may be used for rope diameter 12 mm and below.

Table 5 Mass and Breaking Force for 6 × 21 F (10-5 F-5-1) and 6 × 25 F (12-6 F-6-1) Construction Ropes
(*Clauses* 1, 4 *and* 5)



With Fibre Core (CF)



With Steel Core (CWR)

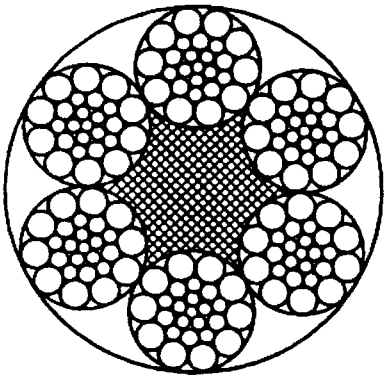
Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100 m		kN	kN	kN	kN	kN	kN
8	24.3	26.8	34	37	38	41	42	46
9	30.8	33.9	43	46	48	52	54	58
10	38.0	41.8	53	57	60	65	66	71
11	46.0	50.6	64	69	72	78	80	86
12	54.7	60.2	76	82	86	93	95	103
13	64.3	70.7	90	97	101	109	112	121
14	74.5	82.0	104	112	117	127	130	140
16	97.3	107	136	147	153	165	169	183
18	123	135	172	186	194	209	214	232
19	137	151	191	207	216	233	239	258
20	152	167	212	229	239	258	265	286
22	184	202	257	277	289	312	320	346
24	219	241	305	330	344	372	381	412
26	257	283	358	387	404	436	447	483
28	298	328	416	449	469	506	519	560
32	389	428	543	586	612	661	678	732
36	493	542	687	742	775	837	858	926
38	549	604	766	827	863	932	956	1 032
40	608	669	848	916	956	1 033	1 059	1 144
44	736	810	1 026	1 109	1 157	1 250	1 281	1 384
48	876	964	1 222	1 319	1 377	1 487	1 525	1 647
52	1028	1 131	1 434	1 548	1 616	1 745	1 790	1 933
56	1 192	1 311	1 663	1 796	1 874	2 024	2 076	2 242
60	1 369	1 506	1 909	2 061	2 152	2 324	2 383	2 573
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 4, 6 and 8 by 1.163 and in col 5, 7 and 9 by 1.25

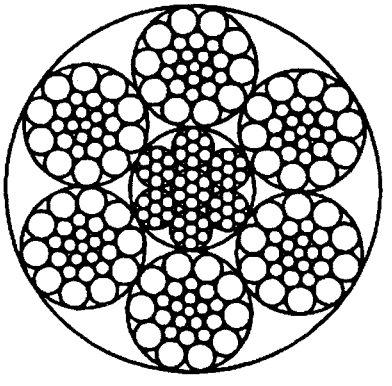
[1)] Wire strand core (CWS) may be used for rope diameter 12 mm and below.

Table 6 Mass and Breaking Force for 6×26 SW (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), 6×49 SWS (16-8+8-8-8-1), 6×55 SWS (16-8+8-8-8/6-1) Construction Ropes

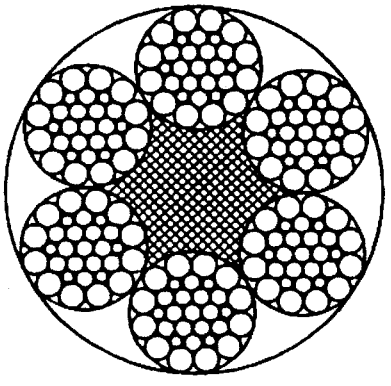
(*Clauses* 1, 4 *and* 5)



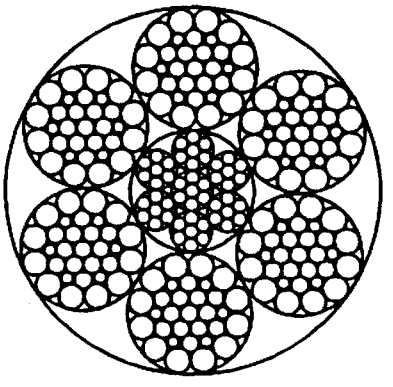
6x26 SW (10-5+5-5-1) (CF)
8 to 40 mm



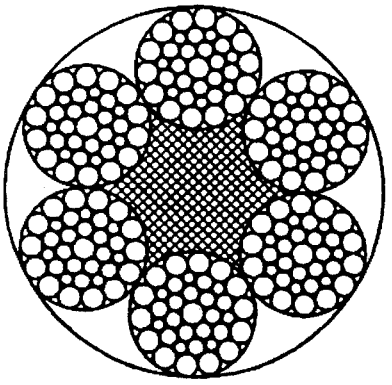
6x26 SW (10-5+5-5-10) (CWR)
8 to 40 mm



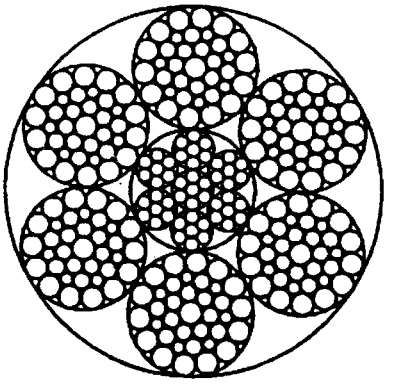
6x31 SW (12-6+6-6-1) (CF)
11 to 40 mm



6x31 SW (12-6+6-6-1) (CWR)
11 to 40 mm

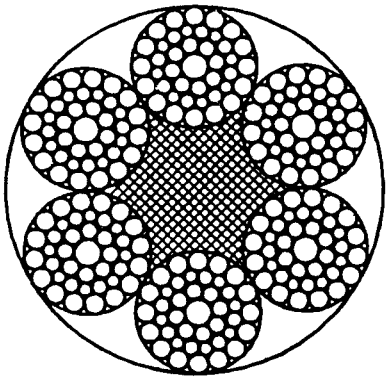


6x36 SW (14-7+7-7-1)(CF)
13 to 56 mm

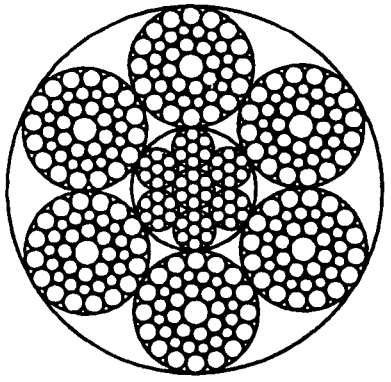


6x36 SW (14-7+7-7-1) (CWR)
13 to 56 mm

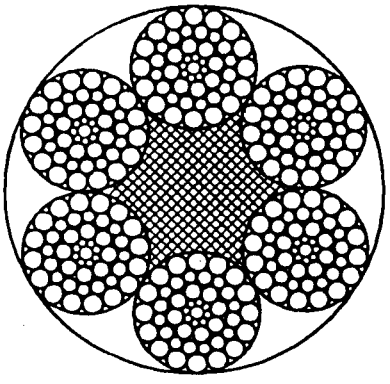
Table 6 (*Continued*)



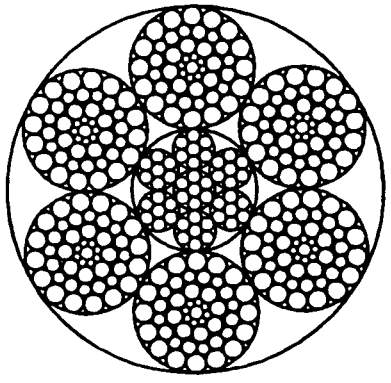
6x41 SW (16-8+8-8-1) (CF)
16 to 60 mm



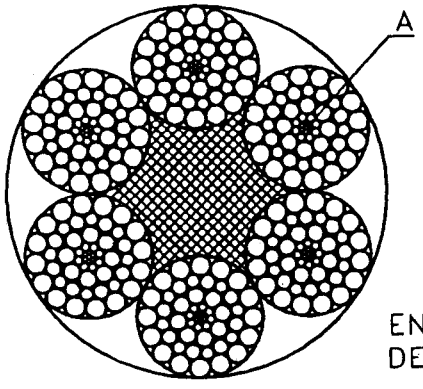
6x41 SW (16-8+8-8-1) (CWR)
16 to 60 mm



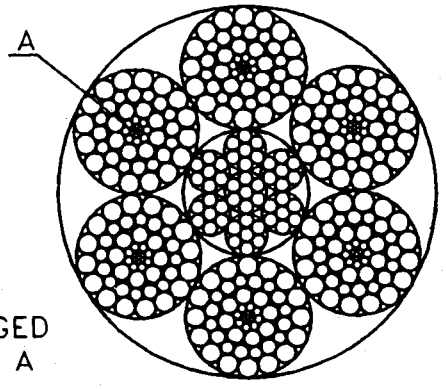
6x49 SWS (16-8+8-8-8-1) (CF)
48 to 92 mm



6x49 SWS (16-8+8-8-1) (CWR)
48 to 92 mm



ENLARGED
DETAIL A



6X55 SWS (16-8+8-8-8/6-1) (CF)
48 to 92 mm

6x55 sws (16-8+8-8-8/6-1) (CWR)
48 to 92 mm

Table 6 (*Concluded*)

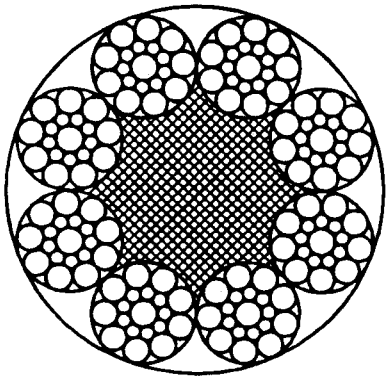
Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100 m		kN	kN	kN	kN	kN	kN
8	24.3	26.8	33	36	37	40	41	45
9	30.8	33.9	42	45	47	51	52	57
10	38.0	41.8	52	56	58	63	65	70
11	46.0	50.6	63	68	71	76	78	85
12	54.7	60.2	75	81	84	91	93	101
13	64.3	70.7	88	95	99	107	109	118
14	74.5	82.0	102	110	114	124	127	137
16	97.3	107	133	143	149	161	166	179
18	123	135	168	181	189	204	209	226
19	137	151	187	202	211	228	233	252
20	152	167	207	224	234	252	259	279
22	184	202	251	271	283	305	313	338
24	219	241	298	322	336	363	372	402
26	257	283	350	378	395	426	437	472
28	298	328	406	439	458	494	507	548
32	389	428	530	573	598	646	662	715
36	493	542	671	725	757	817	838	905
38	549	604	748	808	843	911	934	1008
40	608	669	829	895	934	1 009	1 035	1 117
44	736	810	1 003	1 083	1 130	1 221	1 252	1 352
48	876	964	1 193	1 289	1 345	1 453	1 490	1 609
52	1 028	1 131	1 401	1 513	1 579	1 705	1 748	1 888
56	1 192	1 311	1 624	1 754	1 831	1 978	2 028	2 190
60	1 369	1 506	1 865	2 014	2 102	2 270	2 328	2 514
64	1 557	1 713	2 121	2 291	2 392	2 583	2 648	2 860
68	1 758	1 934	2 395	2 587	2 700	2 916	2 990	3 229
70	1 863	2 049	2 538	2 741	2 861	3 090	3 168	3 422
72	1 971	2 168	2 685	2 900	3 027	3 269	3 352	3 620
76	2 196	2 416	2 992	3 231	3 373	3 643	3 735	4 034
80	2 433	2 676	3 315	3 580	3 737	4 036	4 138	4 469
84	2 683	2 951	3 655	3 947	4 120	4 450	4 562	4 928
86	2 812	3 093	3 831	4 137	4 319	4 664	4 782	5 165
88	2 944	3 239	4 011	4 332	4 522	4 884	5 007	5 408
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 4, 6 and 8 by 1.19 and in col 5, 7 and 9 by 1.28.

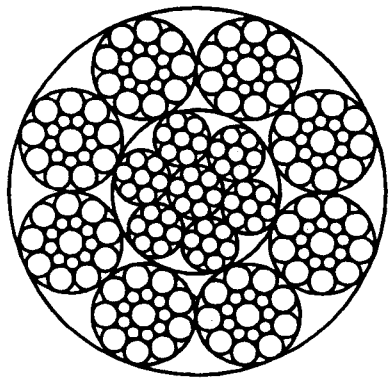
[1)] Wire strand core (CWS) may be used for rope diameter 12 mm and below.

Table 7 Mass and Breaking Force for 8 × 19 S (9-9-1) Construction Ropes

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



With Fibre Core (CF)



With Steel Core (CWR)

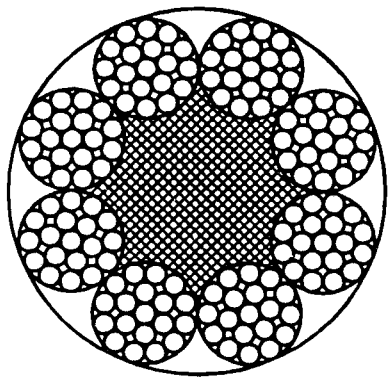
Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
	Fibre core (CF)	Steel core[1] (CWR)	Fibre core (CF)	Steel core[1] (CWR)	Fibre core (CF)	Steel core[1] (CWR)	Fibre core (CF)	Steel core[1] (CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100 m		kN	kN	kN	kN	kN	kN
8	22.3	27.2	29	34	33	38	36	42
9	28.2	34.4	36	43	41	49	46	54
10	34.9	42.5	45	53	51	60	56	66
11	42.2	51.4	55	64	61	73	68	80
12	50.2	61.2	65	77	73	86	81	96
13	58.9	71.8	76	90	86	101	95	112
14	68.3	83.3	88	104	100	117	110	130
16	89.2	109	115	136	130	153	144	170
18	113	138	146	172	165	194	182	215
19	126	153	163	192	183	216	203	240
20	139	170	180	213	203	240	225	265
22	169	206	218	257	246	290	272	321
24	201	245	260	306	293	345	324	382
26	236	287	305	359	343	405	380	449
28	273	333	353	417	398	470	441	520
32	357	435	461	544	520	614	576	680
36	452	551	584	689	658	777	729	860
38	503	614	651	768	734	865	812	958
40	558	680	721	851	813	959	900	1 062
44	675	823	872	1029	983	1 160	1 089	1 285
48	803	979	1 038	1 225	1 170	1 381	1 296	1 529
52	942	1 149	1 218	1 437	1 374	1 621	1 521	1 795

NOTE — To calculate the aggregate breaking force, multiply the figures given in col 4, 6 and 8 by 1.19 and in col 5, 7 and 9 by 1.332.

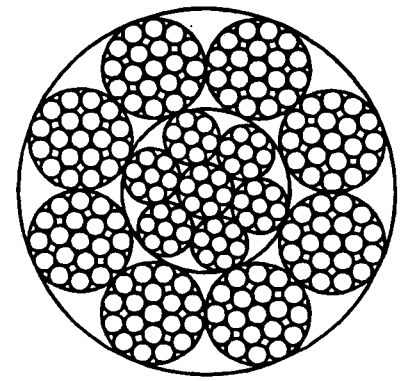
[1] Wire strand core (CWS) may be used for rope diameter 12 mm and below.

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

(Clauses 1, 4 and 5)



With Fibre Core (CF)



With Steel Core (CWR)

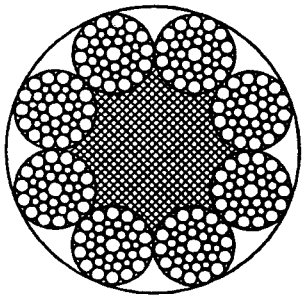
Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]	Fibre core	Steel core[1)]
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100 m		kN	kN	kN	kN	kN	kN
8	22.8	27.8	30	35	33	39	37	43
9	28.9	35.2	37	44	42	50	47	55
10	35.7	43.5	46	54	52	61	58	68
11	43.1	52.6	56	66	63	74	70	82
12	51.3	62.6	66	78	75	88	83	98
13	60.2	73.5	78	92	88	104	97	115
14	69.9	85.2	90	107	102	120	113	133
16	91.3	111	118	139	133	157	147	174
18	116	141	149	176	168	199	186	220
19	129	157	166	196	188	221	208	245
20	143	174	184	218	208	245	230	272
22	173	210	223	263	252	297	279	329
24	205	251	266	313	299	353	331	391
26	241	294	312	368	351	414	389	459
28	279	341	361	426	407	481	451	532
32	365	445	472	557	532	628	589	695
36	462	564	597	705	673	795	746	880
38	515	628	666	785	750	885	831	980
40	570	696	738	870	831	981	921	1 086
44	690	842	892	1 053	1 006	1 187	1 114	1 314
48	821	1 002	1 062	1 253	1 197	1 413	1 326	1 564
52	964	1 176	1 246	1 471	1 405	1 658	1 556	1 836

NOTE — To calculate the aggregate breaking force, multiply the figures given in col 4, 6 and 8 by 1.19 and in col 5, 7 and 9 by 1.332.

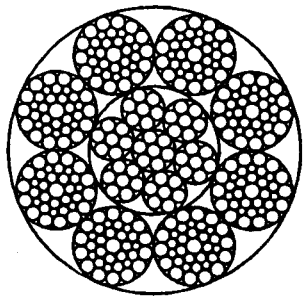
[1)] Wire strand core (CWS) may be used for rope diameter 12 mm and below.

Table 9 Mass and Breaking Force for 8 × 36 SW and 8 × 37 SF Construction Ropes

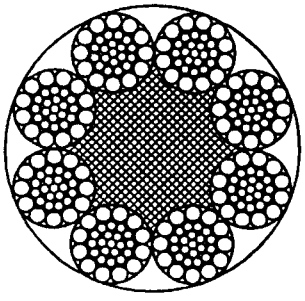
(*Clauses* 1, 4 *and* 5)



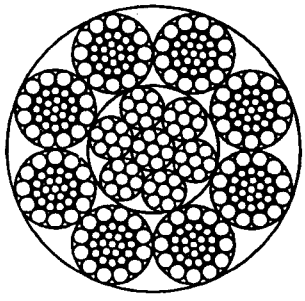
8x36 SW (14-7+7-7-1) (CF)



8x36 SW (14-7+7-7-1) (CWR)



8x37 SF (12-12-6F-6-1) (CF)



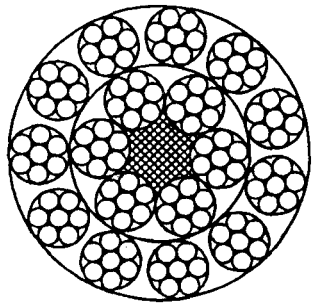
8x37 SF (12-12-6F-6-1) (CWR)

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
mm	kg/100 m		kN	kN	kN	kN	kN	kN
16	91.3	111	115	136	130	153	144	170
18	116	141	146	172	164	194	182	215
19	129	157	162	192	183	216	203	239
20	143	174	180	212	203	239	225	265
22	173	210	218	257	246	290	272	321
24	205	251	259	306	292	345	324	382
26	241	294	304	359	343	405	380	448
28	279	341	353	416	398	469	440	520
32	365	445	461	544	519	613	575	679
36	462	564	583	688	657	776	728	859
38	515	628	650	767	733	864	811	957
40	570	696	720	850	812	958	899	1 061
44	690	842	871	1 028	982	1 159	1 088	1 283
48	821	1 002	1 037	1 223	1 169	1 379	1 294	1 527
52	964	1 176	1 217	1 436	1 372	1 619	1 519	1 792
56	1 118	1 364	1411	1 665	1 591	1 877	1 762	2 079
60	1 283	1 566	1 620	1 912	1 826	2 155	2 022	2 386
64	1 460	1 781	1 843	2 175	2 078	2 452	2 301	2 715
68	1 648	2 011	2 081	2 455	2 346	2 768	2 597	3 065

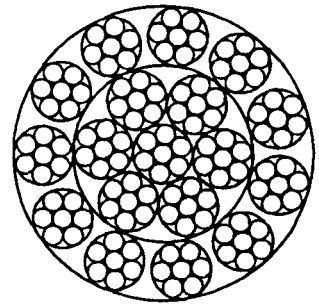
NOTE — To calculate the aggregate breaking force, multiply the figures given in col 4, 6 and 8 by 1.220 and in col 5, 7 and 9 by 1.364

Table 10 Mass and Breaking Force for 17 × 7 (6-1) and 18 × 7 (6-1) Construction Ropes

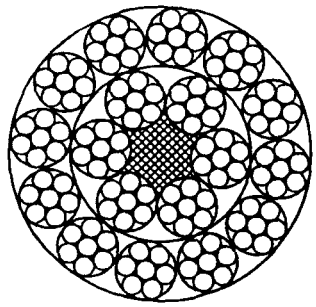
(*Clauses* 1, 4 *and* 5)



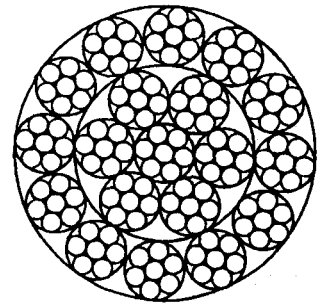
17x7 (6-1) (CF)



17x7 (6-1) (CWS)



18x7 (6-1) (CF)

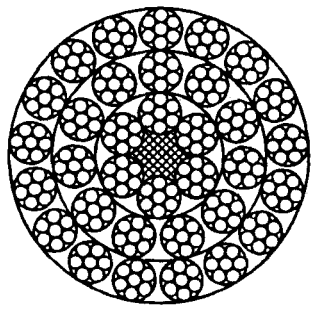


18x7 (6-1) (CWS)

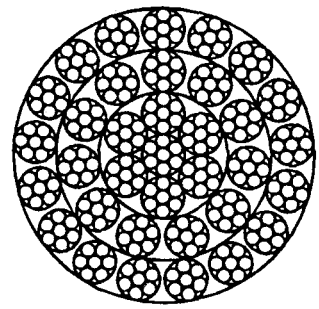
Nominal Diameter	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
	Fibre core	Steel core	Fibre core	Steel core	Fibre core	Steel core	Fibre core	Steel core
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
1	2	3	4	5	6	7	8	9
mm	kg/100 m		kN	kN	kN	kN	kN	kN
8	24.5	25.7	32	33	36	37	40	41
9	31.0	32.6	41	42	46	47	51	52
10	38.3	40.2	50	52	56	58	62	64
11	46.3	48.6	61	62	68	70	76	78
12	55.1	57.9	72	74	81	84	90	93
13	64.7	67.9	85	87	95	98	106	109
14	75.0	78.8	98	101	111	114	122	126
16	98.0	103	128	132	144	149	160	165
18	124	130	162	167	183	188	202	208
19	138	145	181	186	204	210	225	232
20	153	161	200	206	226	232	250	257
22	185	195	242	249	273	281	302	311
24	220	232	288	297	325	335	360	370
26	259	272	338	348	381	393	422	435
28	300	315	392	404	442	455	490	504
32	392	412	512	527	577	595	639	659
36	496	521	648	668	731	753	809	833
38	553	580	722	744	814	839	902	929
40	612	643	800	824	902	929	999	1 029

NOTE — To calculate the aggregate breaking force, multiply the figures given in col 4, 6 and 8 by 1.282 and in col 5, 7 and 9 by 1.319

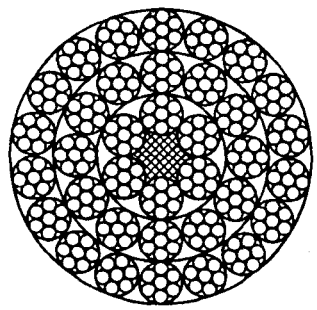
Table 11 Mass and Breaking Force for 34 × 7 (6-1) and 36 × 7 (6-1) Construction Ropes
(*Clauses* 1, 4 *and* 5)



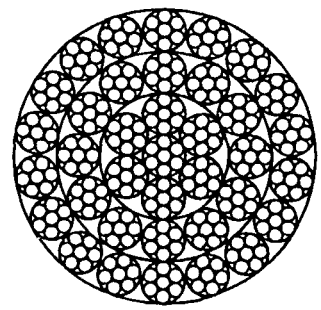
34x7 (6-1) (CF)



34x7 (6-1) (CWS)



36x7 (6-1) (CF)

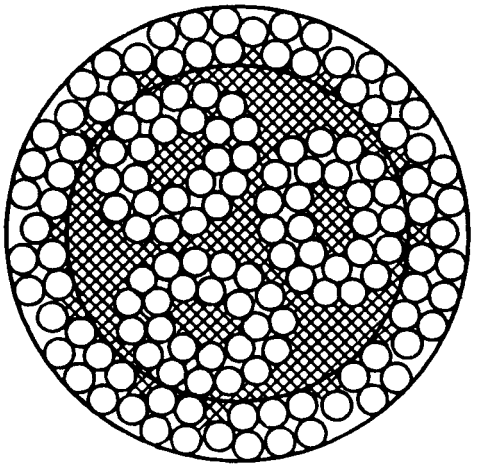


36x7 (6-1) (CWS)

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
mm	kg/100 m		kN	kN	kN	kN	kN	kN
12	56.2	57.9	71	72	80	81	88	90
13	65.9	67.9	83	84	93	95	103	105
14	76.5	78.8	96	98	108	110	120	122
16	99.9	103	125	128	141	144	157	160
18	126	130	159	162	179	183	198	202
19	141	145	177	180	199	203	221	225
20	156	161	196	200	221	225	245	250
22	189	195	237	242	267	273	296	302
24	225	232	282	288	318	325	352	359
26	264	272	331	338	374	381	414	422
28	306	315	384	392	433	442	480	489
32	400	412	502	512	566	577	627	639
36	506	521	635	648	716	730	793	809
38	563	580	708	722	798	814	884	901
40	624	643	784	800	884	902	979	999
44	755	778	949	968	1 070	1 091	1 185	1 208
48	899	926	1 129	1 152	1 273	1 298	1 410	1 438
52	1 055	1 087	1 325	1 352	1 494	1 524	1 655	1 687
56	1 224	1 261	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 4, 6 and 8 by 1.33 and in col 5, 7 and 9 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)

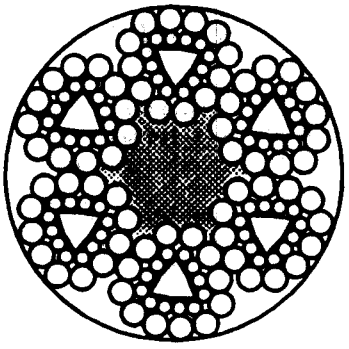


Nominal Diameter	Approximate Mass	Minimum Breaking Force Corresponding to Rope Grade of		
		1570	1770	1960
(1)	(2)	(3)	(4)	(5)
mm	kg/100 m	kN	kN	kN
8	23.2	30	34	38
9	29.3	38	43	48
10	36.2	47	53	59
11	43.8	57	64	71
12	52.1	68	76	85
13	61.2	80	90	99
14	71.0	92	104	115
16	92.7	121	136	151
18	117	153	172	191
19	131	170	192	212
20	145	188	212	235
22	175	228	257	285
24	209	271	306	339
26	245	318	359	397
28	284	369	416	461
32	371	482	544	602
36	469	610	688	762
38	523	680	767	849
40	579	754	850	941

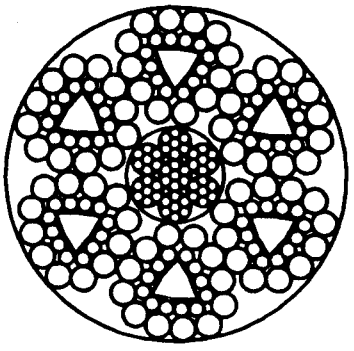
NOTE — To calculate the aggregate breaking force, multiply the figures given in col 3, 4 and 5 by 1.283.

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 (CWS)

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)	(CWS)	(CF)	(CWS)	(CF)	(CWS)	(CF)	(CWS)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100 m		kN	kN	kN	kN	kN	kN
13	69.3	75.5	93	99	105	111	116	123
14	80.4	87.6	108	114	122	129	135	143
16	105	114	141	150	159	169	176	187
18	133	145	179	189	201	213	223	236
19	148	161	199	211	224	238	248	263
20	164	179	220	234	249	263	275	292
22	198	216	267	283	301	319	333	353
24	236	257	317	336	358	379	396	420
26	277	302	373	395	420	445	465	493
28	321	350	432	458	487	516	539	572
32	420	458	564	598	636	674	704	747
36	531	579	714	757	805	853	892	945
38	592	645	796	843	897	951	993	1 053
40	656	715	882	934	994	1 054	1 101	1 167
44	794	865	1 067	1 131	1 203	1 275	1 332	1 412
48	945	1 030	1 270	1 346	1 431	1 517	1 585	1 680

NOTES

1 To calculate the aggregate breaking force, multiply the figures given in col 4, 6 and 8 by 1.177 and in col 5, 7 and 9 by 1.25.

2 In case of Δ wire, 3 or more round wires may be used.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Wire Ropes and Wire Products Sectional Committee, ME 10

Organization	*Representative(s)*
Directorate General of Mines Safety, Dhanbad	SHRI D. SAHA (***Chairman***) SHRI. S. P. BANSAL (*Alternate*)
Aerial Ropeway & Mechanical Handling Co Pvt Ltd, Kolkata	SHRI A. K. KINRA SHRI RANJAN MUKHERJEE (*Alternate*)
Amar Promoters Pvt Ltd, Solan	SHRI VIRENDER AGARWAL SHRI JATINDER AGARWAL (*Alternate*)
Bharat Coking Coal Ltd, Dhanbad	SHRI R. K. PRASAD
Bharat Wire Ropes Ltd, Mumbai	SHRI D. M. SHAH
Central Mining Research Institute, Dhanbad	SHRI S. P. CHAUDHARY SHRI R. P. CHAKRABORTY (*Alternate*)
Directorate General of Aeronautical Quality Assurance, New Delhi	SHRI S. B. PRASAD SHRI SANJAY CHAWLA (*Alternate*)
Directorate General of Civil Aviation, New Delhi	SHRI R. C. GUPTA SHRI. M. M. KAUSHAL (*Alternate*)
Eastern Coalfields Ltd, Kolkata	SHRI H. K. CHAKRABORTY
Fort William Industries Ltd, Hooghly	SHRI J. L. RATHI SHRI BASUDEB BANERJEE (*Alternate*)
JCT Ltd (Steel Division), Hoshiarpur	SHRI S. K. SETHI SHRI M. L. SHARMA (*Alternate*)
Ministry of Defence (Naval), New Delhi	CDR BRAHMASWAROOP SHRI B. L. KHDWAL (*Alternate*)
Ministry of Surface Transport, New Delhi	SHRI G. P. ROY SHRI T. K. DUTTA (*Alternate*)
National Test House, Ghaziabad	SHRI D. S. MAJUMDAR SHRI B. N. SARKAR (*Alternate*)
North Eastern Coalfields Ltd, Kolkata	SHRI A. TIRKEY
Oil and Natural Gas Commission, Dehradun	SHRI R. K. GARG SHRI P. K. SOOD (*Alternate*)
Research Designs & Standards Organization, Lucknow	DEPUTY DIRECTOR (STANDARDS)
South Eastern Coalfields Ltd, Bilaspur	SHRI S. K. MISHRA SHRI G. RAMASWAMI (*Alternate*)
Usha Breco Ltd, Kolkata	SHRI AMIT KUMAR BASU SHRI C. K. KARMAKAR (*Alternate*)
Usha Martin Industries Ltd, Ranchi	SHRI RANA PRATAP SHRI K. K. SENGUPTA (*Alternate*)
Vidarbha Hardware Industries, Akola	SHRI O. P. DALMIA SHRI SANJAY K. DALMIA (*Alternate*)
BIS Directorate General	SHRI M. L. CHOPRA, Director & Head (MED) [Representing Director General (*Ex-officio*)]

Member Secretary
SHRI P. VENKATESWARA RAO
Joint Director (MED), BIS

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act,* 1986 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 latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc : No. ME 10 (618).

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 110 002
Telephones : 323 01 31, 323 33 75, 323 94 02

Telegrams : Manaksanstha
(Common to all offices)

Regional Offices :		Telephone
Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110 002	323 76 17, 323 38 41
Eastern	: 1/14 C.I.T. Scheme VII M, V. I. P. Road, Kankurgachi, KOLKATA 700 054	337 84 99, 337 85 61, 337 86 26, 337 91 20
Northern	: SCO 335-336, Sector 34-A, CHANDIGARH 160 022	60 38 43, 60 20 25
Southern	: C.I.T. Campus, IV Cross Road, CHENNAI 600 113	254 12 16, 254 14 42, 254 25 19, 254 13 15
Western	: Manakalaya, E9 MIDC, Marol, Andheri (East), MUMBAI 400 093	832 92 95, 832 78 58, 832 78 91, 832 78 92

Branches : AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR. NALAGARH. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM. VISAKHAPATNAM.

Printed at Prabhat Offset Press, New Delhi-2