BSI

BS 302 : Part 3 : 1987

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British Standard

Stranded steel wire ropes

Part 3. Specification for zinc coated ropes for ships

Câbles toronnés en acier
Partie 3. Câbles galvanisés pour la construction navale — Spécifications

Litzenseile aus Stahldrähten
Teil 3. Verzinkte Seile für Schiffe

British Standards Institution

Foreword

This Part of BS 302 has been prepared under the direction of the Mechanical Handling Standards Committee. It is one Part of a combined revision of BS 302 : 1968, BS 236 : 1968, BS 329 : 1968, BS 330 : 1968, BS 365 : 1968 and BS 3530 : 1968, which are withdrawn. BS 302 is now published in six Parts and takes account of both national and international developments since 1968.

This Part (Part 3) specifies requirements for zinc coated ropes for ships additional to the general requirements in Part 1. Other Parts specify the additional requirements for other particular uses of ropes:

Part 2 Specification for ropes for general purposes
Part 4 Specification for ropes for lifts
Part 5 Specification for ropes for hauling purposes
Part 6 Specification for ropes for mine hoisting

Two further Parts are in preparation, covering larger diameter ropes (64 mm to 205 mm diameter) and higher strength ropes and will be Parts 7 and 8 respectively.

In line with the principles of international standard ISO 2408, published by the International Organization for Standardization (ISO), the constructions are grouped according to the number of outer wires in the strands. The general requirements of BS 302 : Part 1 and the methods used for calculating breaking loads and approximate masses are in accordance with ISO 2408. In respect of individual usages the ropes in Parts 2 and 3 are fully in accordance with ISO 2408 and those in section two of Part 4 are in accordance with ISO 4344. In each of these Parts however, certain additional ropes still in common use in the UK have been included.

In line with current international practice, the term 'zinc coated' has been adopted in this standard in place of 'galvanized'. The terms are synonymous.

Purchasers ordering to BS 302 are advised to specify in their purchasing contract that the manufacturer operate a quality system in compliance with the appropriate Part of BS 5750, or suitable equivalent, to ensure themselves that products claimed to comply with BS 302 consistently achieve the required level of quality.

Wire rope users will find valuable information in the companion publication BS 6570 'Code of practice for the selection, care and maintenance of steel wire ropes'.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Contents

Specification

1 Scope

This Part of BS 302 specifies the requirements for zinc coated steel wire ropes for ships and includes ropes for standing rigging, cargo lashings, moorings, towing and certain types of cargo handling gear. It is for use in conjunction with Part 1.

NOTE 1. Information to be supplied by the purchaser on the enquiry and order is given in appendix F of BS 302 : Part 1 : 1987.

NOTE 2. The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Part of BS 302, the definitions given in BS 302 : Part 1 apply.

3 Compliance

Ropes in accordance with BS 302 : Part 3 shall comply with this Part and with BS 302 : Part 1.

4 Wire rope constructions and sizes

Constructions and size ranges shall be as given in table 1.

NOTE. In the absence of a precise indication by the purchaser on the enquiry and order, the choice of construction within a group is at the discretion of the supplier.

5 Material

5.1 Wire

5.1.1 *General.* The wire used for the manufacture of wire ropes specified in this Part, as shown in table 1, shall comply with sections one and two of BS 2763 : 1982. The mechanical tests shall be confined to the tensile strength and torsion requirements.

5.1.2 *Wire finish.* The wire shall be zinc coated according to BS 2763. The zinc coating shall be class Z or class A.

NOTE. It will need to be stated by the purchaser on the enquiry and order if class A is required, otherwise class Z will be supplied.

5.1.3 *Tensile grade of wires.* The tensile grade of the wires, other than the king wires, shall be 1420 N/mm^2 * or 1570 N/mm^2 tensile grades, as indicated in tables 2 to 6

Table 1. Wire rope constructions and sizes

	Rope group	Description	Size range (diameter)	Typical construction
Ropes with steel wire main core	7 x 7	Up to seven outer wires in a strand. One layer of wires over a king wire.	mm 12 to 28	6 x 7 (6/1) WSC
	7 x 19	8 to 12 outer wires in a strand. Two layers of wires over a king wire.	32 to 48	6 x 19 (12/6/1) WSC
Ropes with fibre main core	6 x 12	8 to 15 outer wires in a strand. One layer of wires over a fibre strand core.	3 to 16	6 x 12 (12/Fibre) FC
	6 x 24	12 to 15 outer wires in a strand. Two layers of wires over a fibre strand core.	8 to 40	6 x 24 (15/9/Fibre) FC 6 x 24 (12/12 Fibre) FC
	6 x 19	8 to 12 outer wires in a strand. Two layers of wires over a king wire.	3 to 24	6 x 19 (12/6/1) FC 6 x 19 (9/9/1) FC
	6 x 37	14 to 18 outer wires in a strand. Three layers of wires over a king wire.	20 to 72	6 x 37 (18/12/6/1) FC

*1 N/mm^2 = 1 MPa.

except in the case of 3 mm to 7 mm diameter 6 x 12 and 6 x 19 constructions which shall be 1770 N/mm^2 tensile grade.

5.2 Rope main core

The main core of the rope shall be of fibre or steel as specified in table 1. Where a steel core is used it shall be a wire strand (WSC) of the same construction as the outer strands. Fibre cores (FC) shall comply with **3.2** of BS 302 : Part 1 : 1987.

6 Direction of lay

Ropes shall be right-hand ordinary lay.

7 Lubrication

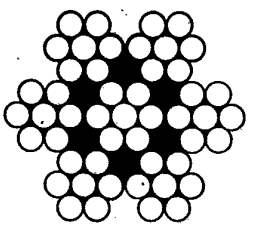
Fibre main cores shall be treated and the wires of the rope shall be coated with a lubricant complying with **3.3** of BS 302 : Part 1 : 1987.

8 Minimum breaking load

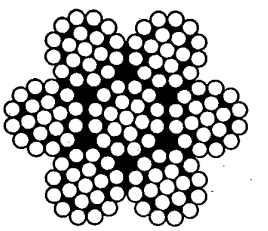
The minimum breaking loads shall be as given in tables 2 to 6.

NOTE. For guidance, these tables also give approximate masses of ropes, calculated as in **C.2** of BS 302 : Part 1 : 1987.

Table 2. Construction groups with steel core



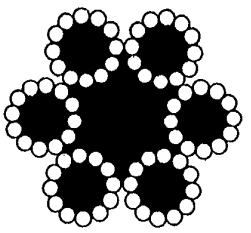
6 x 7 (6/1) WSC (7 x 7)



6 x 19 (12/6/1) WSC (7 x 19)

Nominal diameter	Minimum breaking force		Minimum breaking load		Approximate mass
	1420 N/mm^2 tensile grade	1570 N/mm^2 tensile grade	1420 N/mm^2 tensile grade	1570 N/mm^2 tensile grade	
mm	kN	kN	t	t	kg/100 m
7 x 7 (6/1) group					
12	73.4	81.2	7.48	8.28	54.9
14	99.9	110	10.2	11.2	74.7
16	131	144	13.4	14.7	97.5
18	165	183	16.8	18.7	123
20	204	225	20.8	22.9	152
22	247	273	25.2	27.8	184
24	294	325	30.0	33.1	219
26	345	381	35.2	38.8	258
28	400	442	40.8	45.1	299
7 x 19 group					
32	483	534	49.2	54.4	390
36	611	676	62.3	68.9	494
40	754	834	76.9	85.0	610
44	913	1009	93.1	103	738
48	1086	1201	111	122	878

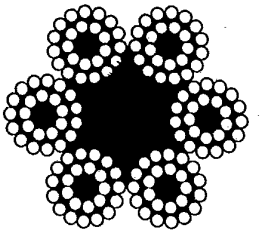
Table 3. 6 x 12 construction group with fibre cores



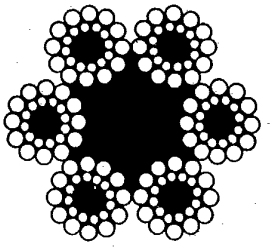
6 x 12 (12/Fibre) FC

Nominal diameter	Minimum breaking force			Minimum breaking load			Approximate mass
	1420 N/mm^2 tensile grade	1570 N/mm^2 tensile grade	1770 N/mm^2 tensile grade	1420 N/mm^2 tensile grade	1570 N/mm^2 tensile grade	1770 N/mm^2 tensile grade	
mm	kN	kN	kN	t	t	t	kg/100 m
3	—	—	3.33	—	—	0.34	2.26
4	—	—	5.92	—	—	0.60	4.02
5	—	—	9.25	—	—	0.94	6.28
6	—	—	13.3	—	—	1.36	9.04
7	—	—	18.1	—	—	1.85	12.3
8	19.0	21.0	—	1.94	2.14	—	16.1
9	24.0	26.6	—	2.45	2.71	—	20.3
10	29.7	32.8	—	3.03	3.34	—	25.1
12	42.7	47.3	—	4.35	4.82	—	36.1
14	58.2	64.3	—	5.93	6.55	—	49.2
16	76.0	84.0	—	7.75	8.56	—	64.3

Table 4. 6 x 24 construction group with fibre cores



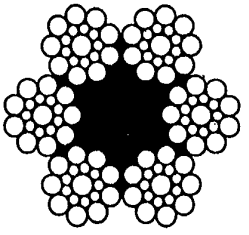
6 x 24 (15/9/Fibre) FC



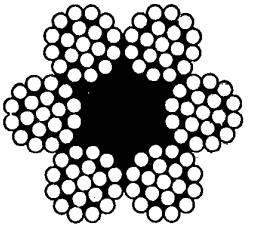
6 x 24 (12/12/F) FC

Nominal diameter	Minimum breaking force		Minimum breaking load		Approximate mass
	1420 N/mm^2 tensile grade	1570 N/mm^2 tensile grade	1420 N/mm^2 tensile grade	1570 N/mm^2 tensile grade	
mm	kN	kN	t	t	kg/100 m
8	25.4	28.1	2.59	2.86	19.7
9	32.2	35.6	3.28	3.63	24.9
10	39.8	44.0	4.06	4.49	30.8
11	48.1	53.2	4.90	5.42	37.3
12	57.3	63.3	5.84	6.45	44.4
13	67.2	74.3	6.85	7.57	52.1
14	77.9	86.2	7.94	8.79	60.4
16	102	113	10.4	11.5	78.8
18	129	142	13.1	14.5	99.8
19	144	159	14.7	16.2	111
20	159	176	16.2	17.9	123
22	192	213	19.6	21.7	149
24	229	253	23.3	25.8	177
26	269	297	27.4	30.3	208
28	312	345	31.8	35.2	241
32	407	450	41.5	45.9	315
35	487	539	49.6	54.9	377
36	515	570	52.5	58.1	399
38	574	635	58.5	64.7	445
40	636	703	64.8	71.7	493

Table 5. 6 x 19 construction group with fibre main core



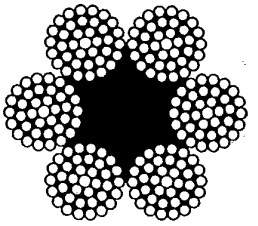
6 x 19 (9/9/1) FC



6 x 19 (12/6/1) FC

Nominal diameter	Minimum breaking force		Minimum breaking load		Approximate mass
	1420 N/mm^2 tensile grade	1770 N/mm^2 tensile grade	1420 N/mm^2 tensile grade	1770 N/mm^2 tensile grade	
mm	kN	kN	t	t	kg/100 m
3	–	4.89	–	0.50	3.1
4	–	8.69	–	0.89	5.5
5	–	13.6	–	1.39	8.6
6	–	19.6	–	2.0	12.5
7	–	26.6	–	2.71	17.0
8	27.9	–	2.84	–	22.1
10	43.6	–	4.44	–	34.6
12	62.8	–	6.40	–	49.8
14	85.4	–	8.71	–	67.8
16	112	–	11.4	–	88.6
18	141	–	14.4	–	112
20	174	–	17.7	–	138
22	211	–	21.5	–	167
24	251	–	25.6	–	199

Table 6. 6 x 37 construction group with fibre main core



6 x 37 (18/12/6/1) FC

Nominal diameter	Minimum breaking force		Minimum breaking load		Approximate mass
	1420 N/mm^2 tensile grade	1570 N/mm^2 tensile grade	1420 N/mm^2 tensile grade	1570 N/mm^2 tensile grade	
mm	kN	kN	t	t	kg/100 m
20	168	185	17.1	18.9	138
22	203	224	20.7	22.8	167
24	241	267	24.6	27.2	199
26	283	313	28.8	31.9	234
28	328	363	33.4	37.0	271
32	429	474	43.7	48.3	354
36	543	600	55.4	61.2	448
40	670	741	68.3	75.5	554
44	811	897	82.7	91.4	670
48	965	1067	98.4	109	797
52	1133	1252	115	128	936
56	1314	1452	134	148	1085
60	1508	1667	154	170	1246
64	1716	1897	175	193	1417
68	1937	2142	197	218	1600
72	2172	2401	221	245	1794

Publications referred to

BS 2763 Specification for round carbon steel wire for wire ropes
BS 5750* Quality systems
Part 2 Specification for manufacture and installation
BS 6570* Code of practice for the selection, care and maintenance of steel wire ropes
ISO 2408* Steel wire ropes for general purposes — Characteristics
ISO 4344* Steel wire ropes for lifts

*Referred to in the foreword only.

BS 302 : Part 3 : 1987

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Institution of Mining Engineers
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National Association of Lift Makers
Zinc Development Association

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Amd. No.	Date of issue	Text affected