Parameter Sample Book

Cranes and Industrial wire rope

www.gsrgroup.cn

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.

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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.

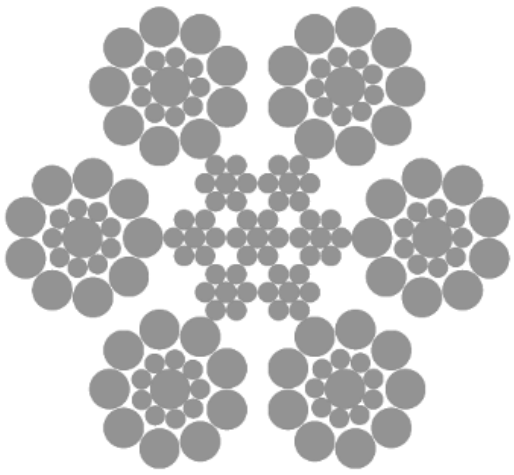
Fiber core steel rope is soft and has good bending performance. When the steel rope is subjected to collision and impact loads during work, the fiber core can play a buffering role. Fiber core is divided into natural fiber core and synthetic fiber core. Natural fiber core has more oil storage, so that 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

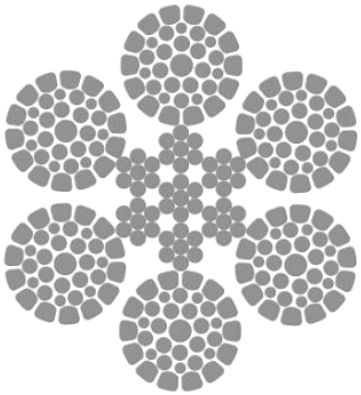
Linear contact lay wire rope the twist length of all steel wires in the rope is the same, and each layer of steel wire is placed on the groove formed between the inner layer of steel wires. The steel wires are in line contact, and the structure of the rope is close. Therefore, the line contact steel 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

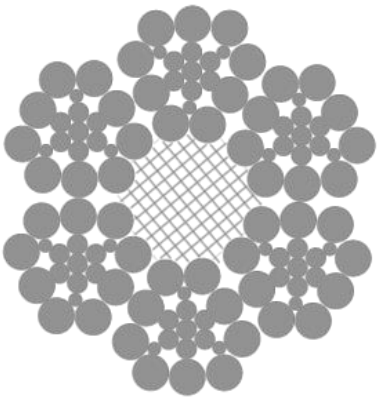
The steel wires in the rope are in surface contact, and the metal filling coefficient of the steel wire rope is large, and the structure of the rope is close. When the steel wire rope is used, the contact stress between the steel wires is small, there is no secondary bending stress, and the contact area 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

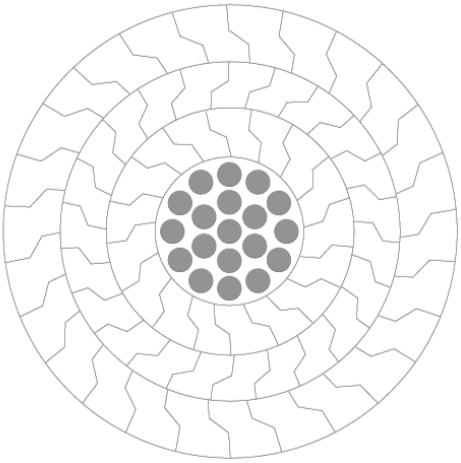
The section of the steel wire rope is not round, which is usually called special-shaped steel wire rope. The main types are triangular and fan-shaped steel wire ropes. The supporting surface of the special-shaped steel wire rope is 3-4 times larger than that of the round steel wire rope, that is, the 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

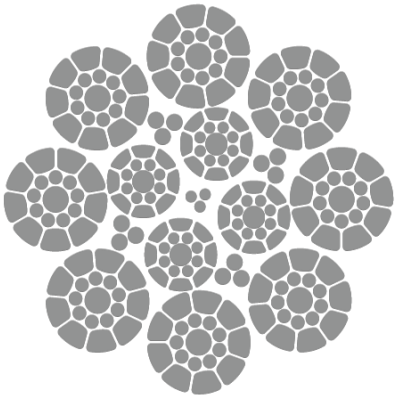
Sealed steel wire rope Sealed steel wire rope layers of special steel wire outside the core are tightly sewn together to form a smooth closed surface, the core and adjacent layers of special steel wire twist to the opposite, so the sealed steel wire rope has the advantages of large metal filling coefficient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



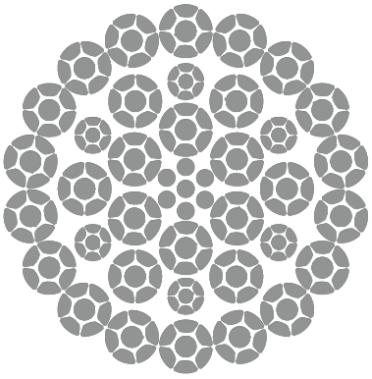
Three layers of Z-wire rope

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.

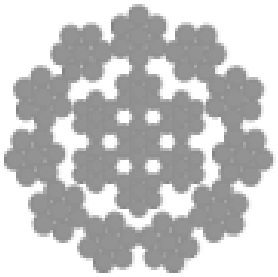
Recommended main uses of wire rope

typology	Recommended Wire Rope Construction
Single-deck reels, duplex reels, duplex pulley block cranes (duplex pulley blocks with counterbalanced arms should be paired for left and right twists to use the wire rope)	6×26WS+IWRC 6×31WS+IWRC 6×36WS+IWRC 6×36WS-EPIWRC 6×K19S-IWRC 6×K26WS-IWRC 6×K31WS-IWRC 6×K36WS-IWRC
Higher lift, less layer winding, single and duplex reels, single and duplex pulley block cranes (when using wire ropes in pairs, they should be paired with left and right twists)	15×K7-IWRC 16×K7-IWRC 35W×7 35(W)×K7
Low lift, single and double coupled drums, single and double coupled pulley blocks, cranes with de-torquers for wire ropes	
Low lift, single coupled reel, single coupled pulley block cranes.	18×7+IWS 35W×7 18×19S+IWS 4V×39S+FC 4×36WS+FC 35(W)×K7

Recommended main uses of wire rope

typology	Recommended Wire Rope Construction
High lift, multi-layer reeling, single and duplex reels, single and duplex pulley block cranes (left and right twists should be paired when wire ropes are used in pairs)	15×K7-IWRC 16×K7-IWRC 15×K7-EPIWRC 16×K7-EPIWRC 35(W)×K7
luffing rope	6×26WS+IWRC 6×31WS+IWRC 6×36WS+IWRC 6×41WS+IWRC 6×29Fi+IWRC
Steel wire rope for lifting ladle	6×19S+IWRC 6×26WS+IWRC 6×31WS+IWRC 6×36WS+IWRC 8×K26WS-IWRC 8×K31WS-IWRC
Blast Furnace Winches	6×25TS+FC 6×28TS+FC
Wire Rope for Dredger	6×K36WS-IWRC 8×K26WS-IWRC 8×K31WS-IWRC 8×26WS+IWRC 8×31WS+IWRC
Gondola Crane Carrying Ropes	one layer of Z-wire two layer of Z-wire

Multi-layer strand wire rope

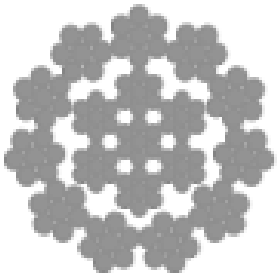


18×7-WSC
Typical structure diagram

Typic structure				Diameter range (mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
17×7	1-6	66	6	6～40
18×7	1-6	72	6	6～50
18×19W	1-6-6＋6	144	12	20～60
18×19S	1-9-9	108	9	16～60
18×19	1/6/12	144	12	20～60

Nominal diameter of wire rope (mm)	Reference weight (kg/100m)		Nominal tensile strength of wire rope MPa									
			1570		1670		1770		1870		1960	
			Minimum breaking force of wire rope kN									
	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core
6	14.4	15.9	17.9	19.1	19.0	20.3	20.1	21.5	21.3	22.8	22.3	23.8
7	19.6	21.7	24.3	26.0	25.9	27.7	27.4	29.3	29.0	31.0	30.3	32.5
8	25.5	28.4	31.8	34.0	33.8	36.1	35.8	38.3	37.8	40.5	39.6	42.4
9	32.3	35.9	40.2	43.0	42.7	45.7	45.3	48.5	47.9	51.2	50.2	53.7
10	39.9	44.3	49.6	53.1	52.8	56.4	55.9	59.8	59.1	63.2	61.9	66.2
11	48.3	53.6	60.0	64.2	63.9	68.3	67.7	72.4	71.5	76.5	74.9	80.2
12	57.5	63.8	71.4	76.4	76.0	81.3	80.5	86.1	85.1	91.0	89.2	95.4
13	67.4	74.9	83.8	89.7	89.2	95.4	94.5	101	99.9	107	105	112
14	78.2	86.8	97.2	104	103	111	110	117	116	124	121	130
16	102	113	127	136	135	145	143	153	151	162	159	170
18	129	144	161	172	171	183	181	194	191	205	201	215
20	160	177	198	212	211	226	224	239	236	253	248	265
22	193	214	240	257	255	273	271	290	286	306	300	321
24	230	255	286	306	304	325	322	345	340	364	357	382
26	270	299	335	359	357	382	378	404	399	427	419	448
28	313	347	389	416	414	443	439	469	463	496	486	519
30	359	399	447	478	475	508	503	538	532	569	557	596
32	409	454	508	543	540	578	573	613	605	647	634	678
34	461	512	574	613	610	653	647	692	683	731	716	766
36	517	574	643	688	684	732	725	775	766	819	803	859
38	576	640	716	766	762	815	808	864	853	913	894	957
40	638	709	794	849	844	903	895	957	945	1011	991	1060

Multi-layer strand wire rope



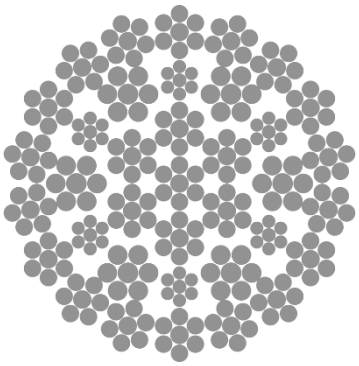
18×7-WSC
Typical structure diagram

Typic structure				Diameter range (mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
17×7	1-6	66	6	6～40
18×7	1-6	72	6	6～50
18×19 W	1-6-6＋6	144	12	20～60
18×19S	1-9-9	108	9	16～60
18×19	1/6/12	144	12	20～60

Nominal diameter of wire rope (mm)	Reference weight (kg/100m)		Nominal tensile strength of wire rope MPa									
			1570		1670		1770		1870		1960	
			Minimum breaking force of wire rope kN									
	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core
42	704	781	875	936	931	996	987	1055	1042	1115	1093	1169
44	772	858	960	1027	1022	1093	1083	1158	1144	1224	1199	1283
46	844	937	1050	1123	1117	1194	1184	1266	1250	1337	1311	1402
48	919	1021	1143	1223	1216	1301	1289	1378	1361	1456	1427	1526
50	998	1108	1240	1327	1319	1411	1398	1496	1477	1580	1548	1656
52	1079	1198	1342	1435	1427	1526	1512	1618	1598	1709	1675	1791
54	1163	1292	1447	1547	1539	1646	1631	1745	1723	1843	1806	1932
56	1251	1389	1556	1664	1655	1770	1754	1876	1853	1982	1942	2078
58	1342	1490	1669	1785	1775	1899	1882	2013	1988	2126	2084	2229
60	1436	1595	1786	1910	1900	2032	2014	2154	2127	2275	2230	2385

Note: The sum of the minimum breaking force = the minimum breaking force of the wire rope × 1.260, of which 17 × 7 is 1.230.

Multi-layer strand wire rope



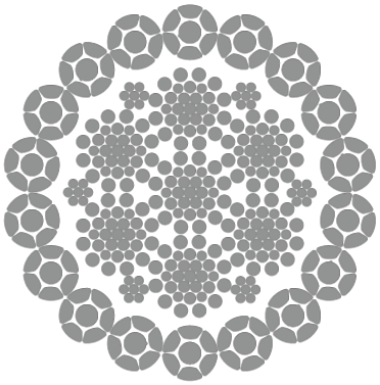
35(W)×7
Typical structure diagram

Typic structure				Diameter range (mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
24(W)×7	1-6	72	6	12～50
35(W)×7	1-6	96	6	14～60
40(W)×7	1-6	108	6	30～60

Nominal diameter of wire rope (mm)	Reference weight (kg/100m)	Nominal tensile strength of wire rope MPa					
		1570	1670	1770	1870	1960	2160
		Minimum breaking force of wire rope kN					
12	68.3	83.9	89.2	94.6	99.9	105	115
14	92.9	114	121	129	136	143	157
16	121	149	159	168	178	186	205
18	154	189	201	213	225	236	260
20	190	233	248	263	278	291	321
22	229	282	300	318	336	352	388
24	273	336	357	378	400	419	462
26	320	394	419	444	469	492	542
28	372	457	486	515	544	570	628
30	427	524	558	591	624	654	721
32	485	596	634	672	710	745	821
34	548	673	716	759	802	841	926
36	614	755	803	851	899	942	1039
38	684	841	895	948	1002	1050	1157
40	758	932	991	1051	1110	1163	1282
42	836	1027	1093	1158	1224	1283	1414
44	918	1128	1199	1271	1343	1408	1551
46	1003	1233	1311	1390	1468	1539	1696
48	1092	1342	1427	1513	1598	1675	1846
50	1185	1456	1549	1642	1734	1818	2003
52	1282	1575	1675	1776	1876	1966	-
54	1382	1698	1807	1915	2023	2120	-
56	1486	1827	1943	2059	2176	2280	-
58	1595	1959	2084	2209	2334	2446	-
60	1706	2097	2230	2364	2498	2618	-

Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.260.

Compacted strand wire rope



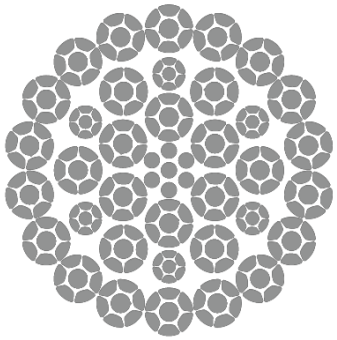
15×K7-IWRC
Typical structure diagram

Typic structure				Diameter range (mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
15×K7-IWRC	1-6	90	6	14～60
16×K7-IWRC	1-6	96	6	16～60

Nominal diameter of wire rope (mm)	Reference weight(kg/100m)	Nominal tensile strength of wire rope MPa				
		1670	1770	1870	1960	2160
		Minimum breaking force of wire rope kN				
	steel core	steel core	steel core	steel core	steel core	steel core
14	94.1	138	146	155	162	179
16	123	180	191	202	212	233
18	156	228	242	256	268	295
20	192	282	299	316	331	365
22	232	341	362	382	400	441
24	276	406	430	455	476	525
26	324	476	505	533	559	616
28	376	553	586	619	648	715
30	432	634	672	710	744	820
32	492	722	765	808	847	933
34	555	815	863	912	956	1054
36	622	913	968	1023	1072	1181
38	693	1018	1079	1140	1194	1316
40	768	1128	1195	1263	1323	1458
42	847	1243	1318	1392	1459	1608
44	929	1364	1446	1528	1601	1765
46	1016	1491	1581	1670	1750	1929
48	1106	1624	1721	1818	1906	2100
50	1200	1762	1867	1973	2068	2279
52	1298	1906	2020	2134	2237	2465
54	1400	2055	2178	2301	2412	2658
56	1505	2210	2342	2475	2594	2859
58	1615	2371	2513	2655	2782	3066
60	1728	2537	2689	2841	2978	3281

Note: Total wire breaking tension=Minimum breaking force of wire rope×1.260.

Compacted strand wire rope



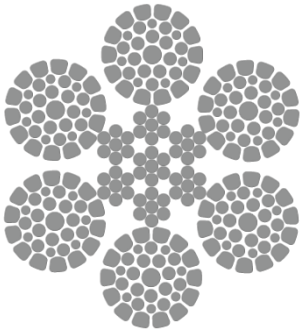
35(W)×K7
Typical structure diagram

Typic structure				Diameter range (mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
35(W)×K7	1-6	210	6	12～60
40(W)×K7	1-6	240	6	20～60
35(W)×K19S	1-9-9	315	9	50～60

Nominal diameter of wire rope (mm)	Reference weight (kg/100m)	Nominal tensile strength of wire rope MPa				
		1670	1770	1870	1960	2160
		Minimum breaking force of wire rope kN				
	steel core	steel core	steel core	steel core	steel core	steel core
12	73.4	101	108	114	119	131
13	86.2	119	126	133	140	154
14	100	138	146	155	162	179
16	131	180	191	202	212	233
18	165	228	242	256	268	295
20	204	282	299	316	331	365
22	247	341	362	382	400	441
24	294	406	430	455	476	525
26	345	476	505	533	559	616
28	400	553	586	619	648	715
30	459	634	672	710	744	820
32	522	722	765	808	847	933
34	590	815	863	912	956	1054
36	661	913	968	1023	1072	1181
38	736	1018	1079	1140	1194	1316
40	816	1128	1195	1263	1323	1458
42	900	1243	1318	1392	1459	1608
44	987	1364	1446	1528	1601	1765
46	1079	1491	1581	1670	1750	1929
48	1175	1624	1721	1818	1906	2100
50	1275	1762	1867	1973	2068	2279
52	1379	1906	2020	2134	2237	2465
54	1487	2055	2178	2301	2412	2658
56	1599	2210	2342	2475	2594	2859
58	1716	2371	2513	2655	2782	3066
60	1836	2537	2689	2841	2978	3281

Note: Total wire breaking tension=Minimum breaking force of wire rope×1.260.

Compacted strand wire rope

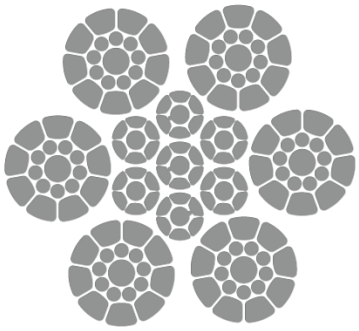


6×K36WS-IWRC
Typical structure diagram

Typic structure				Diameter range (mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
6×K19S	1-9-9	54	9	10～42
6×K25Fi	1-6-6F-12	72	12	14～46
6×K26WS	1-5-5+5-10	60	10	10～46
6×K29Fi	1-7-7F-14	84	14	14～54
6×K31WS	1-6-6+6-12	72	12	14～58
6×K36WS	1-7-7+7-14	84	14	12～60
6×K41WS	1-8-8+8-16	96	16	32～60

Nominal diameter of wire rope (mm)	Reference weight (kg/100m)		Nominal tensile strength of wire rope MPa									
			1670		1770		1870		1960		2160	
			Minimum breaking force of wire rope kN									
	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core
10	42.5	47.0	63.5	70.5	67.3	74.7	71.1	78.9	74.5	82.7	82.1	91.2
12	61.2	67.7	91.4	101	96.9	108	102	114	107	119	118	131
14	83.3	92.1	124	138	132	146	139	155	146	162	161	179
16	109	120	162	180	172	191	182	202	191	212	210	233
18	138	152	206	228	218	242	230	256	241	268	266	295
20	170	188	254	282	269	299	284	316	298	331	328	365
22	206	227	307	341	326	362	344	382	360	400	397	441
24	245	271	366	406	387	430	409	455	429	476	473	525
26	287	318	429	476	455	505	480	533	503	559	555	616
28	333	368	498	553	527	586	557	619	584	648	644	715
30	383	423	571	634	605	672	640	710	670	744	739	820
32	435	481	650	722	689	765	728	808	763	847	840	933
34	491	543	734	815	778	863	821	912	861	956	949	1054
36	551	609	822	913	872	968	921	1023	965	1072	1064	1181
38	614	679	916	1018	971	1079	1026	1140	1075	1194	1185	1316
40	680	752	1015	1128	1076	1195	1137	1263	1192	1323	1313	1458
42	750	829	1119	1243	1186	1318	1253	1392	1314	1459	1448	1608
44	823	910	1229	1364	1302	1446	1376	1528	1442	1601	1589	1765
46	899	995	1343	1491	1423	1581	1504	1670	1576	1750	1737	1929
48	979	1083	1462	1624	1550	1721	1637	1818	1716	1906	1891	2100
50	103	1175	1587	1762	1682	1867	1777	1973	1862	2068	2052	2279
52	1149	1271	1716	1906	1819	2020	1921	2134	2014	2237	2219	2465
54	1239	1371	1850	2055	1961	2178	2072	2301	2172	2412	2393	2658
56	1333	1474	1990	2210	2109	2342	2228	2475	2336	2594	2574	2859
58	1430	1581	2135	2371	2263	2513	2390	2655	2506	2782	2761	3066
60	1530	1692	2285	2537	2421	2689	2558	2841	2681	2978	2955	3281

Compacted strand wire rope



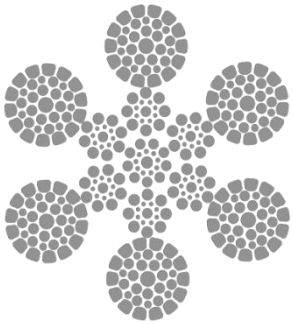
6×K19S-PWRC(K)
Typical structure diagram

Typic structure				Diameter range (mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
6×K19S-PWRC(K) 6×K26WS-PWRC(K) 6×K31WS-PWRC(K) 6×K36WS-PWRC(K) 6×K41WS-PWRC(K)	1-9-9 1-5-5+5-10 1-6-6+6-12 1-7-7+7-14 1-8-8+8-16	54 60 72 84 96	9 10 12 14 16	20～42 20～46 20～58 24～60 36～60

Nominal diameter of wire rope (mm)	Reference weight (kg/100m)	Nominal tensile strength of wire rope MPa				
		1670	1770	1870	1960	2160
		Minimum breaking force of wire rope kN				
	steel core	steel core	steel core	steel core	steel core	steel core
20	192	294	312	329	345	380
22	232	356	377	398	417	460
24	276	423	449	474	497	547
26	324	497	526	556	583	642
28	376	576	611	645	676	745
30	432	661	701	741	776	855
32	492	752	797	843	883	973
34	555	849	900	951	997	1099
36	622	952	1009	1066	1118	1232
38	693	1061	1125	1188	1245	1372
40	768	1176	1246	1316	1380	1521
42	847	1296	1374	1451	1521	1677
44	929	1423	1508	1593	1670	1840
46	1016	1555	1648	1741	1825	2011
48	1106	1693	1794	1896	1987	2190
50	1200	1837	1947	2057	2156	2376
52	1298	1987	2106	2225	2332	2570
54	1400	2143	2271	2399	2515	2771
56	1505	2304	2442	2580	2704	2980
58	1615	2472	2620	2768	2901	3197
60	1728	2645	2804	2962	3105	3421

Note: 1 Minimum breaking force = Minimum breaking force of wire rope × 1.260.
2 This structure of wire rope is only applicable to static load, not applicable to dynamic load.

Compacted strand wire rope

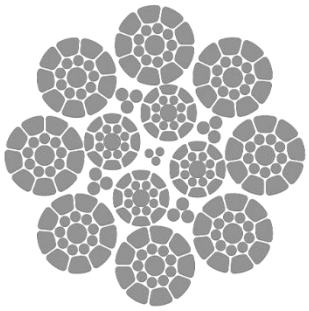


8×K36WS-IWRC
Typical structure diagram

Typic structure				Diameter range (mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
8×K19S	1-9-9	72	9	10～48
8×K25Fi	1-6-6F-12	96	12	18～56
8×K26WS	1-5-5+5-10	80	10	10～50
8×K29Fi	1-7-7F-14	112	14	20～56
8×K31WS	1-6-6+6-12	96	12	18～60
8×K36WS	1-7-7+7-14	112	14	18～60
8×K41WS	1-8-8+8-16	128	16	40～60

Nominal diameter of wire rope (mm)	Reference weight (kg/100m)		Nominal tensile strength of wire rope MPa									
			1670		1770		1870		1960		2160	
			Minimum breaking force of wire rope kN									
	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core
10	40.5	48.5	56.3	70.5	59.6	74.7	63.0	78.9	66.1	82.7	91.2	40.5
12	58.3	69.8	81.0	101	85.9	108	90.7	114	95.1	119	131	58.3
14	79.4	95.1	110	138	117	146	124	155	129	162	179	79.4
16	104	124	144	180	153	191	161	202	169	212	233	104
18	131	157	182	228	193	242	204	256	214	268	295	131
20	162	194	225	282	239	299	252	316	264	331	365	162
22	196	235	272	341	289	362	305	382	320	400	441	196
24	233	279	324	406	344	430	363	455	380	476	525	233
26	274	328	380	476	403	505	426	533	447	559	616	274
28	318	380	441	553	468	586	494	619	518	648	715	318
30	365	437	507	634	537	672	567	710	594	744	820	365
32	415	497	576	722	611	765	645	808	676	847	933	415
34	468	561	651	815	690	863	728	912	764	956	1054	468
36	525	629	729	913	773	968	817	1023	856	1072	1181	525
38	585	700	813	1018	861	1079	910	1140	954	1194	1316	585
40	648	776	900	1128	954	1195	1008	1263	1057	1323	1458	648
42	714	856	993	1243	1052	1318	1112	1392	1165	1459	1608	714
44	784	939	1090	1364	1155	1446	1220	1528	1279	1601	1765	784
46	857	1026	1191	1491	1262	1581	1333	1670	1398	1750	1929	857
48	933	1117	1297	1624	1374	1721	1452	1818	1522	1906	2100	933
50	1013	1213	1407	1762	1491	1867	1575	1973	1651	2068	2279	1013
52	1095	1311	1522	1906	1613	2020	1704	2134	1786	2237	2465	1095
54	1181	1414	1641	2055	1739	2178	1838	2301	1926	2412	2658	1181
56	1270	1521	1765	2210	1871	2342	1976	2475	2071	2594	2859	1270
58	1362	1632	1893	2371	2007	2513	2120	2655	2222	2782	3066	1362
60	1458	1746	2026	2537	2147	2689	2269	2841	2378	2978	3281	1458

Compacted strand wire rope



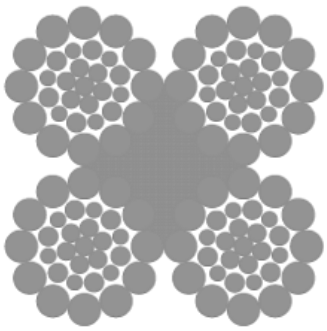
8×K19S-PWRC(K)
Typical structure diagram

Typic structure				Diameter range (mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
16W×K19S	1-9-9	90	9	20～56
8×K19S-PWRC(K)	1-9-9	72	9	20～56
8×K26WS-PWRC(K)	1-5-5+5-10	80	10	24～60
8×K31WS-PWRC(K)	1-6-6+6-12	96	12	24～60
8×K36WS-PWRC(K)	1-7-7+7-14	112	14	26～60
8×K41WS-PWRC(K)	1-8-8+8-16	128	16	40～60

Nominal diameter of wire rope (mm)	Reference weight (kg/100m)	Nominal tensile strength of wire rope MPa				
		1670	1770	1870	1960	2160
		Minimum breaking force of wire rope kN				
	steel core	steel core	steel core	steel core	steel core	steel core
20	204	303	321	339	355	391
22	247	366	388	410	430	474
24	294	436	462	488	511	564
26	345	511	542	573	600	661
28	400	593	629	664	696	767
30	459	681	722	762	799	881
32	522	775	821	867	909	1002
34	590	875	927	979	1026	1131
36	661	980	1039	1098	1151	1268
38	736	1092	1158	1223	1282	1413
40	816	1210	1283	1355	1421	1566
42	900	1334	1414	1494	1566	1726
44	987	1465	1552	1640	1719	1894
46	1079	1601	1697	1792	1879	2070
48	1175	1743	1847	1952	2046	2254
50	1275	1891	2005	2118	2220	2446
52	1379	2046	2168	2291	2401	2646
54	1487	2206	2338	2470	2589	2853
56	1599	2372	2514	2657	2784	3069
58	1716	2545	2697	2850	2987	3292
60	1836	2723	2887	3050	3196	3523

Note: 1 Minimum breaking force = Minimum breaking force of wire rope × 1.260.
2 The structure of parallel twisted compacted wire rope is only applicable to static load, not applicable to dynamic load.

Four-strand wire rope



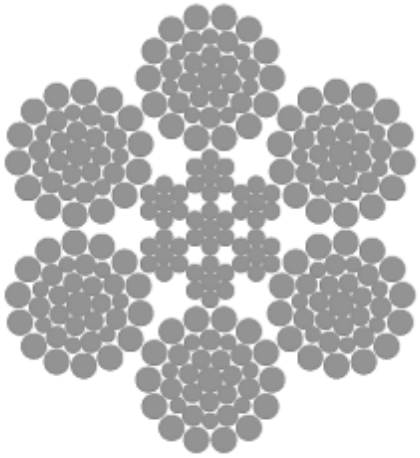
4×36WS-FC
Typical structure diagram

Typic structure				Diameter range (mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
4×19S-FC	1-9-9	36	9	8～20
4×19W-FC	1-6-6＋6	48	12	8～20
4×25Fi-FC	1-6-6F-12	48	12	12～24
4×26WS-FC	1-5-5＋5-10	40	10	12～24
4×31WS-FC	1-6-6＋6-12	48	12	16～36
4×41WS-FC	1-7-7＋7-14	56	14	16～36
	1-8-8＋8-16	64	16	30～46

Nominal diameter of wire rope (mm)	reference weight (kg/100m)	Nominal tensile strength of wire rope MPa					
		1570	1670	1770	1870	1960	2160
		Minimum breaking force of wire rope kN					
8	26.8	36.9	39.2	41.6	43.9	46.0	50.7
10	41.9	57.6	61.3	65.0	68.6	71.9	79.3
12	60.3	83.0	88.3	93.5	98.8	104	114
14	82.1	113	120	127	135	141	155
16	107	148	157	166	176	184	203
18	136	187	199	210	222	233	257
20	168	230	245	260	275	288	317
22	203	279	297	314	332	348	384
24	241	332	353	374	395	414	457
26	283	390	414	439	464	486	536
28	328	452	481	509	538	564	621
30	377	519	552	585	618	647	713
32	429	590	628	665	703	737	812
34	484	666	709	751	793	832	916
36	543	747	794	842	889	932	1027
38	605	832	885	938	991	1039	1145
40	670	922	981	1039	1098	1151	1268
42	739	1016	1081	1146	1211	1269	1398
44	811	1116	1187	1258	1329	1393	1535
46	887	1219	1297	1375	1452	1522	1677

Note：1、Minimum breaking tension coefficient = Minimum breaking force of wire rope×1.191.
2、Minimum breaking tension coefficient of metal strand core and fiber core is the same, metal strand core is 2% larger than fiber core reference weight.

Wire contact wire rope



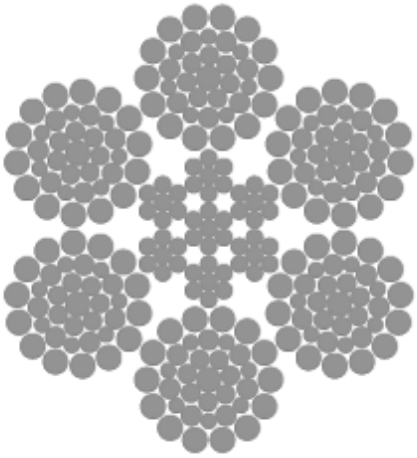
6×36WS-IWRC
Typical structure diagram

Typic structure				Diameter range(mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
6×25Fi	1-6-6F-12	72	12	8～52
6×26WS	1-5-5+5-10	60	10	8～52
6×29Fi	1-7-7F-14	84	14	8～58
6×31WS	1-6-6+6-12	72	12	8～58
6×36WS	1-7-7+7-14	84	14	8～60
6×37S	1-6-15-15	90	15	8～60
6×41WS	1-8-8+8-16	96	16	36～60
6×46WS	1-9-9+9-18	108	18	40～60
6×49SWS	1-8-8-8+8-16	96	16	40～60
6×55SWS	1-9-9-9+9-18	108	18	44～60

Nominal diameter of wire rope (mm)	Reference weight (kg/100m)			Nominal tensile strength of wire rope MPa									
				1670		1770		1870		1960		2160	
				Minimum breaking force of wire rope kN									
	natural fiber core	synthesize fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core
8	24.9	24.4	27.6	36.0	39.2	38.2	41.6	40.3	43.9	42.3	46.0	46.6	50.7
10	38.9	38.2	43.1	56.3	61.3	59.6	65.0	63.0	68.6	66.1	71.9	72.8	79.3
12	56.0	55.0	62.1	81.0	88.3	85.9	93.5	90.7	98.8	95.1	104	105	114
13	65.7	64.6	72.8	95.1	104	101	110	107	116	112	122	123	134
14	76.2	74.9	84.5	110	120	117	127	124	135	129	141	143	155
16	99.6	97.8	110	144	157	153	166	161	176	169	184	186	203
18	126	124	140	182	199	193	210	204	222	214	233	236	257
20	156	153	172	225	245	239	260	252	275	264	288	291	317
22	188	185	209	272	297	289	314	305	332	320	348	352	384
24	224	220	248	324	353	344	374	363	395	380	414	419	457
26	263	258	291	380	414	403	439	426	464	447	486	492	536
28	305	299	338	441	481	468	509	494	538	518	564	571	621
30	350	344	388	507	552	537	585	567	618	594	647	655	713

Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.200(fiber core) or 1.283(steel core).

Wire contact wire rope



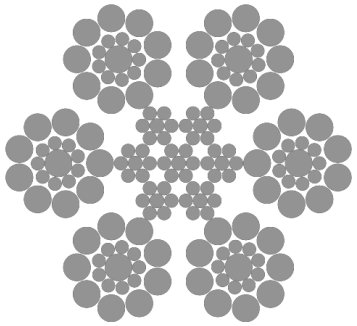
6×36WS-IWRC
Typical structure diagram

Typic structure				Diameter range(mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
6×25Fi	1-6-6F-12	72	12	8～52
6×26WS	1-5-5+5-10	60	10	8～52
6×29Fi	1-7-7F-14	84	14	8～58
6×31WS	1-6-6+6-12	72	12	8～58
6×36WS	1-7-7+7-14	84	14	8～60
6×37S	1-6-15-15	90	15	8～60
6×41WS	1-8-8+8-16	96	16	36～60
6×46WS	1-9-9+9-18	108	18	40～60
6×49SWS	1-8-8-8+8-16	96	16	40～60
6×55SWS	1-9-9-9+9-18	108	18	44～60

Nominal diameter of wire rope (mm)	Reference weight (kg/100m)			Nominal tensile strength of wire rope MPa									
				1670		1770		1870		1960		2160	
				Minimum breaking force of wire rope kN									
	natural fiber core	synthesize fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core
32	398	391	441	576	628	611	665	645	703	676	737	745	812
34	450	442	498	651	709	690	751	728	793	764	832	841	916
36	504	495	559	729	794	773	842	817	889	856	932	943	1027
38	562	552	622	813	885	861	938	910	991	954	1039	1051	1145
40	622	611	690	900	981	954	1039	1008	1098	1057	1151	1165	1268
42	686	674	760	993	1081	1052	1146	1112	1211	1165	1269	1284	1398
44	753	740	834	1090	1187	1155	1258	1220	1329	1279	1393	1409	1535
46	823	808	912	1191	1297	1262	1375	1333	1452	1398	1522	1540	1677
48	896	880	993	1297	1412	1374	1497	1452	1581	1522	1657	1677	1826
50	973	955	1078	1407	1532	1491	1624	1575	1716	1651	1798	1820	1982
52	1052	1033	1165	1522	1657	1613	1756	1704	1856	1786	1945	1968	2144
54	1134	1114	1257	1641	1787	1739	1894	1838	2001	1926	2098	2123	2312
56	1220	1198	1352	1765	1922	1871	2037	1976	2152	2071	2256	2283	2486
58	1309	1285	1450	1893	2062	2007	2185	2120	2309	2222	2420	2449	2667
60	1400	1375	1552	2026	2206	2147	2339	2269	2471	2378	2590	2621	2854

Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.200(fiber core) or 1.283(steel core).

Wire contact wire rope



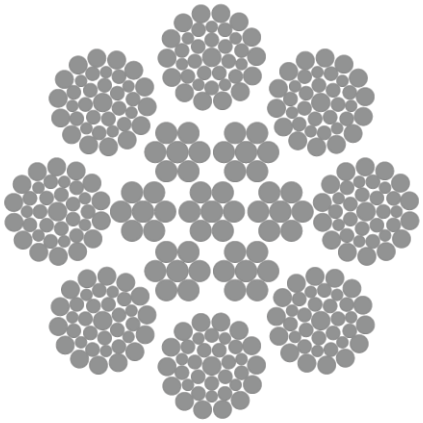
6×19S-IWRC
Typical structure diagram

Typic structure				Diameter range(mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
6×19S-FC	1-9-9	54	9	6～40
6×19S-IWRC	1-9-9	54	9	6～40
6×19W-FC	1-6-6+6	72	12	
6×19W-IWRC	1-6-6+6	72	12	

Nominal diameter of wire rope (mm)	Reference weight (kg/100m)			Nominal tensile strength of wire rope MPa									
				1570		1670		1770		1870		1960	
				Minimum breaking force of wire rope kN									
	natural fiber core	synthesize fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core
6	13.5	13.4	15.0	19.0	20.7	20.3	22.1	21.5	23.4	22.7	24.7	23.8	25.9
7	18.4	18.2	20.4	25.9	28.2	27.6	30.0	29.2	31.8	30.9	33.6	32.4	35.2
8	24.0	23.7	26.7	33.9	36.9	36.0	39.2	38.2	41.6	40.3	43.9	42.3	46.0
9	30.4	30.1	33.8	42.9	46.7	45.6	49.6	48.3	52.6	51.0	55.6	53.5	58.3
10	37.5	37.1	41.7	52.9	57.6	56.3	61.3	59.6	65.0	63.0	68.6	66.1	71.9
11	45.4	44.9	50.5	64.0	69.7	68.1	74.2	72.2	78.6	76.3	83.0	79.9	87.0
12	54.0	53.4	60.0	76.2	83.0	81.0	88.3	85.9	93.5	90.7	98.8	95.1	104
13	63.4	62.7	70.5	89.4	97.4	95.1	104	101	110	107	116	112	122
14	73.5	72.7	81.7	104	113	110	120	117	127	124	135	129	141
16	96.0	95.0	107	135	148	144	157	153	166	161	176	169	184
18	122	120	135	171	187	182	199	193	210	204	222	214	233
20	150	148	167	212	230	225	245	239	260	252	275	264	288
22	182	180	202	256	279	272	297	289	314	305	332	320	348
24	216	214	240	305	332	324	353	344	374	363	395	380	414
26	254	251	282	358	390	380	414	403	439	426	464	447	486
28	294	291	327	415	452	441	481	468	509	494	538	518	564
30	338	334	375	476	519	507	552	537	585	567	618	594	647
32	384	380	427	542	590	576	628	611	665	645	703	676	737
34	434	429	482	612	666	651	709	690	751	728	793	764	832
36	486	481	540	686	747	729	794	773	842	817	889	856	932
38	542	536	602	764	832	813	885	861	938	910	991	954	1039
40	600	594	667	847	922	900	981	954	1039	1008	1098	1057	1151

Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.190(fiber core) or 1.270(steel core).

Wire contact wire rope



8×36WS-IWRC

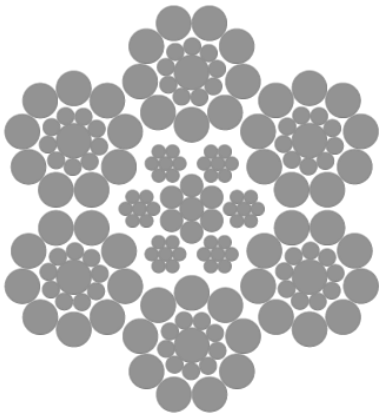
Typical structure diagram

Tectonic	Structure of wire rope strand	Outer wire count		Diameter range (mm)
		Total	Per share	
8×25Fi	1-6-6F-12	72	12	14～52
8×26WS	1-5-5+5-10	60	10	14～52
8×29Fi	1-7-7F-14	84	14	14～58
8×31WS	1-6-6+6-12	72	12	14～58
8×36WS	1-7-7+7-14	84	14	14～60
8×41WS	1-8-8+8-16	96	16	40～60
8×49SWS	1-8-8-8+8-16	96	16	46～60
8×46WS	1-9-9+9-18	108	18	42～60
8×55SWS	1-9-9-9+9-18	108	18	46～60

Nominal diameter of wire rope (mm)	Reference weight (kg/100m)			Nominal tensile strength of wire rope MPa									
				1670		1770		1870		1960		2160	
				Minimum breaking force of wire rope kN									
	natural fiber core	synthesize fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	steel core	
14	71.5	69.4	87.8	97.9	117	104	124	110	130	115	137	151	
16	90.6	88.1	111	128	152	135	161	143	170	150	179	197	
18	115	111	141	162	193	171	204	181	216	190	226	249	
20	142	138	174	200	238	212	252	224	266	234	279	308	
22	171	166	211	242	288	256	305	271	322	284	338	372	
24	204	198	251	288	342	305	363	322	383	338	402	443	
26	239	233	294	338	402	358	426	378	450	396	472	520	
28	278	270	341	391	466	415	494	438	522	459	547	603	
30	319	310	392	449	535	476	567	503	599	527	628	692	
32	362	352	445	511	609	542	645	573	682	600	715	787	
34	409	398	503	577	687	612	728	646	770	677	807	889	
36	459	446	564	647	770	686	817	725	863	760	904	997	
38	511	497	628	721	858	764	910	807	961	846	1008	1110	
40	566	550	696	799	951	847	1008	895	1065	938	1116	1230	
42	624	607	767	881	1049	934	1112	986	1174	1034	1231	1356	
44	685	666	842	967	1151	1025	1220	1082	1289	1135	1351	1489	
46	749	728	920	1057	1258	1120	1333	1183	1409	1240	1476	1627	
48	816	793	1002	1150	1370	1219	1452	1288	1534	1350	1608	1772	
50	885	860	1088	1248	1486	1323	1575	1398	1664	1465	1744	1922	
52	957	930	1176	1350	1608	1431	1704	1512	1800	1585	1887	2079	
54	1032	1003	1268	1456	1734	1543	1837	1630	1941	1709	2035	2242	
56	1110	1079	1364	1566	1864	1660	1976	1753	2088	1838	2188	2411	
58	1191	1157	1463	1680	2000	1780	2120	1881	2239	1971	2347	2587	
60	1274	1238	1566	1798	2140	1905	2268	2013	2397	2110	2512	2768	

Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.200(fiber core) or 1.330(steel core).

Parallel twisted compacted wire rope



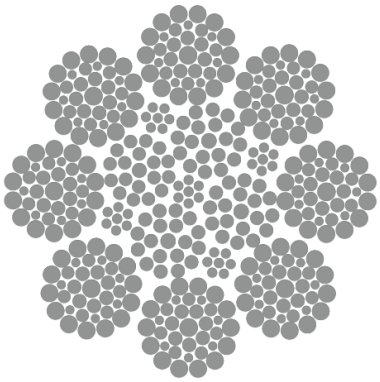
6×19S-PWRC
Typical structure diagram

Typic structure				Diameter range(mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
6×19S-PWRC	1-9-9	72	9	20～50
6×25Fi-PWRC	1-6-6F-12	96	12	24～56
6×26WS-PWRC	1-5-5+5-10	80	10	24～56
6×29Fi-PWRC	1-7-7F-14	112	14	26～60
6×31WS-PWRC	1-6-6+6-12	96	12	28～60
6×36WS-PWRC	1-7-7+7-14	112	14	30～60
6×41WS-PWRC	1-8-8+8-16	128	16	36～60

Nominal diameter of wire rope (mm)	Reference weight (kg/100m)	Nominal tensile strength of wire rope MPa				
		1670	1770	1870	1960	2160
		Minimum breaking force of wire rope kN				
20	178	275	292	308	323	356
22	215	333	353	373	391	431
24	256	396	420	444	465	513
26	301	465	493	521	546	602
28	349	539	572	604	633	698
30	401	619	656	693	727	801
32	456	705	747	789	827	911
34	514	795	843	891	933	1029
36	577	892	945	998	1047	1153
38	643	994	1053	1113	1166	1285
40	712	1101	1167	1233	1292	1424
42	785	1214	1286	1359	1424	1570
44	862	1332	1412	1492	1563	1723
46	942	1456	1543	1630	1709	1883
48	1025	1585	1680	1775	1861	2050
50	1113	1720	1823	1926	2019	2225
52	1203	1860	1972	2083	2184	2406
54	1298	2006	2126	2247	2355	2595
56	1396	2158	2287	2416	2532	2791
58	1497	2315	2453	2592	2716	2994
60	1602	2477	2625	2774	2907	3204

Note: 1 Minimum breaking force = Minimum breaking force of wire rope × 1.260.
2 This structure of wire rope is only applicable to static load, not applicable to dynamic load.

Parallel twisted compacted wire rope



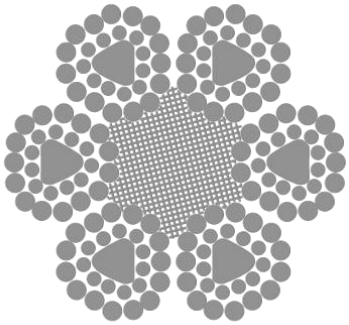
8×36WS-PWRC
Typical structure diagram

Typic structure				Diameter range(mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
16W×19S	1-9-9	72	9	20～50
8×19S-PWRC	1-9-9	72	9	20～50
8×25Fi-PWRC	1-6-6F-12	96	12	24～56
8×26WS-PWRC	1-5-5+5-10	80	10	24～56
8×29Fi-PWRC	1-7-7F-14	112	14	26～60
8×31WS-PWRC	1-6-6+6-12	96	12	28～60
8×36WS-PWRC	1-7-7+7-14	112	14	30～60
8×41WS-PWRC	1-8-8+8-16	128	16	36～60

Nominal diameter of wire rope (mm)	Reference weight (kg/100m)	Nominal tensile strength of wire rope MPa				
		1670	1770	1870	1960	2160
		Minimum breaking force of wire rope kN				
20	190	275	292	308	323	356
22	229	333	353	373	391	431
24	273	396	420	444	465	513
26	320	465	493	521	546	602
28	372	539	572	604	633	698
30	427	619	656	693	727	801
32	485	705	747	789	827	911
34	548	795	843	891	933	1029
36	614	892	945	998	1047	1153
38	684	994	1053	1113	1166	1285
40	758	1101	1167	1233	1292	1424
42	836	1214	1286	1359	1424	1570
44	918	1332	1412	1492	1563	1723
46	1003	1456	1543	1630	1709	1883
48	1092	1585	1680	1775	1861	2050
50	1185	1720	1823	1926	2019	2225
52	1282	1860	1972	2083	2184	2406
54	1382	2006	2126	2247	2355	2595
56	1486	2158	2287	2416	2532	2791
58	1595	2315	2453	2592	2716	2994
60	1706	2477	2625	2774	2907	3204

Note: 1 Minimum breaking force = Minimum breaking force of wire rope × 1.260.
2 This structure of wire rope is only applicable to static load, not applicable to dynamic load.

Shaped strand wire rope



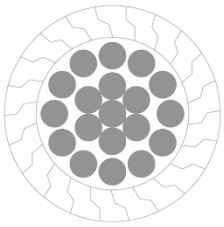
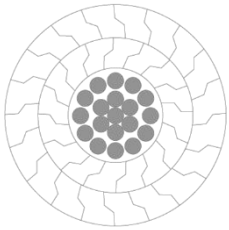
6×28TS+FC
Typical structure diagram

Typic structure				Diameter range (mm)
Tectonic	Structure of wire rope strand	Outer wire count		
		Total	Per share	
6×V37S	/1×7-3/-12-15	90	15	28～56
6×25TS	V－12-12	72	12	24～56
6×28TS	V－12-15	90	15	32～60
6×31TS	V－12-18	108	18	

Nominal diameter of wire rope (mm)	Reference weight(kg/100m)			Nominal tensile strength of wire rope MPa							
				1570		1670		1770		1870	
				Minimum breaking force of wire rope kN							
	fiber core		steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core	fiber core	steel core
	natural	synthesize									
24	246	242	262	342	366	364	390	385	413	407	436
26	289	285	308	401	430	427	457	452	485	478	512
28	335	330	357	465	499	495	530	525	562	554	594
30	384	379	410	534	572	568	609	602	645	636	682
32	437	431	466	608	651	646	693	685	734	724	776
34	494	487	526	686	735	730	782	773	829	817	875
36	553	546	590	769	824	818	877	867	929	916	982
38	617	608	657	857	918	912	977	966	1035	1021	1094
40	683	674	728	950	1017	1010	1082	1070	1147	1131	1212
42	753	743	803	1047	1122	1114	1193	1180	1265	1247	1336
44	827	815	881	1149	1231	1222	1309	1295	1388	1368	1466
46	904	891	963	1256	1345	1336	1431	1416	1517	1496	1603
48	984	970	1048	1367	1465	1454	1558	1542	1652	1629	1745
50	1068	1053	1138	1484	1590	1578	1691	1673	1792	1767	1893
52	1155	1138	1230	1605	1719	1707	1829	1809	1938	1911	2048
54	1245	1228	1327	1731	1854	1841	1972	1951	2090	2061	2208
56	1339	1320	1427	1861	1994	1980	2121	2098	2248	2217	2375
58	1436	1416	1531	1996	2139	2124	2275	2251	2411	2378	2548
60	1537	1516	1638	2136	2289	2273	2435	2409	2581	2545	2726

Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.177(fiber core)1.213(steel core).
The table shows the reference weight of 6V×37S. 6×25TS, 6×28TS, and 6×31TS are 2% larger than the reference weight of 6V×37S.

Sealed wire rope for other applications

	Nominal diameter of wire rope (mm)	Reference weight (kg/100m)	Nominal tensile strength of wire rope MPa				
			1180	1270	1370	1470	1570
			Minimum wire breaking tension kN				
 One layer of Z-wire	16	144	175	188	203	218	232
	18	182	221	238	257	275	294
	20	224	273	294	317	340	363
	22	272	330	355	383	411	439
	24	323	393	423	456	489	523
	26	379	461	496	535	574	613
	28	440	535	576	621	666	711
	30	505	614	661	713	765	817
	32	574	698	752	811	870	929
	34	649	788	849	915	982	1049
	36	727	884	951	1026	1101	1176
	38	810	985	1060	1143	1227	1310
	40	898	1091	1174	1267	1359	1452
	42	990	1203	1295	1397	1499	1601
 Two-layer Z-wire	24	328	404	435	470	504	538
	26	385	475	511	551	591	631
	28	447	550	592	639	686	732
	30	513	632	680	734	787	841
	32	584	719	774	835	896	957
	34	659	812	874	942	1011	1080
	36	739	910	979	1056	1134	1211
	38	823	1014	1091	1177	1263	1349
	40	912	1123	1209	1304	1399	1495
	42	1005	1239	1333	1438	1543	1648
	44	1104	1359	1463	1578	1693	1809
	46	1206	1486	1599	1725	1851	1977
	48	1313	1618	1741	1878	2015	2152
	50	1425	1755	1889	2038	2187	2335
	52	1541	1898	2043	2204	2365	2526
Note: The sum of the minimum breaking tension of the wire rope x 0.87.							

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.

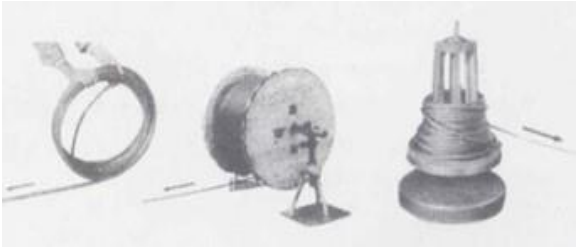


Figure 1: Rope release method Figure

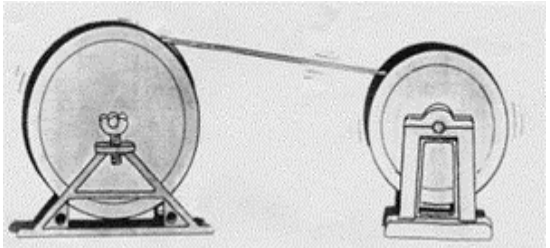


Figure 2: Rope reeling method

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.

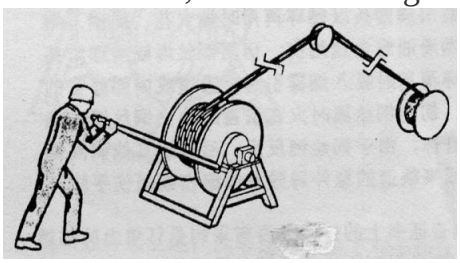


Figure 3

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.

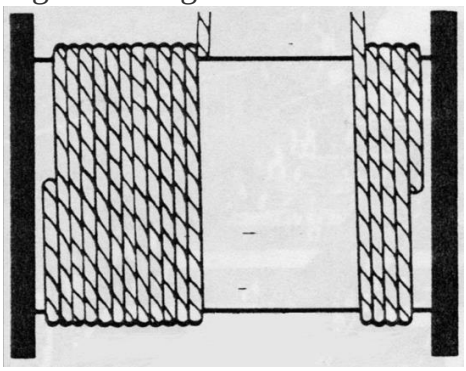


Figure 4: Left twisted wire rope

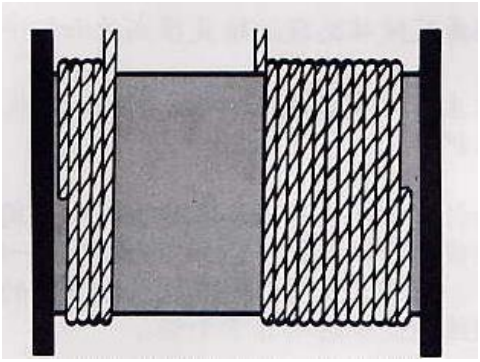


Figure 5: Right twisted wire rope

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.

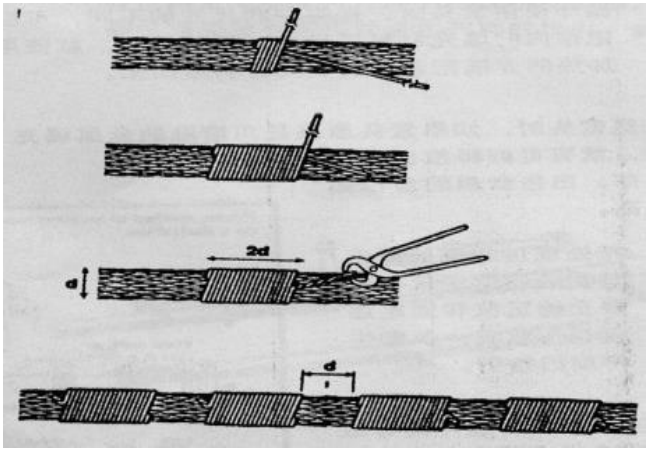


Figure 6

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.

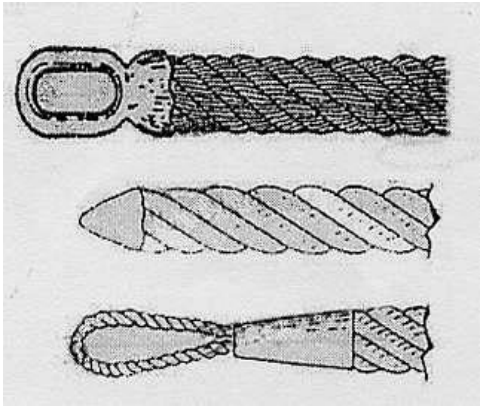


Figure 7

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

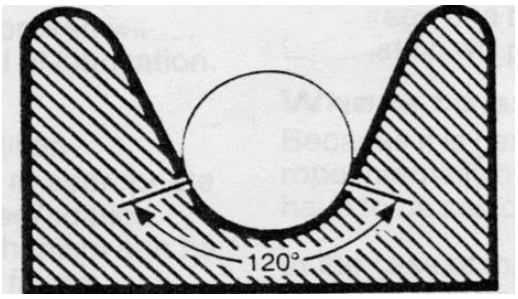


Figure 8 correct

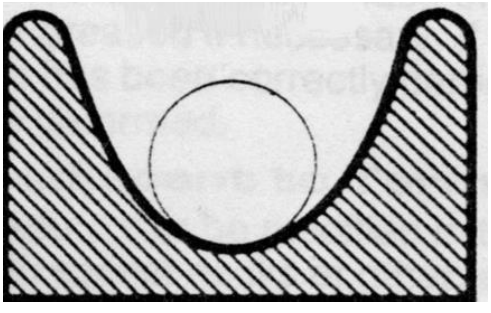


Figure 9 Error

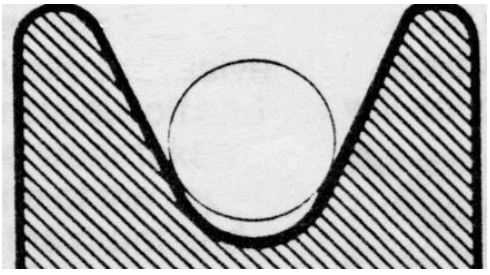


Figure 10 Error

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°.

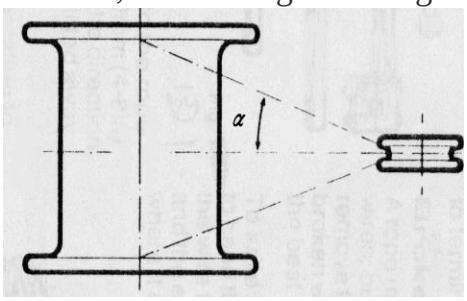


Figure 11

How to use the wire rope clamp

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

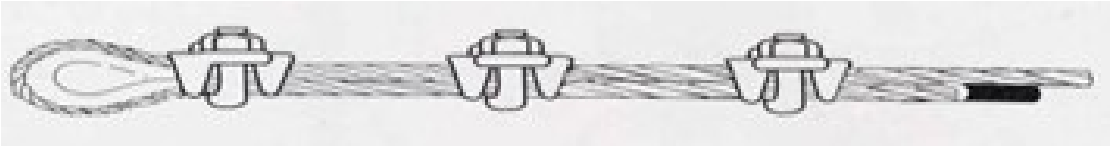


Figure 12

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.

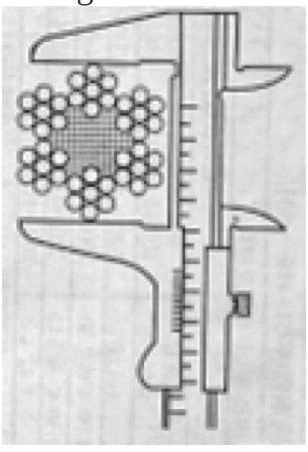


Figure 14

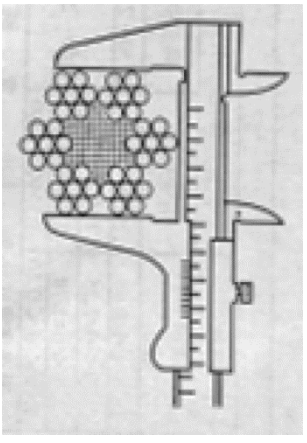


Figure 15

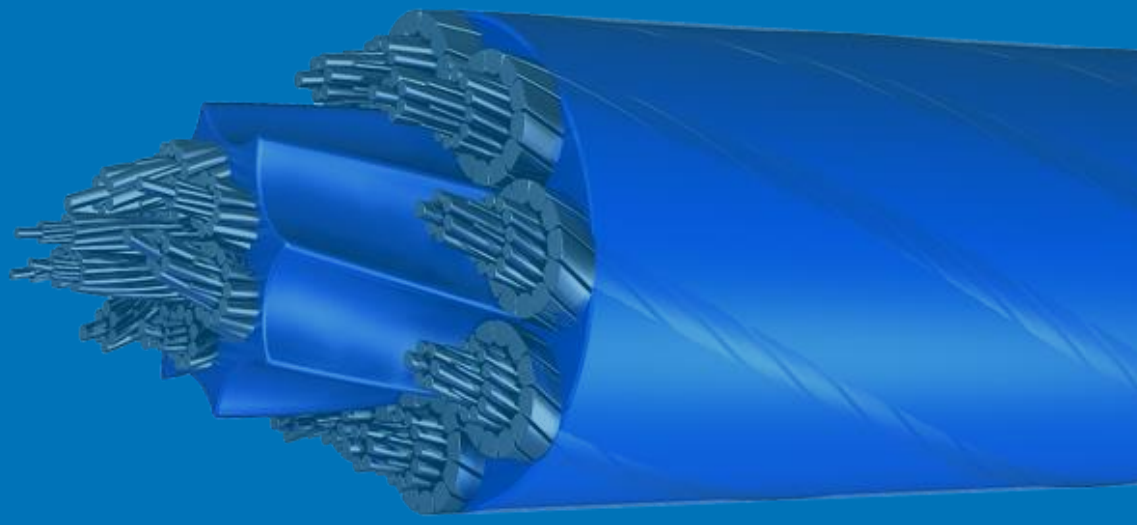
Warning!

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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