Parameter Sample Book

Petroleum wire rope

Company overview

GSR is a leading company specializing in research, production, processing, sales, and import-export operations of wire ropes, wires, strands, and related products, equipment, materials, and technologies. The main products include wire ropes, bridge cables, commercial wires, wire rope accessories, and prestressed steel strands. The annual production capacity reaches 600,000 tons. The company excels in producing high-strength, high-toughness, extract, extra-long, special-structure, and special-purpose wire rope products. Therefore, GSR has become a technologically strong, high-capacity and market-leading Chinese industry leader.

For over 50 years, GSR has remained committed to the steel wire rope industry and has taken the initiative to lead its development, assuming both responsibility and mission. The company boasts inherent strengths that include production of various structural steel wire ropes, ranging in diameter 1.0mm to 264mm (reaching 200mm for zinc-aluminum alloy sealed steel wire ropes), as well as PC steel strands ranging in diameter from 5.0mm to 28.6mm, various purpose wires ranging in diameter from 0.15mm to 9.0mm, and deep-processed products such as pretensioned, coated, and rigged steel wire ropes that display high-strength, high-toughness, exceptional thickness, length, and unique structures for special purposes. The "Julong" brand wire ropes produced by GSR are widely used in an array of industries and fields, such as aerospace, national defense construction, building structures, bridge engineering, cable car transport, high-speed elevators, marine engineering, water conservancy engineering, ports, machinery, steel smelting, mining, petroleum drilling and more.

GSR has research platforms such as China National Enterprise Technology Center, China National Torch Program Key High tech Enterprise, High Performance Special Cable Manufacturing Technology and Application National and Local Joint Engineering Research Center, and has undertaken and completed multiple key technological innovation projects in China. The company have independently developed a series of high-tech products, including fully sealed steel wire ropes coated with zinc aluminum rare earth alloy, 264mm large-diameter marine engineering steel wire ropes, large-span bridge steel wire ropes, large electric shovel steel wire ropes, SPC manned steel wire ropes, etc. The technical indicators of these products are higher than the industry technical standards and have reached the international leading level.

The various types of steel wire ropes developed and produced by GSR are widely used in various industries and fields. A large number of difficult and high-tech steel wire rope products have been successfully used in the Gezhouba Water Conservancy Hub Project, Three Gorges Power Station, Shenzhen Yantian Port, Tianjin Port, Guangdong Humen Bridge, Guizhou Baling River Bridge, Beipanjiang Bridge, Hunan Aizhai Bridge, Hong Kong Zhuhai Macao Bridge, Zhenhua 30, the world's largest salvage crane ship, Heidaigou large open-pit coal mine, Kongtong Mountain tourist cableway, Tongren Olympic Sports Center,

Liaoning aircraft carrier Major projects and super projects such as China's "Heavenly Eye" and "Shenzhou" manned spacecraft No. 8, 9, 10, and 11. The company's products are also exported to more than 40 countries and regions in Europe, America, Asia, Africa, Oceania, etc., and have been successfully used in projects such as the Harrogate Bridge in Norway, Maputo Bridge in Mozambique, Heima Coal Mine in Türkiye, Chambishi Mine in Central Africa, Zambia, and Singapore Container Terminal, which are highly recognized in the international market.

GSR has consistently prioritized the strengthening of its technological innovation system and the conversion of its achievements, this makes the company a leader in the industry, and from being an enforcer of rules to a rule-maker. GSR has taken lead and participated in the revision of over 40 international standards, national standards in China, military, and industry standards. In June 2017, the company led the revision of ISO 2408:2017 "Wire ropes - Requirements," an international standard that was published and distributed.

GSR places great importance on the creation, utilization, and protection of intellectual property rights. The company has filed 303 patent technology achievements, which have been accepted by the Chinese National Intellectual Property Administration. Furthermore, GSR has been granted 135 patents.

GSR has obtained ISO 9001 quality management system, ISO 14001 environmental management system, GB/T 01 occupational health and safety management system, ISO 10012 measurement management system, GJB 9001B national military standard quality management system, American Petroleum Institute (API) certification, as well as recognition, certification, and approval from ship classification societies such as CCS, LR, DNV.GL, BV, ABS, KR, among others.

The number of recognitions, certifications, and approvals received by GSR ranks top in the industry. GSR's "Julong" brand wire ropes have been rated as user products for 20 consecutive years. The company is recognized as a AAAA-level "Standardized Good Behavior Enterprise" at the level, a key high-tech enterprise in China's Torch Plan, a demonstration enterprise for China's technological innovation, a Chinese intellectual property advantage enterprise, and a demonstration enterprise for nurturing Chinese industrial brands. The company was awarded the "China Quality Nomination Award" in 2016, and its wire rope products were included in the list of "China Manufacturing Single Item Champion Demonstration Enterprises" in 2017.

Directory

Characteristics of steel wire rope

Construction of steel wire rope

Wire rope is made of several strands and a rope core (metal core, fiber core or other rope core), and the strand is made of several steel rods and a core (central steel wire or fiber core).

Rope core

Rope core is divided into fiber core and steel core fiber core.

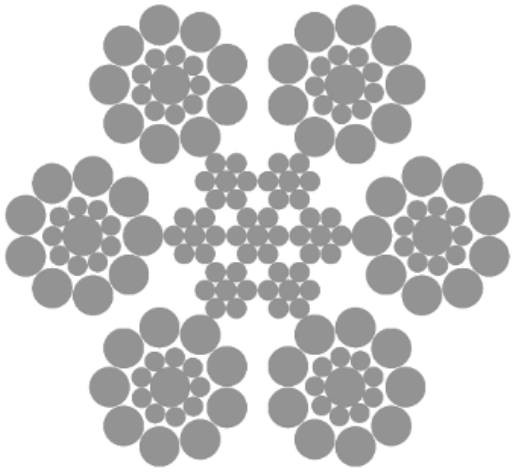
Fiber core steel rope is soft and has good bending performance. When the steel rope is subjected to collision and impact loads during work, the fiber core can play a buffering role. Fiber core is divided into natural fiber core and synthetic fiber core. Natural fiber core has more oil storage, so that the steel rope has enough lubrication internally during work and prevents corrosion of steel wire; synthetic fiber core (such as polypropylene, polyethylene) has good toughness, water absorption, acid resistance, alkali resistance, corrosion resistance, extrusion resistance and wear resistance, etc., and the steel rope is not easy to deform under dynamic load and has a stable diameter.

Steel core

Steel core is divided into independent steel wire core (IWRC) and steel wire core (WSC). Metal and steel core steel rope has large breaking pull force, extrusion resistance and high temperature resistance, and is not easy to deform under dynamic load and has a stable diameter.

linear contact lay wire rope

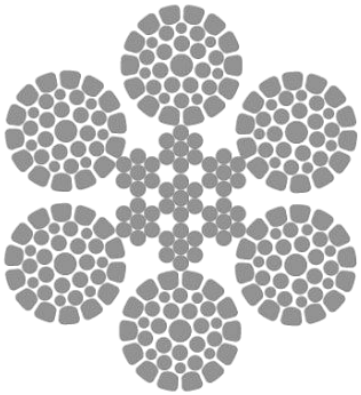
Linear contact lay wire rope the twist length of all steel wires in the rope is the same, and each layer of steel wire is placed on the groove formed between the inner layer of steel wires. The steel wires are in line contact, and the structure of the rope is close. Therefore, the line contact steel wire rope has a large breaking pull force, no secondary bending stress between the layers of steel wires when used, and good fatigue resistance.



6×19S-IWRC

Compacted steel wire rope

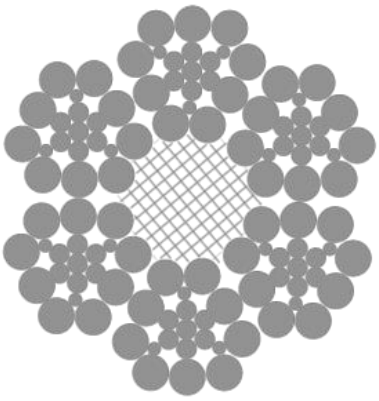
The steel wires in the rope are in surface contact, and the metal filling coefficient of the steel wire rope is large, and the structure of the rope is close. When the steel wire rope is used, the contact stress between the steel wires is small, there is no secondary bending stress, and the contact area between the steel wire rope and the wheel groove is large. Therefore, the compacted steel wire rope has good wear resistance, fatigue resistance and extrusion resistance, and is not easy to deform.



6×K36WS-IWRC

Special-shaped steel wire rope

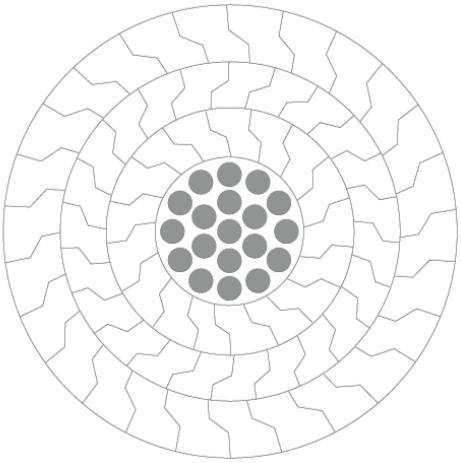
The section of the steel wire rope is not round, which is usually called special-shaped steel wire rope. The main types are triangular and fan-shaped steel wire ropes. The supporting surface of the special-shaped steel wire rope is 3-4 times larger than that of the round steel wire rope, that is, the contact area with the wheel groove is large, the contact stress is small, and the service life is 2-3 times higher than that of the round steel wire rope. The contact points between the rope and the rope of the triangular steel wire rope are increased, and the compression resistance and fatigue resistance are good. The metal effective section area of the special-shaped steel wire rope is large, and the breaking pull force of the whole rope is increased by 25% compared with that of the round steel wire rope at the same diameter and strength.



6×V19-FC

Locked coil wire rope

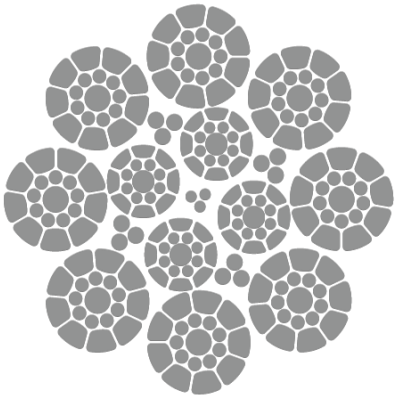
Sealed steel wire rope Sealed steel wire rope layers of special steel wire outside the core are tightly sewn together to form a smooth closed surface, the core and adjacent layers of special steel wire twist to the opposite, so the sealed steel wire rope has the advantages of large metal filling coefficient and breaking pull, good wear resistance, long service life, no rotation, small structural elongation.



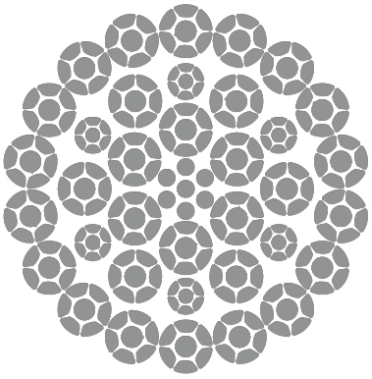
Three layers of Z-wire rope

Resistance rotation steel wire rope

6 or 8 strands of steel wire rope for rotation of steel wire rope, when the steel wire rope is used for single or high lift lifting steel wire rope twist because of rotation, not only affect the service life of the steel wire rope, but also affect the lifting efficiency and safety of operators. By changing the structure and twist method of the steel wire rope can eliminate the rotation of the steel wire rope. The current use of micro-rotation and resistance rotation steel wire rope is multi-strand, three-strand, four-strand round or fan-shaped strand steel wire rope.



8×K19S-PWRC (Slight spin)



35(W)×K7(Stop rotation)

Metal core coated steel wire rope

Plastic polymer coated on the surface of the metal core and between the strands of the steel wire rope, reduce the wear between the strands and the inner and outer layers of the rope, thus improving the wear resistance, fatigue resistance, impact resistance and extrusion resistance of the steel wire rope. Prolong the service life of the steel wire rope.

Galvanized aluminum (zinc) steel wire rope

Galvanized aluminum (zinc) steel wire rope is made of electro galvanized or hot galvanized aluminum (zinc) steel wire twisted. Zinc or zinc aluminum alloy layer in the corrosive environment (such as seawater, marine atmosphere corrosion, hydrogen sulfide, sulfur dioxide atmosphere corrosion, etc.) to protect the steel wire, improve the service life of the wire rope.

Lubrication of steel wire rope

Lubricating oil can prevent steel wire rust, make the lubrication between the steel wire, steel wire rope and pulley components reduce friction. If the user has no special requirements, we in the production of the rope core and the surface of the steel wire rope are coated with lubricating oil, and for important uses and more serious corrosion places with steel wire rope using the stock spray high drop point lubricating oil; friction improvement with steel wire rope coated with grease.

Twisting of steel wire rope

Interactive twist: the twisting direction of the steel wire in the outer layers is opposite to the twisting direction of the outer layers in the steel wire rope. As shown in the figure below.

Right interactive twist (sZ)

Left interactive twist (zS)

Concurrent twist: the twisting direction of the steel wire in the outer layers is the same as the twisting direction of the outer layers in the steel wire rope. As shown in the figure below.

right-hand lang-lay (zZ)

left-hand lang-lay (sS)

Number of outer steel wires

For the same diameter of the steel wire rope, the selection of the outer steel wire number of the steel wire rope can improve the wear resistance of the steel wire rope, and the selection of the outer steel wire number of the steel wire rope has the advantages of soft, fatigue resistance.

Approximate calculation of the diameter of the outermost layer of the wire rope

Six-strand steel wire rope: d= D /(N+3.5)

Eight-strand steel wire rope: d= D /(N+6.5)

Where:

d: outer steel wire diameter, in mm.

D: nominal diameter of steel wire rope, in mm.

N: number of outer steel wires of steel wire rope.

Calculation formula for reference weight of steel wire rope

Calculation formula for reference weight of steel wire rope: $M=KD^2$

Where:

M: reference weight of steel wire rope per unit length, in kg/100m.

D: nominal diameter of steel wire rope, in mm.

K: weight coefficient of a certain type of oil-coated steel wire rope per unit length, in kg/100m*mm², the value of K is shown in the table below.

Calculation formula for minimum breaking tension of steel wire rope

Calculation formula for minimum breaking tension of steel wire rope:

$F=K*D^2*R /1000$

Where:

F--minimum breaking tension of steel wire rope, in KN.

D--nominal diameter of steel wire rope, in mm.

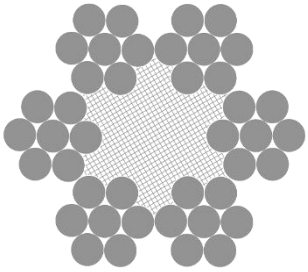
R--nominal tensile strength of steel wire rope, in MPa.

K'--minimum breaking tension coefficient of a certain type of steel wire rope, the value of K' is shown in the table below.

Structural elongation of wire rope

The elongation of wire rope consists of elastic elongation and structural elongation, structural elongation is permanent elongation. Some applications (such as permanent suspension load-bearing structures, reciprocating load-bearing ropes, and other lengths of lifting ropes, etc.) require that the wire rope must be eliminated from the structure of the elongation of the pre-tensioning is to eliminate the effective means of the elongation of the Construction of wire rope. Our company can provide users with this service.

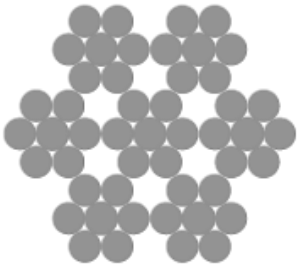
Petroleum wire rope



Structure type		Diameter range mm
rope structure	share structure	
6×7+FC	1+6	6 ~36

Nominal diameter of wire rope		reference weight	Minimum breaking tension of wire rope kN			
mm	in	kg/100m	1770	1960	IPS	EIPS
6		12.4	21.2	23.4		
(6.35)	(1/4)	13.9			23.5	25.8
7		16.9	28.8	31.9		
(7.94)	(5/16)	21.8			36.5	40.1
8		22.1	37.6	41.6		
9		27.9	47.6	52.7		
(9.5)	(3/8)	31.1			52.1	57.4
10		34.5	58.8	65.1		
11		41.7	71.1	78.7		
(11.1)	(7/16)	42.5			70.5	77.6
12		49.7	84.6	93.7		
(12.7)	(1/2)	55.6			91.6	101
13		58.3	99.3	110		
14		67.6	115	128		
(14.3)	(9/16)	70.5			116	127
(15.9)	(5/8)	87.2			141	
16		88.3	150	167		
18		112	190	211		
19		125	212	235		
(19.1)	(3/4)	126			202	222
20		138	235	260		
22		167	284	315		
(22.2)	(7/8)	170			273	301
24		199	338	375		
(25.4)	(1)	223			353	389
26		233	397	440		
28		270	461	510		
(28.6)	(1-1/8)	282			443	488
(31.8)	(1-1/4)	349			543	
32		353	602			
(34.9)	(1-3/8)	420			650	
35		423	720			
36		447	762			

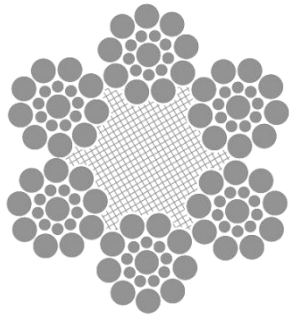
Petroleum wire rope



Structure type		Diameter range mm
rope structure	share structure	
6×7+IWS 6×7+IWRC	1+6	6 ~36

Nominal diameter of wire rope		reference weight	Minimum breaking tension of wire rope kN			
mm	in	kg/100m	1770	1960	IPS	EIPS
6	(1/4)	13.8	22.9	25.3		
(6.35)		15.5			25.3	27.8
7	(5/16)	18.8	31.1	34.5		
(7.94)		24.2			39.2	43.1
8		24.6	40.7	45.0		
9	(3/8)	31.1	51.5	57.0		
(9.5)		34.7			56.0	61.6
10		38.4	63.5	70.4		
11	(7/16)	46.5	76.9	85.1		
(11.1)		47.3			75.8	83.4
12	(1/2)	55.3	91.5	101		
(12.7)		61.9			98.7	109
13		64.9	107	119		
14	(9/16)	75.3	125	138		
(14.3)	(5/8)	78.5			125	137
(15.9)		97.1			152	167
16		98.3	163	180		
18		124	206	228		
19	(3/4)	139	229	254		
(19.1)		140			217	238
20		154	254	281		
22	(7/8)	186	308	341		
(22.2)		189			294	323
24	(1)	221	366	405		
(25.4)		248			380	418
26		260	430	476		
28	(1-1/8)	301	498	552		
(28.6)	(1-1/4)	314			476	524
(31.8)		388			584	
32	(1-3/8)	393	651			
(34.9)		468			699	
35		470	778			
36		498	824			

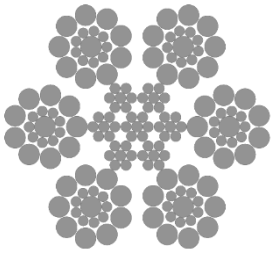
Petroleum wire rope



Structure type		Diameter range mm
rope structure	share structure	
6×19S+FC	1+9+9	6~40
6×19W+FC	1+5/5+10	6~40
6×21Fi+FC	1+5+5F+10	13~44
6×26WS+FC	1+5+5/5+10	13~44
6×25Fi+FC	1+6+6F+12	14~50.8

Nominal diameter of wire rope		reference weight	Minimum breaking tension of wire rope kN					
mm	in	kg/100m	1770	1960	2160	IPS	EIPS	EEIPS
6		12.9	21.0	23.3	25.7			
(6.35)	(1/4)	14.5				24.4	26.8	
7		17.6	28.6	31.7	34.9			
(7.94)	(5/16)	22.6				37.9	41.7	
8		23.0	37.4	41.4	45.6			
9		29.1	47.3	52.4	57.7			
(9.5)	(3/8)	32.4				54.3	59.7	65.7
10		35.9	58.4	64.7	71.3			
11		43.3	70.7	78.3	86.2			
(11.1)	(7/16)	44.2				73.6	81.0	89.0
12		51.7	84.1	93.1	103			
(12.7)	(1/2)	57.9				95.2	105	115
13		60.7	98.7	109	120			
14		70.4	114	127	140			
(14.3)	(9/16)	73.4				120	133	145
(15.9)	(5/8)	90.8				149	164	180
16		91.9	150	166	182			
18		116	189	210	231			
19		130	211	233	257			
(19.1)	(3/4)	131				212	233	256
20		144	234	259	285			
22		174	283	313	345			
(22.2)	(7/8)	177				286	315	347
24		207	336	373	411			
(25.4)	(1)	232				372	409	450
26		243	395	437	482			
28		281	458	507	559			
(28.6)	(1-1/8)	294				468	515	566
(31.8)	(1-1/4)	363				575	633	
32		368	598	662				
(34.9)	(1-3/8)	437				691	761	
35		440	716	792				
36		465	757	838				
38		518	843	934				
(38.1)	(1-1/2)	521				818	898	
40		574	935	1040				
(41.3)	(1-5/8)	612				952	1050	
44		695	1130	1250				
(44.5)	(1-3/4)	711				1100	1210	
45		727	1180	1310				
(47.6)	(1-7/8)	813				1250	1380	
48		827	1350	1490				
50.8	(2)	926				1420		

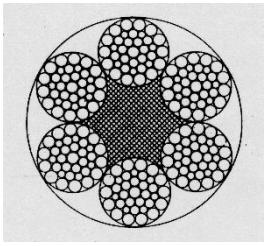
Petroleum wire rope



Structure type		Diameter range
rope structure	share structure	
6×19S+IWRC	1+9+9	6 ~40
6×19W+IWRC	1+5/5+10	6 ~40
6×21Fi+IWRC	1+5+5F+10	13~44
6×26WS+IWRC	1+5+5/5+10	13~44
6×25Fi+IWRC	1+6+6F+12	14~50.8

Nominal diameter of wire rope		reference weight	Minimum breaking tension of wire rope kN					
mm	in	kg/100m	1770	1960	2160	IPS	EIPS	EEIPS
6		14.4	22.7	25.1	27.7			
(6.35)	(1/4)	16.1				26.2	30.2	
7		19.6	30.9	34.2	37.7			
(7.94)	(5/16)	25.2				40.7	46.9	
8		25.6	40.3	44.7	49.2			
9		32.4	51.0	56.5	62.2			
(9.5)	(3/8)	36.1				58.4	67.2	73.8
10		40.0	63.0	69.8	76.9			
11		48.4	76.2	84.4	93.0			
(11.1)	(7/16)	49.3				79.1	90.7	99.6
12		57.6	90.7	100	111			
(12.7)	(1/2)	64.5				102	118	130
13		67.6	106	118	130			
14		78.4	124	137	151			
(14.3)	(9/16)	81.8				129	149	165
(15.9)	(5/8)	101				157	183	202
16		102	161	179	197			
18		130	204	226	249			
19		144	227	252	278			
(19.1)	(3/4)	146				228	262	288
20		160	252	279	308			
22		194	305	338	372			
(22.2)	(7/8)	197				308	354	390
24		230	363	402	443			
(25.4)	(1)	258				399	460	506
26		270	426	472	520			
28		314	494	547	603			
(28.6)	(1-1/8)	327				503	578	636
(31.8)	(1-1/4)	404				617	711	
32		410	645	715				
(34.9)	(1-3/8)	487				743	854	
35		490	772	855				
36		518	817	904				
38		578	910	1010				
(38.1)	(1-1/2)	581				880	1010	
40		640	1010	1120				
(41.3)	(1-5/8)	682				1020	1170	
44		774	1220	1350				
(44.5)	(1-3/4)	792				1180	1360	
45		810	1280	1410				
(47.6)	(1-7/8)	906				1350	1550	
48		922	1450	1610				
(50.8)	(2)	1030				1530		

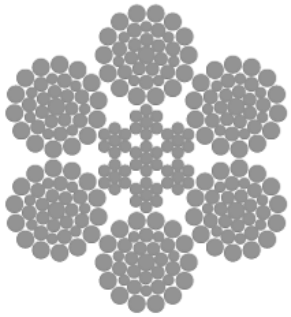
Petroleum wire rope



Structure type		Diameter range mm
rope structure	share structure	
6×31WS+FC	1+6+6/6+12	14 ~50
6×36WS+FC	1+7+7/7+14	16 ~60
6×41WS+FC	1+8+8/8+16	32 ~60
6×41SFi+FC	1+8+8+8F+16	32 ~60
6×46WS+FC	1+9+9/9+18	36 ~60
6×49SWS+FC	1+8+8+8/8+16	42 ~60
6×55SWS+FC	1+9+9+9/9+18	42 ~60

Nominal diameter of wire rope		reference weight	Minimum breaking tension of wire ropekN					
mm	in	kg/100m	1770	1960	2160	IPS	EIPS	EEIPS
14		71.9	114	127	140			
(14.3)	(9/16)	75.0				120	133	145
(15.9)	(5/8)	92.8				149	164	180
16	(3/4)	94.0	150	166	182			
18		119	189	210	231			
19		132	211	233	257			
(19.1)	(7/8)	134				212	233	256
20		147	234	259	285			
22	(1)	178	283	313	345			
(22.2)		181				286	315	347
24		211	336	373	411			
(25.4)	(1-1/8)	237				372	409	450
26	(1-1/4)	248	395	437	482			
28		288	458	507	559			
(28.6)	(1-3/8)	300				468	515	566
(31.8)		371				575	633	696
32		376	598	662	730			
(34.9)		447				691	761	836
35	(1-1/2)	450	716	792	873			
36		476	757	838	924			
38	(1-5/8)	530	843	934	1030			
(38.1)		533				818	898	987
40	(1-3/4)	587	935	1040	1140			
(41.3)		626				952	1050	
44	(1-7/8)	711	1130	1250				
(44.5)		727				1100	1210	
45	(2)	743	1180	1310				
(47.6)		832				1250	1380	
48		846	1350	1490				
(50.8)	(2-1/8)	947				1420	1570	
51		955	1520	1680				
52	(2-1/4)	992	1580	1750				
(54.0)		1070				1590	1750	
56		1150	1830	2030				
(57.2)		1200				1780	1960	
60		1320	2100	2330				

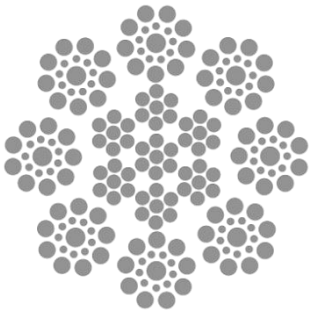
Petroleum wire rope



Structure type		Diameter range mm
rope structure	share structure	
6×31WS+IWRC	1+6+6/6+12	14 ~50
6×36WS+IWRC	1+7+7/7+14	16 ~60
6×41WS+IWRC	1+8+8/8+16	32 ~60
6×41SFi+IWRC	1+8+8+8F+16	32 ~60
6×46WS+IWRC	1+9+9/9+18	36 ~60
6×49SWS+IWRC	1+8+8+8/8+16	42 ~60
6×55SWS+IWRC	1+9+9+9/9+18	42 ~60

Nominal diameter of wire rope		reference weight	Minimum breaking tension of wire rope kN					
mm	in	kg/100m	1770	1960	2160	IPS	EIPS	EEIPS
14		80.2	124	137	151			
(14.3)	(9/16)	83.6				129	149	165
(15.9)	(5/8)	103				157	183	202
16		105	161	179	197			
18		133	204	226	249			
19		148	227	252	278			
(19.1)	(3/4)	149				228	262	288
20		164	252	279	308			
22		198	305	338	372			
(22.2)	(7/8)	202				308	354	390
24		236	363	402	443			
(25.4)	(1)	264				399	460	506
26		276	426	472	520			
28		321	494	547	603			
(28.6)	(1-1/8)	335				503	578	636
(31.8)	(1-1/4)	414				617	711	782
32		419	645	715	787			
(34.9)	(1-3/8)	498				743	854	943
35		501	772	855	942			
36		530	817	904	997			
38		591	910	1010	1110			
(38.1)	(1-1/2)	594				880	1010	1110
40		654	1010	1120	1230			
(41.3)	(1-5/8)	698				1020	1170	
44		792	1220	1350				
(44.5)	(1-3/4)	810				1180	1360	
45		828	1280	1410				
(47.6)	(1-7/8)	927				1350	1550	
48		942	1450	1610				
(50.8)	(2)	1060				1530	1760	
51		1060	1640	1810				
52		1110	1700	1890				
(54.0)	(2-1/8)	1190				1710	1970	
56		1280	1980	2190				
(57.2)	(2-1/4)	1340				1910	2200	
60		1470	2270	2510				

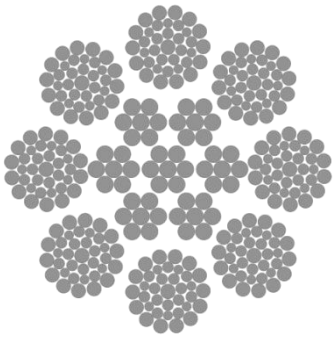
Petroleum wire rope



Structure type		Diameter range mm
rope structure	share structure	
8×19S+IWRC	1+9+9	10 ~48
8×19W+IWRC	1+6+6/6	10 ~48
8×21Fi+IWRC	1+5+5F+10	15.9 ~54
8×26WS+IWRC	1+5+5/5+10	15.9 ~54
8×25Fi+IWRC	1+6+6F+12	16 ~60

Nominal diameter of wire rope		reference weight	Minimum breaking tension of wire rope kN					
mm	in	kg/100m	1770	1960	2160	IPS	EIPS	EEIPS
10		40.7	63.0	69.8	76.9			
11		49.2	76.2	84.4	93.0			
(11.1)	(7/16)	50.1				79.1	90.7	99.6
12		58.6	90.7	100	111			
(12.7)	(1/2)	65.6				102	118	130
13		68.8	106	118	130			
14		79.8	124	137	151			
(14.3)	(9/16)	83.2				129	149	165
(15.9)	(5/8)	103				157	183	202
16		104	161	179	197			
18		132	204	226	249			
19		147	227	252	278			
(19.1)	(3/4)	148				228	262	288
20		163	252	279	308			
22		197	305	338	372			
(22.2)	(7/8)	201				308	354	390
24		234	363	402	443			
(25.4)	(1)	263				399	460	506
26		275	426	472	520			
28		319	494	547	603			
(28.6)	(1-1/8)	333				503	578	636
(31.8)	(1-1/4)	412				617	711	782
32		417	645	715	787			
(34.9)	(1-3/8)	496				743	854	943
35		499	772	855	942			
36		527	817	904				
38		588	910	1010				
(38.1)	(1-1/2)	591				880	1010	
40		651	1010	1120				
(41.3)	(1-5/8)	694				1020	1170	
44		788	1220	1350				
(44.5)	(1-3/4)	806				1180	1360	
45		824	1280	1410				
(47.6)	(1-7/8)	922				1350	1550	
48		938	1450	1610				
(50.8)	(2)	1050				1530	1760	
51		1060	1640	1810				
52		1100	1700	1890				
(54.0)	(2-1/8)	1190				1710	1970	
56		1280	1980					
(57.2)	(2-1/4)	1330				1910		
60		1470	2270					

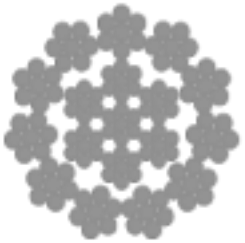
Petroleum wire rope



Structure type		Diameter range mm
rope structure	share structure	
8×31WS+IWRC 8×36WS+IWRC 8×41WS+IWRC	1+6+6/6+12 1+7+7/7+14 1+8+8/8+16	18 ~60 19 ~60 38 ~60

Nominal diameter of wire rope		reference weight	Minimum breaking tension of wire rope kN					
mm	in	kg/100m	1770	1960	2160	IPS	EIPS	EEIPS
18		135	204	226	249			
19		151	227	252	278			
(19.1)	(3/4)	152				228	262	288
20		167	252	279	308			
22		202	305	338	372			
(22.2)	(7/8)	206				308	354	390
24		240	363	402	443			
(25.4)	(1)	269				399	460	506
26		282	426	472	520			
28		327	494	547	603			
(28.6)	(1-1/8)	341				503	578	636
(31.8)	(1-1/4)	422				617	711	782
32		427	645	715	787			
(34.9)	(1-3/8)	508				743	854	943
35		511	772	855	942			
36		540	817	904	997			
38		602	910	1010	1110			
(38.1)	(1-1/2)	605				880	1010	1110
40		667	1010	1120	1230			
(41.3)	(1-5/8)	711				1020	1170	1300
44		807	1220	1350	1490			
(44.5)	(1-3/4)	826				1180	1360	1500
45		844	1280	1410				
(47.6)	(1-7/8)	945				1350	1550	
48		961	1450	1610				
(50.8)	(2)	1080				1530	1760	
51		1080	1640	1810				
52		1130	1700	1890				
(54.0)	(2-1/8)	1220				1710	1970	
56		1310	1980	2190				
(57.2)	(2-1/4)	1360				1910	2200	
60		1500	2270	2510				

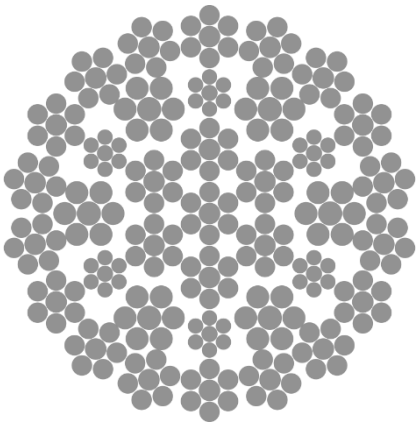
Petroleum wire rope



Structure type		Diameter range mm
rope structure	share structure	
17×7+FC 17×7+IWS 18×7+FC 18×7+IWS	1+6 1+6 1+6 1+6	6 ~38.1

Nominal diameter of wire rope		reference weight		Minimum breaking tension of wire rope kN			
mm	in	fiber core	metal core	1770	1960	IPS	EIPS
		kg/100m					
6		13.8	14.4	20.9	23.1		
(6.35)	(1/4)	15.4	16.2			22.3	24.6
7		18.7	19.6	28.4	31.5		
(7.94)	(5/16)	24.1	25.3			34.7	38.3
8		24.4	25.7	37.2	41.1		
9		30.9	32.5	47.0	52.1		
(9.5)	(3/8)	34.5	36.2			49.7	54.5
10		38.2	40.1	58.1	64.3		
11		46.2	48.5	70.2	77.8		
(11.1)	(7/16)	47.1	49.4			67.4	73.9
12		55.0	57.7	83.6	92.6		
(12.7)	(1/2)	61.6	64.7			87.6	95.8
13		64.6	67.8	98.1	109		
14		74.9	78.6	114	126		
(14.3)	(9/16)	78.1	82.0			110	121
(15.9)	(5/8)	96.6	101			136	149
16		97.8	103	149	165		
18		124	130	188	208		
19		138	145	210	232		
(19.1)	(3/4)	139	146			194	214
20		153	160	232	257		
22		185	194	281	311		
(22.2)	(7/8)	188	198			262	289
24		220	231	334	370		
(25.4)	(1)	246	259			341	375
26		258	271	392	435		
28		299	314	455	504		
(28.6)	(1-1/8)	312	328			429	472
(31.8)	(1-1/4)	386	406			527	579
32		391	411	594	658		
(34.9)	(1-3/8)	465	488			634	697
35		468	491	711	788		
36		495	520	752	833		
38		552	579	838	928		
(38.1)	(1-1/2)	555	582			751	826

Petroleum wire rope



Structure type		Diameter range mm
rope structure	share structure	
35W×7 40W×7	1+6 1+6	12~40 18~40

Nominal diameter of wire rope mm	reference weight kg/100m	Minimum breaking tension of wire rope kN		
		1770	1960	2160
12	66.2	91.8	102	109
13	77.7	108	119	128
14	90.2	125	138	148
16	118	163	181	194
18	149	206	229	245
19	166	230	255	273
20	184	255	282	302
22	223	308	342	366
24	265	367	406	435
26	311	431	477	511
28	361	500	553	593
32	471	652	723	774
35	564	781	864	926
36	596	826	914	980
38	664	920	1020	1090
40	736	1020	1130	

Precautions for the use of wire rope

Handling, storage and maintenance of wire rope

When loading and unloading the wire rope disk, it must be loaded and unloaded by crane, so as not to cause damage to the rope disk or the phenomenon of chaotic roll; ground handling, the wire rope disk is not allowed to roll on the uneven ground, resulting in the surface of the wire rope pressure injury; no packaging of the wire rope handling, the surface of the wire rope cannot be stuck with stones, clay and so on, affecting the use of the wire rope.

Steel wire rope should be stored in a dry and ventilated warehouse, to prevent direct sunlight or heat dry baking, the warehouse cannot be multi-layer stacking of steel wire rope. If the wire rope is stored in large quantities for a long time, it should be inspected frequently to prevent rusting, and should be treated in time after rusting is found and re-lubricated, such as serious corrosion, the section of wire rope should be scrapped. When the wire rope is placed outdoors, it should be cushioned with wooden boards, placed on dry ground and covered with rain cover. Wire rope storage time more than one year, should be re-sampling test, qualified before use.

Wire rope has been coated with enough lubricating oil when it is manufactured, but in the process of using, the original lubricating oil will be slowly lost and emitted, so the wire rope should be coated with lubricating oil on a regular basis to ensure rust prevention and lubrication, reduce friction and prolong the service life of the wire rope.

Inspection of wire rope

Wire rope in the use of the process, should be in accordance with the relevant provisions of the regular inspection, and will check the results of good records. Inspection content should include the following items: the degree of wear and tear of the wire rope, wire breakage, corrosion, lubrication, deformation, rope connection part or end fastening part and other abnormal phenomena. Wire rope in the reel, pulley and over the wire wheel and other components above the sliding, through the friction components are easy to wear out grooves to make the wire rope wear faster, and sometimes the wear of the pulley will also make the wire rope deformation, increase bending fatigue. Therefore, these components must be carefully inspected, if there is unsuitable, must be immediately replaced or amended.

Wire Rope Unwinding and Reeling Methods

See Fig. 1 for the way of wire rope release and Fig. 2 and Fig. 3 for the way of wire rope reeling.

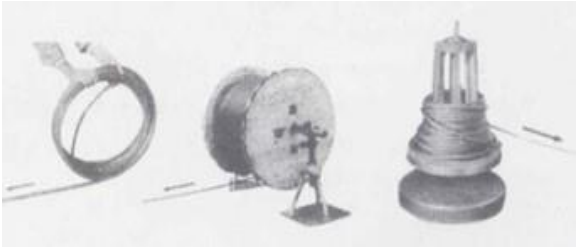


Figure 1: Rope release method Figure

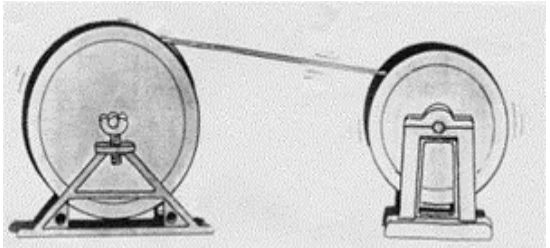


Figure 2: Rope reeling method

When the wire rope is wound in multiple layers of the reel, the tensioning device should be added to the rope release frame to ensure that the wire rope is evenly and tightly wound on the reel, as shown in Figure 3.

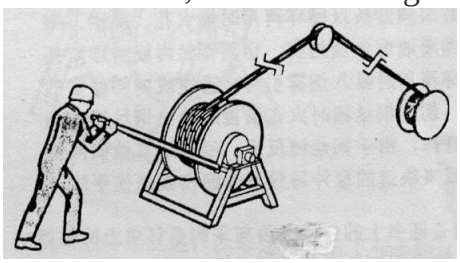


Figure 3

The direction of single-layer winding of wire rope on the reel

The direction of single layer winding of wire rope on the reel is shown in Fig. 4 and Fig. 5.

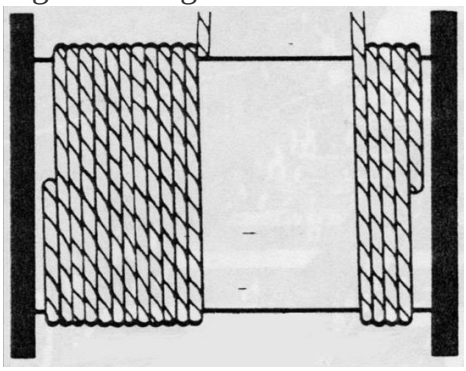


Figure 4: Left twisted wire rope

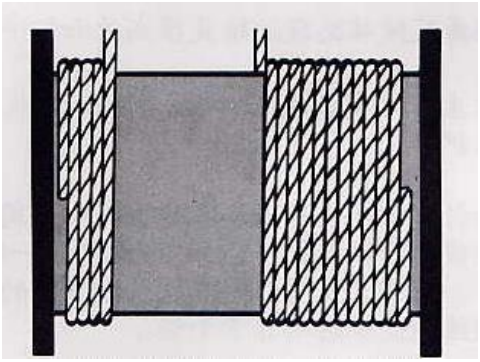


Figure 5: Right twisted wire rope

Wire rope cutting head bundling method

When the wire rope needs to be cut off and used, both ends of the cut head should be tied with wire or small rope strands, and the tying length should be at least 2 times the diameter of the wire rope (D), and the tying length of the parallel twisted wire rope, multi-layer stranded wire rope and single stranded wire rope should be at least 6 times the diameter of the wire rope (D), and the tying method should be as shown in Fig. 6.

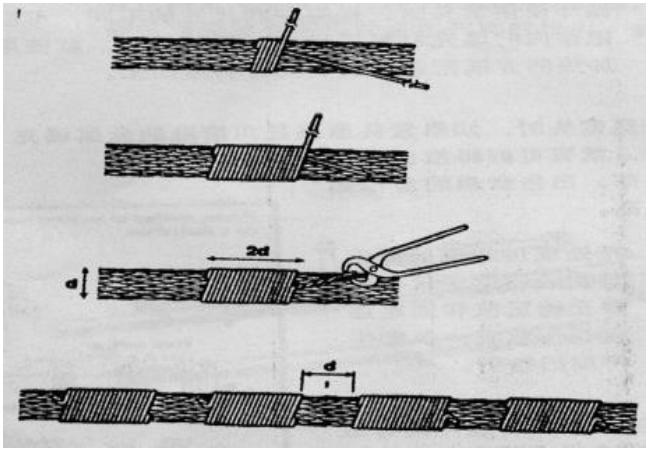


Figure 6

Installation of wire rope

When the old rope is used as the hauling rope of the new rope, the coupling method of welding the new and old rope ends to each other cannot be used, because this method will seriously damage the structure of the new wire rope. Correct coupling method:

1. As shown in Fig. 7, weld the end of the new wire rope with a ring, pressure head, twisted head processing

2. Use fine steel wire rope or three-strand fiber rope with the same twisting direction as the new wire rope as hauling rope.

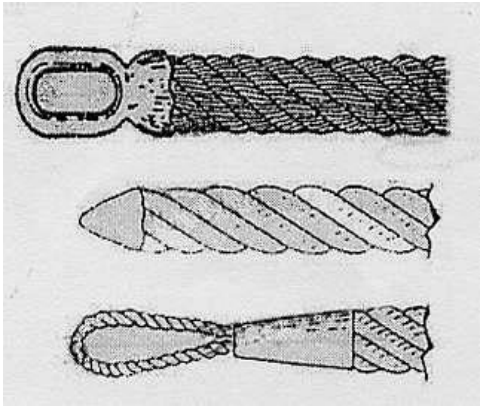


Figure 7

The relationship between wire rope in use and sheave groove

Suitable wheel groove and wire rope contact should be as shown in Figure 8. Wheel groove is too large as shown in Figure 9 and wheel groove is too small as shown in Figure 10, in use will exacerbate the fatigue of the wire rope breakage.

Wheel groove radius (R) and the nominal diameter of the wire rope (D) ratio: R/D=0.525~0.550

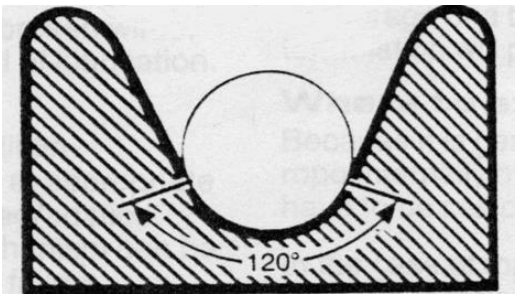


Figure 8 correct

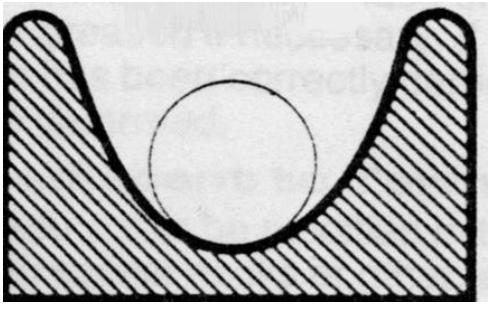


Figure 9 Error

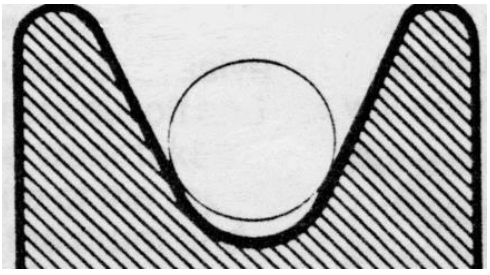


Figure 10 Error

Rope and drum angle

The angle between the wire rope and the drum is shown in Fig. 11, the angle of the ungrooved drum is <1.5°, and the angle of the grooved drum is <2.5°.

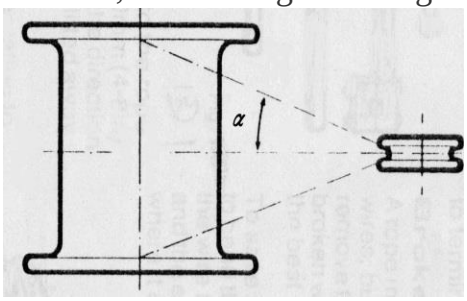


Figure 11

How to use the wire rope clamp

The method of using the wire rope rope clip is shown in Fig. 12.

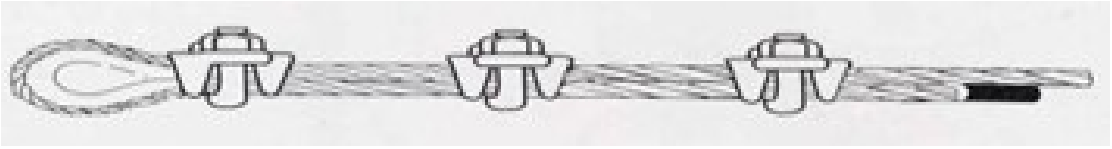


Figure 12

Wire rope breakage treatment

Wire rope in the process of use, broken wire, wire rope can continue to run, it should be as early as possible to remove the broken wire. Although commonly used method of breaking the broken wire directly clamped off with wire cutters, but is by no means the best method, because it will leave a rough break affecting the use, you can use wire cutters to clamp the broken wire before and after bending until it breaks off, with this method so that the wire breaks in the middle of the strands will not cause harm.

Measurement of wire rope diameter

The diameter of the wire rope is measured as shown in Fig. 14, and Fig. 15 shows the wrong measurement method.

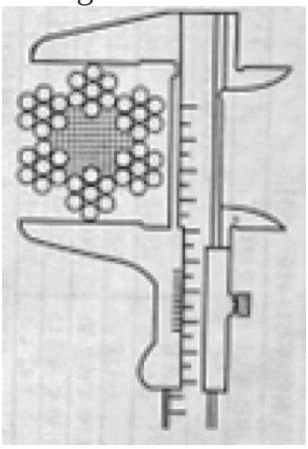


Figure 14

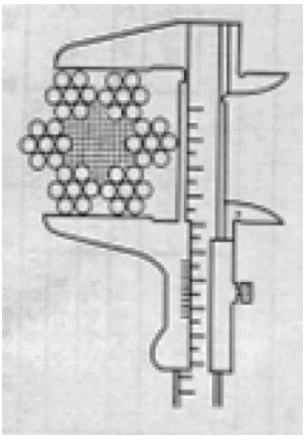


Figure 15

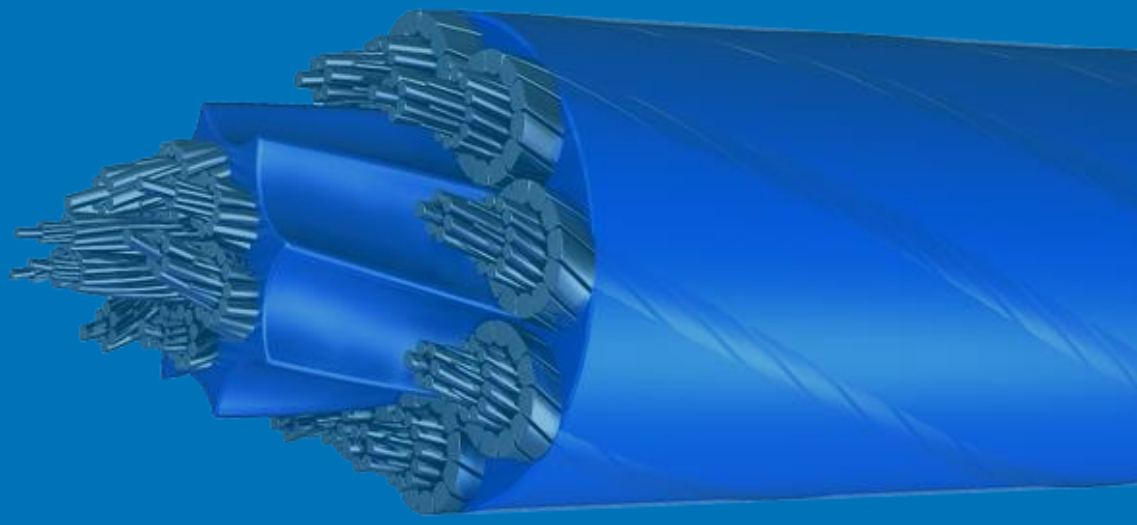
Warning!

Overweight, wear and tear, misuse, damage and improper maintenance will cause the rope to fail. For your safety and the protection of other equipment.

Attention:

- **Check the wire rope for wear and damage before each use.**
- **Never allow the use of seriously worn, damaged and scrapped wire rope.**
- **Never allow overloading of wire rope.**

Consult the correct method of wire rope use, relevant standards and norms.



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