



# Parameter Sample Book

Marine and Fisheries wire rope



[www.gsrgroup.cn](http://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.

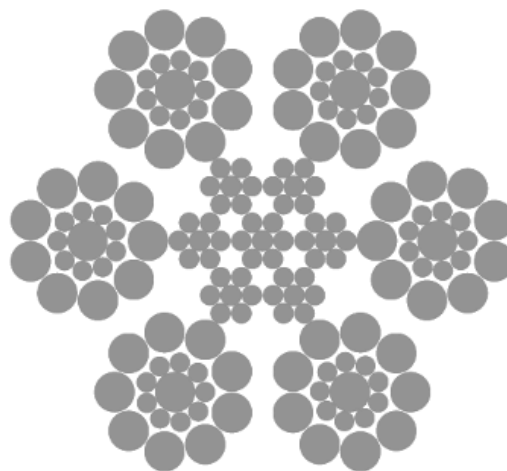
Fiber core steel rope is soft and has good bending performance. When the steel rope is subjected to collision and impact loads during work, the fiber core can play a buffering role. Fiber core is divided into natural fiber core and synthetic fiber core. Natural fiber core has more oil storage, so that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

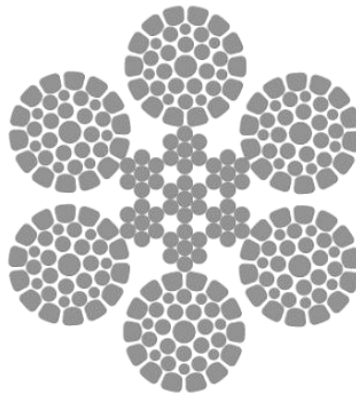
Linear contact lay wire rope the twist length of all steel wires in the rope is the same, and each layer of steel wire is placed on the groove formed between the inner layer of steel wires. The steel wires are in line contact, and the structure of the rope is close. Therefore, the line contact steel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

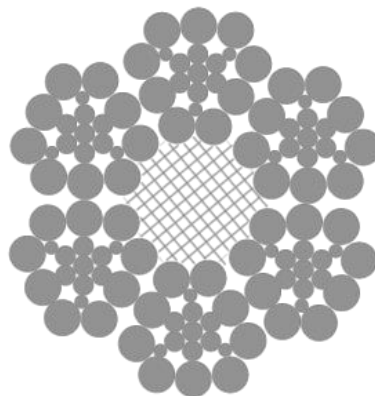
The steel wires in the rope are in surface contact, and the metal filling coefficient of the steel wire rope is large, and the structure of the rope is close. When the steel wire rope is used, the contact stress between the steel wires is small, there is no secondary bending stress, and the contact area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

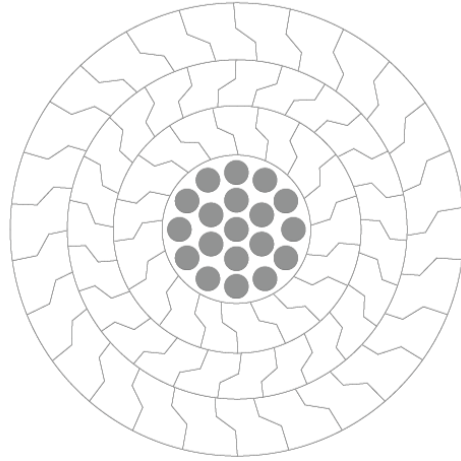
The section of the steel wire rope is not round, which is usually called special-shaped steel wire rope. The main types are triangular and fan-shaped steel wire ropes. The supporting surface of the special-shaped steel wire rope is 3-4 times larger than that of the round steel wire rope, that is, the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

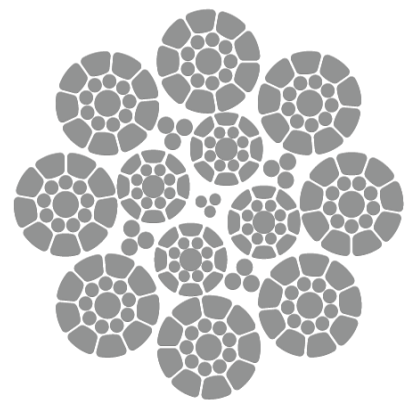
Sealed steel wire rope Sealed steel wire rope layers of special steel wire outside the core are tightly sewn together to form a smooth closed surface, the core and adjacent layers of special steel wire twist to the opposite, so the sealed steel wire rope has the advantages of large metal filling coefficient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



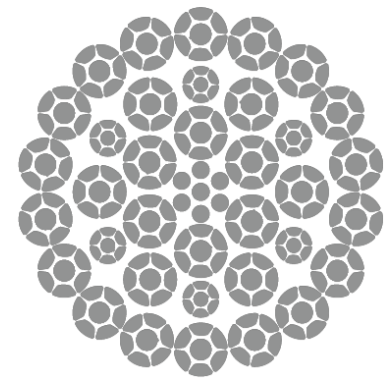
Three layers of Z-wire rope

### 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\*mm<sup>2</sup>, 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:

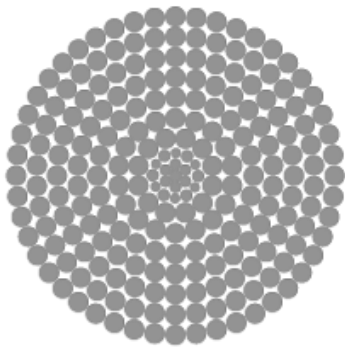
F--minimum breaking tension of steel wire rope, in KN.

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.

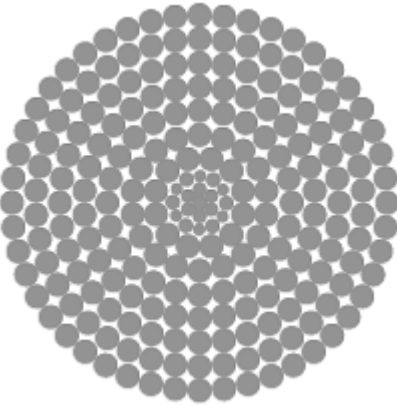
### Single strand wire rope

 1×229 Typical structure diagram		Typic structure				Diameter range (mm)
		Tectonic	Structure of wire rope strand	Outer wire count		
				Total	Per share	
1×229	1×31WS/18/24/30/36/42/48	48	48	55~101		
1×283	1×229/54	54	54	80~110		
1×343	1×229/54/60	60	60	90~120		
1×409	1×229/54/60/66	66	66	100~140		
1×481	1×229/54/60/66/72	72	72	120~160		
1×559	1×229/54/60/66/72/78	78	78	140~180		

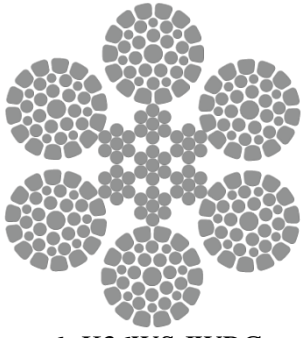
  

Nominal diameter of wire rope(mm)	Reference weight (kg/100m)	Nominal tensile strength of wire rope MPa				
		1570	1670	1770	1870	1960
		Minimum breaking force of wire rope kN				
55	1485	2303	2450	2597	2744	2876
56	1540	2388	2540	2692	2844	2981
58	1652	2562	2725	2888	3051	3198
60	1768	2741	2916	3090	3265	3422
62	1887	2927	3113	3300	3486	3654
64	2011	3119	3318	3516	3715	3894
66	2139	3317	3528	3739	3951	4141
68	2270	3521	3745	3969	4194	4396
70	2406	3731	3969	4206	4444	4658
72	2545	3947	4199	4450	4702	4928
74	2689	4170	4435	4701	4966	5205
76	2836	4398	4678	4958	5239	5491
80	3142	4873	5184	5494	5804	6084
84	3464	5373	5715	6057	6399	6707
88	3802	5897	6272	6648	7023	7361
92	4156	6445	6855	7266	7676	8046
96	4525	7018	7464	7911	8358	8761
100	4910	7615	8100	8585	9070	9506
104	5311	8236	8760	9285	9810	-
108	5727	8882	9447	10013	10579	-
112	6159	9552	10160	10768	11377	-
116	6607	10246	10899	11551	12204	-
120	7070	10965	11663	12362	13060	-
124	7550	11708	12454	13200	-	-
128	8045	12476	13270	14065	-	-
132	8555	13268	14113	14958	-	-
136	9082	14084	14981	15878	-	-
140	9624	14924	15875	16826	-	-

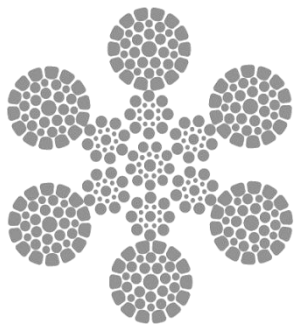
### Single strand wire rope

 1×229 Typical structure diagram		Typic structure				Diameter range (mm)
		Tectonic	Structure of wire rope strand	Outer wire count		
				Total	Per share	
1×229	1×31WS/18/24/30/36/42/48	48	48	55~101		
1×283	1×229/54	54	54	80~110		
1×343	1×229/54/60	60	60	90~120		
1×409	1×229/54/60/66	66	66	100~140		
1×481	1×229/54/60/66/72	72	72	120~160		
1×559	1×229/54/60/66/72/78	78	78	140~180		
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				
144	10181	15789	16795	-	-	-
148	10755	16679	17741	-	-	-
152	11344	17593	18713	-	-	-
156	11949	18531	19711	-	-	-
160	12570	19493	20735	-	-	-
164	13206	20480	21784	-	-	-
168	13858	21491	22860	-	-	-
172	14526	22527	23962	-	-	-
176	15209	23587	25089	-	-	-
180	15908	24671	26242	-	-	-
Note: Minimum wire breaking force sum=Minimum breaking force of wire rope ×1.149.						

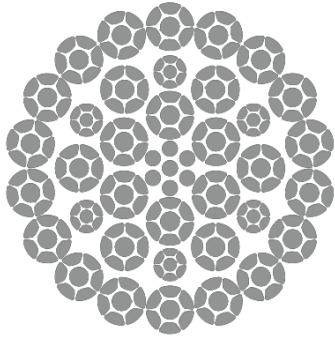
### Compacted strand wire rope

 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

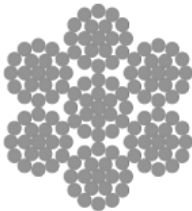
 8×K36WS-IWRC Typical structure diagram			Typic structure								Diameter range (mm)		
			Tectonic	Structure of wire rope strand				Outer wire count					
								Total	Per share				
			Nominal diameter of wire rope (mm)	Reference weight (kg/100m)		Nominal tensile strength of wire rope MPa							
1670		1770				1870		1960		2160			
fiber core		steel core		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
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

 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

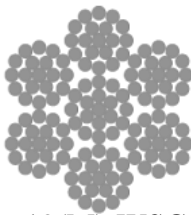
Note: Total wire breaking tension=Minimum breaking force of wire rope×1.260.

### Point contact wire rope

 6×19(M)-WSC Typical structure diagram		Typic structure											Diameter range(mm)		
		Tectonic	Structure of wire rope strand				Outer wire count								
							Total	Per share							
		6×19(M)-FC	1-6/12				72	12						3~50	
		6×19(M)-WSC	1-6/12				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	fiber core	steel core
3	3.23	3.19	3.71	4.42	4.83	4.70	5.14	4.99	5.45	5.27	5.76	5.52	6.03		
4	5.74	5.66	6.59	7.86	8.59	8.36	9.14	8.86	9.69	9.36	10.23	9.82	10.73		
5	8.98	8.85	10.3	12.3	13.4	13.1	14.3	13.9	15.1	14.6	16.0	15.3	16.8		
6	12.9	12.7	14.8	17.7	19.3	18.8	20.6	19.9	21.8	21.1	23.0	22.1	24.1		
7	17.6	17.3	20.2	24.1	26.3	25.6	28.0	27.1	29.7	28.7	31.3	30.1	32.8		
8	23.0	22.7	26.4	31.5	34.4	33.5	36.6	35.5	38.7	37.5	40.9	39.3	42.9		
9	29.1	28.7	33.4	39.8	43.5	42.3	46.3	44.9	49.0	47.4	51.8	49.7	54.3		
10	35.9	35.4	41.2	49.1	53.7	52.3	57.1	55.4	60.5	58.5	64.0	61.3	67.0		
11	43.4	42.8	49.9	59.5	65.0	63.2	69.1	67.0	73.2	70.8	77.4	74.2	81.1		
12	51.7	51.0	59.3	70.8	77.3	75.3	82.2	79.8	87.2	84.3	92.1	88.3	96.5		
14	70.4	69.4	80.8	96.3	105	102	112	109	119	115	125	120	131		
16	91.9	90.6	105	126	137	134	146	142	155	150	164	157	172		
18	116	115	133	159	174	169	185	179	196	190	207	199	217		
20	144	142	165	197	215	209	228	222	242	234	256	245	268		
22	174	171	199	238	260	253	276	268	293	283	310	297	324		

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

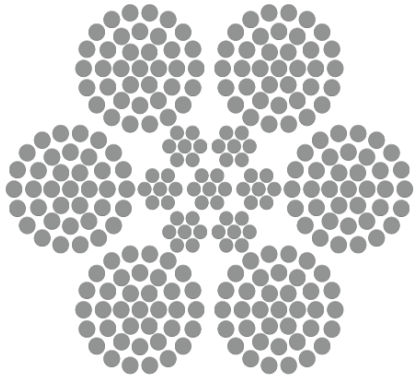
### Point contact wire rope

 6×19(M)-WSC Typical structure diagram		Typic structure											Diameter range(mm)		
		Tectonic		Structure of wire rope strand				Outer wire count							
								Total		Per share					
		6×19(M)-FC		1-6/12				72		12					
6×19(M)-WSC		1-6/12				72		12			3~50				
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	fiber core	steel core
24	207	204	237	283	309	301	329	319	349	337	368	353	386		
26	243	239	279	332	363	353	386	375	409	396	432	415	453		
28	281	278	323	385	421	410	448	434	475	459	501	481	526		
30	323	319	371	442	483	470	514	499	545	527	576	552	603		
32	368	362	422	503	550	535	585	567	620	599	655	628	686		
34	415	409	476	568	621	604	660	640	700	677	739	709	775		
36	465	459	534	637	696	677	740	718	785	759	829	795	869		
38	518	511	595	710	775	755	825	800	874	845	923	886	968		
40	574	566	659	786	859	836	914	886	969	936	1023	982	1073		
42	633	624	727	867	947	922	1007	977	1068	1032	1128	1082	1182		
44	695	685	798	951	1040	1012	1106	1073	1172	1133	1238	1188	1298		
46	760	749	872	1040	1136	1106	1209	1172	1281	1239	1353	1298	1418		
48	827	816	949	1132	1237	1204	1316	1276	1395	1349	1474	1413	1544		
50	898	885	1030	1229	1342	1307	1428	1385	1513	1463	1599	1534	1676		

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

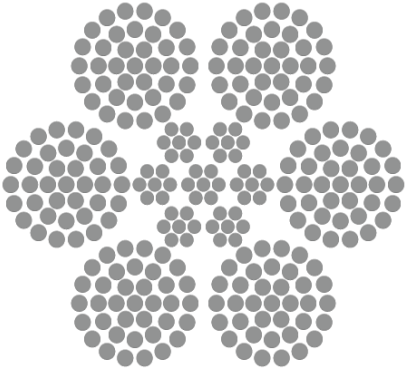


### Point contact wire rope

 6×37(M)-IWRC Typical structure diagram				Typic structure								Diameter range (mm)	
				Tectonic	Structure of wire rope strand				Outer wire count				
									Total	Per share			
				6×37(M)-FC				108	18	6~60			
				6×37(M)-IWRC				108	18	6~60			
Nominal diameter (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	12.7	12.5	14.8	17.0	18.6	18.1	19.8	19.2	21.0	20.3	22.1	21.2	23.2
7	17.3	17.0	20.2	23.2	25.3	24.6	26.9	26.1	28.5	27.6	30.1	28.9	31.6
8	22.7	22.2	26.4	30.2	33.1	32.2	35.2	34.1	37.3	36.0	39.4	37.8	41.3
9	28.7	28.1	33.4	38.3	41.8	40.7	44.5	43.2	47.2	45.6	49.8	47.8	52.2
10	35.4	34.7	41.2	47.3	51.7	50.3	54.9	53.3	58.2	56.3	61.5	59.0	64.5
11	42.8	42.0	49.9	57.2	62.5	60.8	66.5	64.5	70.5	68.1	74.4	71.4	78.0
12	51.0	50.0	59.3	68.1	74.4	72.4	79.1	76.7	83.9	81.1	88.6	85.0	92.9
13	59.8	58.6	69.6	79.9	87.3	85.0	92.9	90.0	98.4	95.1	104	99.7	109
14	69.4	68.0	80.8	92.6	101	99	108	104	114	110	121	116	126
16	90.6	88.8	105	121	132	129	141	136	149	144	157	151	165
18	115	112	133	153	167	163	178	173	189	182	199	191	209
20	142	139	165	189	207	201	220	213	233	225	246	236	258
22	171	168	199	229	250	243	266	258	282	272	298	286	312
24	204	200	237	272	298	290	316	307	335	324	354	340	371
26	239	235	279	319	349	340	371	360	394	381	416	399	436
28	278	272	323	370	405	394	43	418	457	441	482	463	506

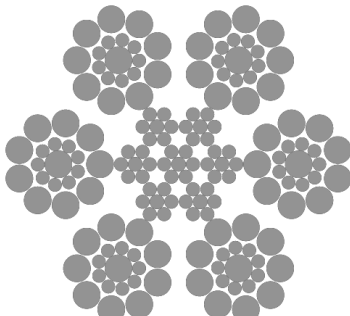
Note: Total wire breaking tension = minimum breaking force of wire rope x 1.224 (fiber core) or 1.297 (steel core).

### Point contact wire rope

 6×37(M)-IWRC Typical structure diagram				Typic structure									Diameter range (mm)	
				Tectonic	Structure of wire rope strand				Outer wire count					
									Total	Per share				
				6×37(M)-FC				108		18		6~60		
				6×37(M)-IWRC				108		18		6~60		
Nominal diameter (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
30	319	312	371	425	465	452	494	479	524	507	554	531	580	
32	362	355	422	484	529	515	563	546	596	576	630	604	660	
34	409	401	476	546	597	581	635	616	673	651	711	682	745	
36	459	450	534	612	669	651	712	690	755	729	797	765	836	
38	511	501	595	682	746	726	793	769	841	813	888	852	931	
40	566	555	659	756	826	804	879	852	932	901	984	944	1032	
42	624	612	727	834	911	887	969	940	1027	993	1085	1041	1137	
44	685	672	798	915	1000	973	1064	1031	1127	1090	1191	1142	1248	
46	749	734	872	1000	1093	1064	1163	1127	1232	1191	1302	1248	1364	
48	816	799	949	1089	1190	1158	1266	1228	1342	1297	1417	1359	1486	
50	885	868	1030	1181	1291	1257	1374	1332	1456	1407	1538	1475	1612	
52	957	938	1114	1278	1397	1359	1486	1441	1575	1522	1664	1595	1744	
54	1032	1012	1201	1378	1506	1466	1602	1554	1698	1641	1794	1720	1880	
56	1110	1088	1292	1482	1620	1576	1723	1671	1826	1765	1929	1850	2022	
58	1191	1167	1386	1590	1738	1691	1848	1792	1959	1893	2070	1985	2169	
60	1274	1249	1483	1701	1860	1810	1978	1918	2096	2026	2215	2124	2321	

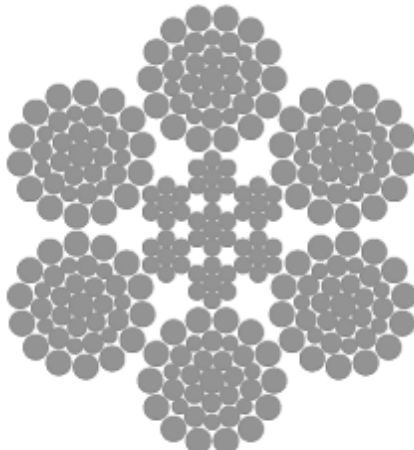
Note: Total wire breaking tension = minimum breaking force of wire rope x 1.224 (fiber core) or 1.297 (steel core).

### 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							
6×19W-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

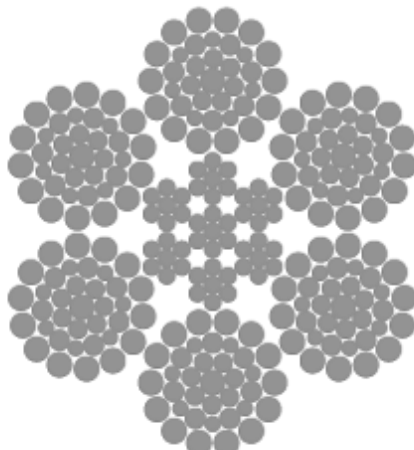
 6x36WS-IWRC Typical structure diagram				Typic structure								Diameter range(mm)	
				Tectonic	Structure of wire rope strand	Outer wire count							
						Total	Per share						
6x25Fi	1-6-6F-12	72	12	8~52									
6x26WS	1-5-5+5-10	60	10	8~52									
6x29Fi	1-7-7F-14	84	14	8~58									
6x31WS	1-6-6+6-12	72	12	8~58									
6x36WS	1-7-7+7-14	84	14	8~60									
6x37S	1-6-15-15	90	15	8~60									
6x41WS	1-8-8+8-16	96	16	36~60									
6x46WS	1-9-9+9-18	108	18	40~60									
6x49SWS	1-8-8-8+8-16	96	16	40~60									
6x55SWS	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	
	natural fiber core	synthetic fiber core	steel core	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
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

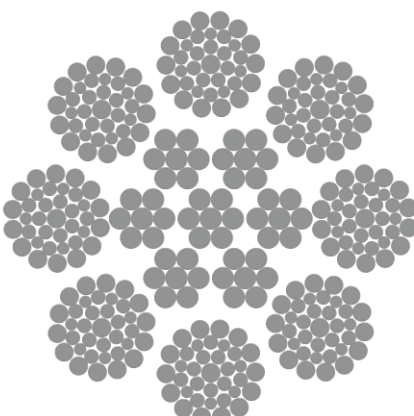
Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.200(fiber core) or 1.283(steel core).

### 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	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		

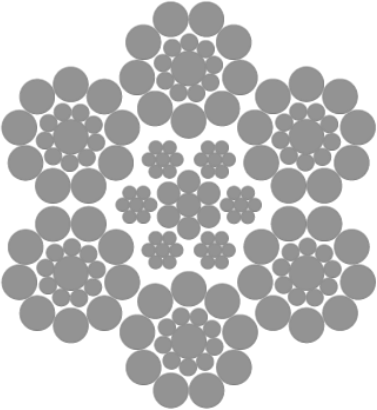
Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.200(fiber core) or 1.283(steel core).

### Wire contact wire rope

 8×36WS-IWRC Typical structure diagram				Typic structure								Diamete r range (mm)				
				Tectonic	Structure of wire rope strand		Outer wire count									
							Total	Per share								
								8×25Fi	1-6-6F-12		72	12	14~52			
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

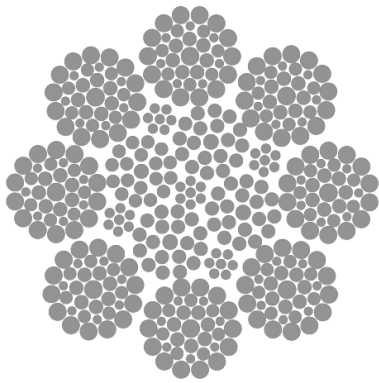
 6×19S-PWRC Typical structure diagram		Typic structure				Diameter range(mm)
		Tectonic	Structure of wire rope strand	Outer wire count		
				Total	Per share	
6×19S-PWRC	1-9-9	72	9	20~50		
6×25Fi-PWRC	1-6-6F-12	96	12	24~56		
6×26WS-PWRC	1-5-5+5-10	80	10	24~56		
6×29Fi-PWRC	1-7-7F-14	112	14	26~60		
6×31WS-PWRC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

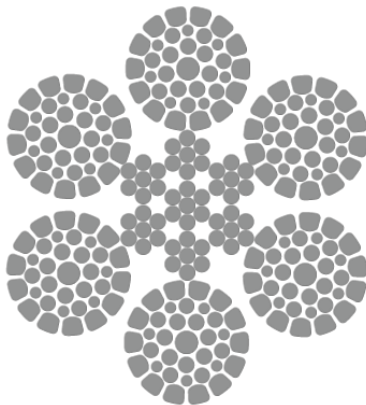
### Parallel twisted compacted wire rope

 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.

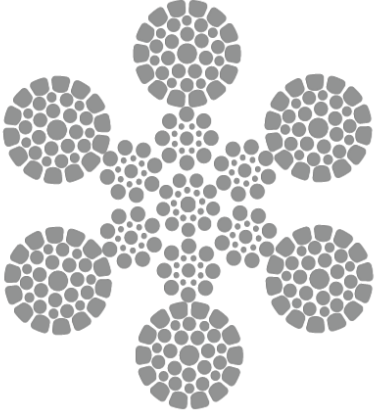


### Coarse diameter wire rope

 <p>6×K36WS-IWRC Typical structure diagram</p>		Typic structure				Diameter range (mm)
		Tectonic	Structure of wire rope strand	Outer wire count		
				Total	Per share	
		6×K36WS	1-7-7+7-14	84	14	64~80
		6×K41WS	1-8-8+8-16	96	16	64~88
		6×K47WS	1-6-8-8+8-16	96	16	64~88
		6×K49SWS	1-8-8-8+8-16	96	16	64~88
		6×K46WS	1-9-9+9-18	108	18	76~120
		6×K52WS	1-6-9-9+9-18	108	18	76~120
		6×K55SWS	1-9-9-9+9-18	108	18	76~120
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				
	steel core	steel core	steel core	steel core	steel core	steel core
64	1925	2714	2887	3059	3232	3388
68	2173	3064	3259	3454	3649	3825
72	2436	3435	3653	3872	4091	4288
76	2715	3827	4071	4314	4558	4777
80	3008	4240	4510	4780	5050	5294
84	3316	4675	4973	5270	5568	5836
88	3640	5131	5458	5784	6111	6405
92	3978	5608	5965	6322	6679	7001
96	4332	6106	6495	6884	7273	7623
100	4700	6625	7047	7469	7891	8271
104	5084	6962	7406	7849	8293	--
108	5482	7508	7986	8465	8943	--
112	5896	8075	8589	9103	--	--
116	6324	8662	9213	9765	--	--
120	6768	9269	9860	10450	--	--

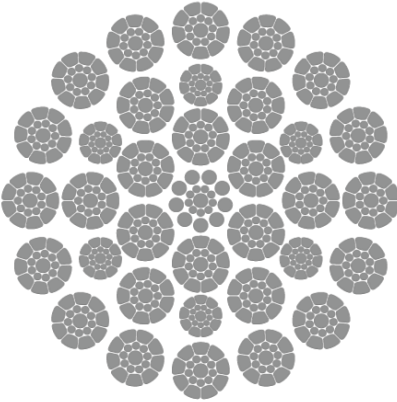
Note: Total wire breaking tension=Minimum breaking force of wire rope×1.260.

### Coarse diameter wire rope

 <p>8×K36WS-IWRC Typical structure diagram</p>		Typic structure				Diameter range (mm)
		Tectonic	Structure of wire rope strand	Outer wire count		
				Total	Per share	
		8×K36WS	1-7-7+7-14	112	14	64~88
		8×K41WS	1-8-8+8-16	128	16	64~120
		8×K47WS	1-6-8-8+8-16	128	16	64~120
		8×K49SWS	1-8-8-8+8-16	128	16	64~120
		8×K46WS	1-9-9+9-18	144	18	88~140
		8×K52WS	1-6-9-9+9-18	144	18	88~140
		8×K55SWS	1-9-9-9+9-18	144	18	88~140
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				
	steel core	steel core	steel core	steel core	steel core	steel core
64	1987	2714	2887	3059	3232	3388
68	2243	3064	3259	3454	3649	3825
72	2514	3435	3653	3872	4091	4288
76	2801	3827	4071	4314	4558	4777
80	3104	4240	4510	4780	5050	5294
84	3422	4675	4973	5270	5568	5836
88	3756	5131	5458	5784	6111	6405
92	4105	5608	5965	6322	6679	7001
96	4470	6106	6495	6884	7273	7623
100	4850	6625	7047	7469	7891	8271
104	5246	6962	7406	7849	8293	8692
108	5657	7508	7986	8465	8943	9373
112	6084	8075	8589	9103	9617	--
116	6526	8662	9213	9765	10317	--
120	6984	9269	9860	10450	11040	--
124	7457	9898	10528	11158	--	--
128	7946	10546	11218	11890	--	--
132	8451	11216	11930	12645	--	--
136	8971	11906	12664	13423	--	--
140	9506	12617	13420	14224	--	--

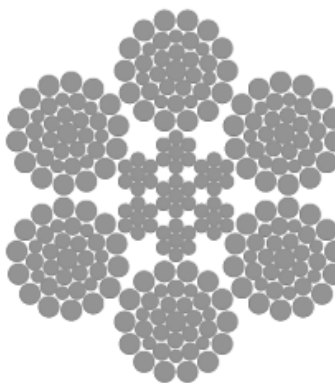
Note: Total wire breaking tension=Minimum breaking force of wire rope×1.260.

### Coarse diameter wire rope

 <p>35(W)×K19S Typical structure diagram</p>		Typic structure				Diameter range (mm)
		Tectonic	Structure of wire rope strand	Outer wire count		
				Total	Per share	
		35(W)×K19S	1-9-9	144	9	64~100
		35(W)×K26WS	1-5-5+5-10	160	10	64~100
		35(W)×K31WS	1-6-6+6-12	192	12	64~120
		35(W)×K36WS	1-7-7+7-14	224	14	80~140
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				
	steel core	steel core	steel core	steel core	steel core	steel core
64	2089	2714	2887	3059	3232	3388
68	2358	3064	3259	3454	3649	3825
72	2644	3435	3653	3872	4091	4288
76	2946	3827	4071	4314	4558	4777
80	3264	4240	4510	4780	5050	5294
84	3599	4675	4973	5270	5568	5836
88	3949	5131	5458	5784	6111	6405
92	4317	5608	5965	6322	6679	7001
96	4700	6106	6495	6884	7273	7623
100	5100	6625	7047	7469	7891	8271
104	5516	6962	7406	7849	8293	8692
108	5949	7508	7986	8465	8943	9373
112	6397	8075	8589	9103	9617	--
116	6863	8662	9213	9765	10317	--
120	7344	9269	9860	10450	11040	--
124	7842	9898	10528	11158	--	--
128	8356	10546	11218	11890	--	--
132	8886	11216	11930	12645	--	--
136	9433	11906	12664	13423	--	--
140	9996	12617	13420	14224	--	--

Note: Total wire rope breaking tension = minimum wire rope breaking force × 1.287.

### Coarse diameter wire rope

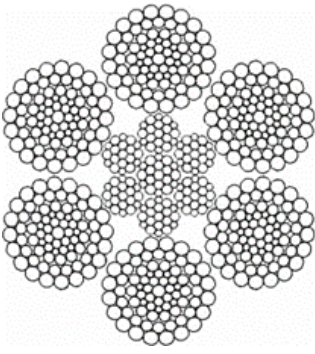
 6x36WS-IWRC Typical structure diagram			Typic structure								Diameter range(mm)	
			Tectonic	Structure of wire rope strand				Outer wire count				
								Total	Per share			
6x36WS	1-7-7+7-14				84	14	64~80					
6x41WS	1-8-8+8-16				96	16	64~88					
6x49SWS	1-8-8-8+8-16				96	16	64~88					
6x46WS	1-9-9+9-18				108	18	76~120					
6x55SWS	1-9-9-9+9-18				108	18	76~120					
6x61FWS	1-5-5F-10-10+10-20				120	20	80~140					
6x64SFS	1-9-9-9F-18-18				108	18	80~140					

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
64	1618	1835	2167	2360	2305	2510	2443	2661	2581	2811	2705	2946
68	1826	2072	2447	2664	2602	2834	2758	3004	2914	3173	3054	3326
72	2048	2322	2743	2987	2918	3177	3092	3367	3267	3558	3424	3729
76	2282	2588	3056	3328	3251	3540	3445	3752	3640	3964	3815	4155
80	2528	2867	3386	3688	3602	3922	3818	4157	4033	4392	4227	4604
84	2787	3161	3733	4066	3971	4325	4209	4584	4447	4842	4661	5076
88	3059	3469	4097	4462	4358	4746	4619	5030	4880	5315	5115	5570
92	3343	3792	4478	4877	4763	5188	5049	5498	5334	5809	5591	6088
96	3640	4129	4876	5310	5187	5648	5497	5987	5808	6325	6087	6629
100	3950	4480	5291	5762	5628	6129	5965	6496	6302	6863	6605	7193
104	4272	4846	5604	6045	5961	6430	6318	6815	6675	7200	6996	7547
108	4607	5225	6043	6519	6428	6934	6813	7350	7198	7765	7544	8139
112	4955	5620	6499	7011	6913	7458	7327	7904	7741	8351	8113	8753
116	5315	6028	6972	7521	7416	8000	7860	8479	8304	8958	8703	9389
120	5688	6451	7461	8048	7936	8561	8411	9074	8886	9586	9314	10048
124	6074	6888	--	8594	--	9141	--	9689	--	--	--	--
128	6472	7340	--	9157	--	9741	--	10324	--	--	--	--
132	6882	7806	--	9739	--	10359	--	10979	--	--	--	--
136	7306	8286	--	10338	--	10996	--	11655	--	--	--	--
140	7742	8781	--	10955	--	11653	--	12350	--	--	--	--

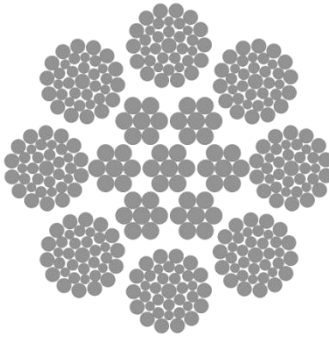
Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.226(fiber core)或 1.321(steel core)。

### Coarse diameter wire rope

 6x76WSNS-IWRC Typical structure diagram			Typic structure									Diameter range(mm)						
			Tectonic		Structure of wire rope strand				Outer wire count									
									Total	Per share								
			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				
64	1593	1835	2084	2289	2216	2435	2349	2581	2482	2727	2601	2858						
68	1799	2072	2352	2584	2502	2749	2652	2914	2802	3078	2936	3226						
72	2017	2322	2637	2897	2805	3082	2973	3267	3141	3451	3292	3617						
76	2247	2588	2938	3228	3125	3434	3312	3640	3500	3845	3668	4030						
80	2490	2867	3256	3577	3463	3805	3670	4033	3878	4261	4064	4466						
84	2745	3161	3589	3944	3818	4195	4046	4446	4275	4697	4481	4923						
88	3012	3469	3939	4328	4190	4604	4441	4880	4692	5155	4918	5403						
92	3292	3792	4305	4731	4580	5032	4854	5333	5128	5635	5375	5906						
96	3585	4129	4688	5151	4987	5479	5285	5807	5584	6135	5853	6431						
100	3890	4480	5087	5589	5411	5945	5735	6301	6059	6657	6350	6978						
104	4207	4846	5400	5875	5744	6250	6088	6624	6432	6998	6741	7335						
108	4537	5225	5823	6336	6194	6740	6565	7143	6936	7547	7270	7910						
112	4880	5620	6263	6814	6662	7248	7061	7682	7459	8116	7818	8507						
116	5234	6028	6718	7310	7146	7775	7574	8241	8002	8706	8387	9125						
120	5602	6451	7189	7822	7647	8321	8105	8819	8563	9317	8975	9766						
124	5981	6888	--	8353	--	8885	--	9417	--	9949	--	--						
128	6373	7340	--	8900	--	9467	--	10034	--	10601	--	--						
132	6778	7806	--	9465	--	10068	--	10671	--	11274	--	--						
136	7195	8286	--	10047	--	10687	--	11327	--	11967	--	--						
140	7624	8781	--	10647	--	11325	--	12003	--	12682	--	--						
144	8066	9290	--	11264	--	11982	--	12699	--	--	--	--						
148	8521	9813	--	11899	--	12657	--	13414	--	--	--	--						
152	8987	10351	--	12551	--	13350	--	14149	--	--	--	--						
156	9467	10903	--	13220	--	14062	--	14904	--	--	--	--						
160	9958	11469	--	13906	--	14792	--	15678	--	--	--	--						

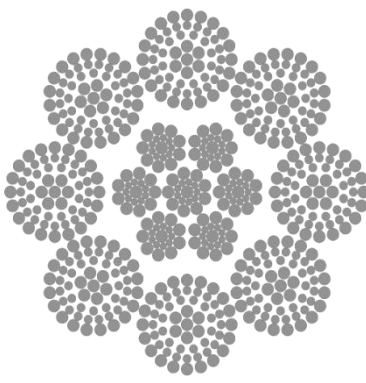
Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.226(fiber core) or 1.321(steel core).

### Coarse diameter wire rope

 8×36WS-IWRC Typical structure diagram		Typic structure				Diameter range(mm)
		Tectonic	Structure of wire rope strand	Outer wire count		
				Total	Per share	
		8×36WS	1-7-7+7-14	112	14	64~88
		8×41WS	1-8-8+8-16	128	16	64~120
		8×49SWS	1-8-8-8+8-16	128	16	64~120
		8×46WS	1-9-9+9-18	144	18	64~140
		8×55SWS	1-9-9-9+9-18	144	18	88~140
		8×61FWS	1-5-5F-10-10+10-20	160	20	88~160
		8×64SFS	1-9-9-9F-18-18	144	18	88~160
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				
	steel core	steel core	steel core	steel core	steel core	steel core
64	1876	2289	2435	2581	2727	2858
68	2118	2584	2749	2914	3078	3226
72	2374	2897	3082	3267	3451	3617
76	2645	3228	3434	3640	3845	4030
80	2931	3577	3805	4033	4261	4466
84	3232	3944	4195	4446	4697	4923
88	3547	4328	4604	4880	5155	5403
92	3877	4731	5032	5333	5635	5906
96	4221	5151	5479	5807	6135	6431
100	4580	5589	5945	6301	6657	6978
104	4954	5875	6250	6624	6998	7335
108	5342	6336	6740	7143	7547	7910
112	5745	6814	7248	7682	8116	8507
116	6163	7310	7775	8241	8706	9125
120	6595	7822	8321	8819	9317	9766
124	7042	8353	8885	9417	9949	10427
128	7504	8900	9467	10034	10601	11111
132	7980	9465	10068	10671	11274	11816
136	8471	10047	10687	11327	--	--
140	8977	10647	11325	12003	--	--
144	9497	11264	11982	12699	--	--
148	10032	11899	12657	13414	--	--
152	10582	12551	13350	14149	--	--
156	11146	13220	14062	14904	--	--
160	11725	13906	14792	15678	--	--

Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.321(steel core)。

### Coarse diameter wire rope

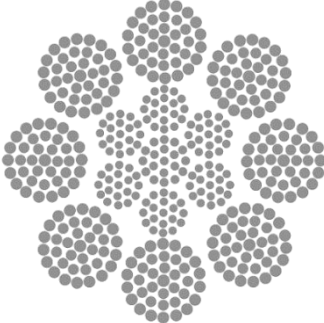
 8×65FNS-IWRC Typical structure diagram		Typic structure				Diameter range(mm)
		Tectonic	Structure of wire rope strand	Outer wire count		
				Total	Per share	
8×65FNS	1-6-6F-12/20-20	160	20	64~120		
8×76WSNS	1-7-7+7-14/20-20	160	20	64~120		
8×80WSNS	1-7-7+7-14/22-22	176	22	64~120		
8×84WSNS	1-7-7+7-14/24-24	192	24	64~140		
8×95WSNS	1-6-8-8+8-16/24-24	192	24	64~140		
8×111WSNS	1-9-9-9+9-18/28-28	224	28	100~180		
8×103FSNS	1-7-7F-14-14/30-30	240	30	120~220		
8×109SWSNS	1-8-8-8+8-16/30-30	240	30	120~220		

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				
steel core		steel core	steel core	steel core	steel core	steel core
64	1868	2225	2367	2508	2650	2778
68	2109	2512	2672	2832	2992	3136
72	2364	2816	2995	3175	3354	3516
76	2634	3138	3337	3537	3737	3917
80	2918	3477	3698	3919	4141	4340
84	3218	3833	4077	4321	4565	4785
88	3531	4207	4475	4743	5011	5252
92	3860	4598	4891	5184	5476	5740
96	4202	5006	5325	5644	5963	6250
100	4560	5432	5778	6124	6470	6782
108	5319	6153	6545	6937	7329	7681
116	6136	7098	7550	8003	8455	8862
124	7011	8111	8628	9144	9661	10126
132	7945	9192	9777	10362	10948	11475
140	8938	10339	10998	11657	12315	12908
148	9988	11555	12291	13027	--	--
156	11097	12838	13655	14473	--	--
164	12265	14188	15092	15996	--	--
172	13490	15606	16600	17594	--	--
180	14774	17092	18180	19269	--	--
188	16117	18090	19242	--	--	--
196	17518	19662	20914	--	--	--
204	18977	21300	22657	--	--	--
212	20494	23003	24468	--	--	--
220	22070	24772	26350	--	--	--

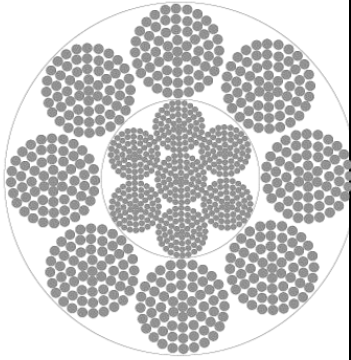
Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.321(steel core).

### Coarse diameter wire rope

 8×37M-IWRC Typical structure diagram		Typic structure				Diameter range (mm)	
		Tectonic	Structure of wire rope strand	Outer wire count			
				Total	Per share		
		8×37M	1-6/12/18	144	18	64~92	
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
	steel core	steel core	steel core	steel core	steel core	steel core	
64	1774	2051	2182	2313	2443	2561	
68	2002	2316	2463	2611	2758	2891	
72	2245	2596	2762	2927	3092	3241	
76	2501	2893	3077	3261	3446	3611	
80	2771	3205	3409	3614	3818	4002	
84	3055	3534	3759	3984	--	--	
88	3353	3878	4125	4372	--	--	
92	3665	4239	4509	4779	--	--	
Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.321(steel core).							

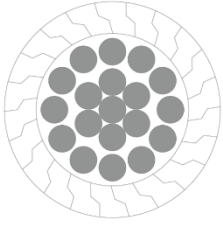
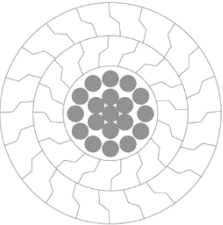


### Coarse diameter wire rope

 8×61M-IWRC Typical structure diagram		Typic structure				Diameter range (mm)	
		Tectonic	Structure of wire rope strand	Outer wire count			
				Total	Per share		
		8×61M	1-6/12/18/24		192	24	64~120
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
	steel core	steel core	steel core	steel core	steel core	steel core	
64	1749	1968	2093	2218	2344	2457	
68	1974	2221	2363	2504	2646	2773	
72	2214	2490	2649	2808	2966	3109	
76	2466	2775	2952	3128	3305	3464	
80	2733	3075	3271	3466	3662	3838	
84	3013	3390	3606	3822	4038	4232	
88	3307	3720	3957	4194	4431	4645	
92	3614	4066	4325	4584	4843	5076	
96	3935	4428	4710	4992	5274	5527	
100	4270	4804	5110	5416	--	--	
104	4618	5196	5527	5858	--	--	
108	4981	5604	5961	6317	--	--	
112	5356	6026	6410	6794	--	--	
116	5746	6465	6876	7288	--	--	
120	6149	6918	7359	7799	--	--	

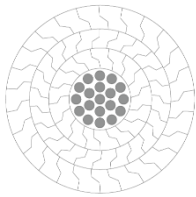
Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.321(steel core).

### 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				
 <p>One layer of Z-wire</p>	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	
 <p>Two-layer Z-wire</p>	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	

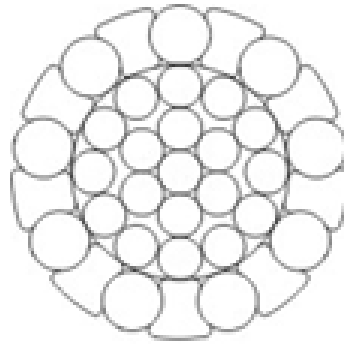
Note: The sum of the minimum breaking tension of the wire rope x 0.87.

### 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
 <p>Three or more layers of Z-wire</p>	48	1382	1645	1770	1910	2049	2188	
	50	1500	1785	1921	2072	2223	2375	
	52	1622	1930	2078	2241	2405	2568	
	54	1750	2082	2241	2417	2593	2770	
	56	1882	2239	2410	2599	2789	2979	
	58	2018	2402	2585	2788	2992	3195	
	60	2160	2570	2766	2984	3202	3419	
	62	2306	2744	2954	3186	3419	3651	
	64	2458	2924	3147	3395	3643	3891	
	66	2614	3110	3347	3610	3874	4138	
	68	2774	3301	3553	3833	4112	4392	
	70	2940	3498	3765	4061	4358	4654	
	72	3110	3701	3983	4297	4610	4924	
	74	3286	3909	4207	4539	4870	5201	
	76	3466	4123	4438	4787	5137	5486	
	78	3650	4343	4675	5043	5411	5779	
80	3840	4569	4917	5305	5692	6079		

Note: The sum of the minimum breaking tension of the wire rope x 0.87.

### Sealed wire rope for other applications

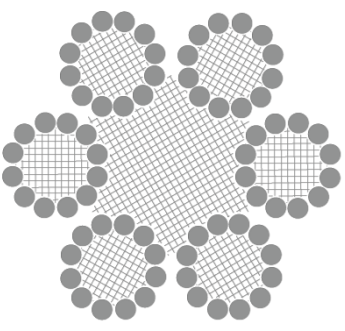


One layer of X-shaped special steel wire and round steel wire

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				
20	224	283	305	329	353	377
22	272	343	369	398	427	456
24	323	408	439	473	508	543
26	379	479	515	556	596	637
28	440	555	597	644	691	739
30	505	637	686	740	794	848
32	571	725	780	842	903	965
34	645	818	881	950	1020	1089
36	723	918	988	1065	1143	1221
38	806	1022	1100	1187	1274	1360
40	880	1133	1219	1315	1411	1507
42	970	1166	1255	1353	1452	1551
44	1065	1279	1377	1485	1594	1702
46	1164	1398	1505	1623	1742	1860
48	1267	1522	1639	1768	1897	2026
50	1375	1652	1778	1918	2058	2198

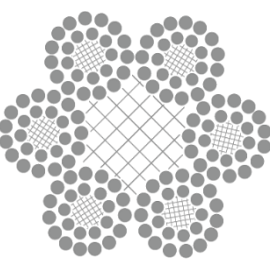
Note: The sum of the minimum breaking tension of the wire rope x 0.88.

### Steel wire rope for fisheries

 6×12FC-7FC Typical structure diagram		Typic structure				Diameter range (mm)
		Tectonic	Structure of wire rope strand	Outer wire count		
				Total	Total	
		6×12FC-7FC	FC-12	72	12	6~40
Nominal diameter of wire rope (mm)	Reference weight (kg/100m)		Nominal tensile strength of wire rope MPa			
	natural fiber core	synthesize fiber core	1470	1570	1670	1770
			Minimum breaking force of wire rope kN			
8	16.1	14.8	19.7	21.0	22.3	23.7
9	20.3	18.7	24.9	26.6	28.3	30.0
9.3	21.7	20.0	26.6	28.4	30.2	32.0
10	25.1	23.1	30.7	32.8	34.9	37.0
11	30.4	28.0	37.2	39.7	42.2	44.8
12	36.1	33.3	44.2	47.3	50.3	53.3
12.5	39.2	36.1	48.0	51.3	54.5	57.8
13	42.4	39.0	51.9	55.5	59.0	62.5
14	49.2	45.3	60.2	64.3	68.4	72.5
15.5	60.3	55.5	73.8	78.8	83.9	88.9
16	64.3	59.1	78.7	84.0	89.4	94.7
17	72.5	66.8	88.8	94.8	101	107
18	81.3	74.8	99.5	106	113	120
18.5	85.9	79.1	105	112	119	127
20	100	92.4	123	131	140	148
21.5	116	107	142	152	161	171
22	121	112	149	159	169	179
24	145	133	177	189	201	213
24.5	151	139	184	197	210	222
26	170	156	208	222	236	250
28	197	181	241	257	274	290
30	226	208	277	295	314	333
32	257	237	315	336	357	379
34	290	267	355	379	403	428
36	325	299	398	425	452	479
38	362	334	444	474	504	534
40	402	370	492	525	558	592

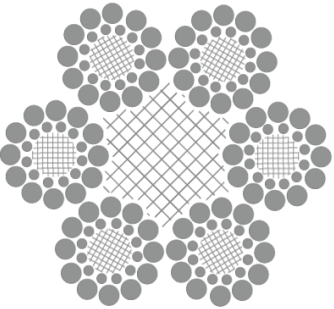
Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.136.

### Steel wire rope for fisheries

 6×24MFC-7FC Typical structure diagram	Typic structure				Diameter range (mm)	
	Tectonic	Structure of wire rope strand	Outer wire count			
			Total	Total		
	6×24MFC-7FC	FC-9/15	90	15	8~50	
Nominal diameter of wire rope (mm)	Reference weight (kg/100m)		Nominal tensile strength of wire rope MPa			
	natural fiber core	synthesize fiber core	1470	1570	1670	1770
			Minimum breaking force of wire rope kN			
8	20.4	19.5	26.3	28.1	29.9	31.7
9	25.8	24.6	33.3	35.6	37.9	40.1
10	31.8	30.4	41.2	44.0	46.8	49.6
11	38.5	36.8	49.8	53.2	56.6	60.0
12	45.8	43.8	59.3	63.3	67.3	71.4
13	53.7	51.4	69.6	74.3	79.0	83.8
14	62.3	59.6	80.7	86.2	91.6	97.1
16	81.4	77.8	105	113	120	127
18	103	98.5	133	142	152	161
20	127	122	165	176	187	198
22	154	147	199	213	226	240
24	183	175	237	253	269	285
26	215	206	278	297	316	335
28	249	238	323	345	367	389
30	286	274	370	396	421	446
32	326	311	421	450	479	507
34	368	351	476	508	541	573
36	412	394	533	570	606	642
38	459	439	594	635	675	716
40	509	486	659	703	748	793
42	561	536	726	775	825	874
44	616	589	797	851	905	959
46	673	643	871	930	989	1050
48	733	700	948	1010	1080	1140
50	795	760	1030	1100	1170	1240

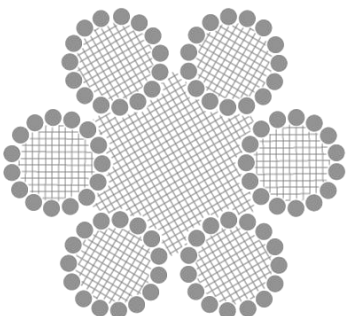
Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.150.

### Steel wire rope for fisheries

 6x24SFC-FC Typical structure diagram	Typic structure				Diameter range (mm)	
	Tectonic	Structure of wire rope strand	Outer wire count			
			Total	Total		
	6x24SFC-FC	FC-12-12	72	12	10~44	
	6x24WFC-FC	FC-8-8/8	96	16	10~44	
Nominal diameter of wire rope (mm)	Reference weight (kg/100m)		Nominal tensile strength of wire rope MPa			
	natural fiber core	synthesize fiber core	1470	1570	1670	1770
			Minimum breaking force of wire rope kN			
10	33.1	31.6	42.8	45.7	48.6	51.5
11	40.0	38.2	51.8	55.3	58.8	62.3
12	47.7	45.5	61.6	65.8	70.0	74.2
13	55.9	53.4	72.3	77.2	82.1	87.0
14	64.9	61.9	83.8	90.0	95.3	101
16	84.7	80.9	110	117	124	132
18	107	102	139	148	157	167
20	132	126	171	183	194	206
22	160	153	207	221	235	249
24	191	182	246	263	280	297
26	224	214	289	309	329	348
28	260	248	335	358	381	404
30	298	284	385	411	437	464
32	339	324	438	468	498	527
34	383	365	495	528	562	595
36	429	410	554	592	630	668
38	478	456	618	660	702	744
40	530	506	684	731	778	824
42	584	557	755	806	857	909
44	641	612	828	885	941	997

Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.150.

### Steel wire rope for fisheries

 6×15FC-FC Typical structure diagram		Typic structure				Diameter range(mm)
		Tectonic	Structure of wire rope strand	Outer wire count		
				Total	Total	
		6×15FC-FC	FC-15	90	15	10~32
Nominal diameter of wire rope (mm)	Reference weight (kg/100m)		Nominal tensile strength of wire rope			MPa
	natural fiber core	synthesize fiber core	1470	1570	1670	1770
			Minimum breaking force of wire rope			kN
10	20.0	18.5	26.5	28.3	30.1	31.9
12	28.8	26.6	38.1	40.7	43.3	45.9
14	39.2	36.3	51.9	55.4	58.9	62.4
16	51.2	47.4	67.7	72.3	77.0	81.6
18	64.8	59.9	85.7	91.6	97.4	103
20	80.0	74.0	106	113	120	127
22	96.8	89.5	128	137	145	154
24	115	107	152	163	173	184
26	135	125	179	191	203	215
28	157	145	207	222	236	250
30	180	166	238	254	271	287
32	205	189	271	289	308	326

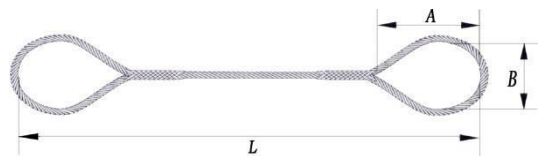
Note: Minimum wire breaking force sum=Minimum breaking force of wire rope×1.136.



## Wire Rope Rigging

Wire rope slings--Braider clips (fiber core)

Implementation standards GB/T 16271, GB/T 16762

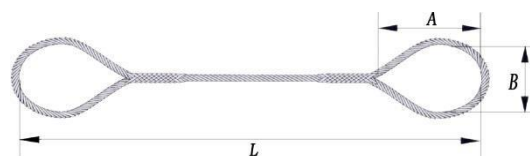


Encodings	Nominal diameter of wire rope	WLL kN		Length A×B	classification
	mm	1670N/mm <sup>2</sup>	1770 N/mm <sup>2</sup>	mm	
8-001F-01	6	2.58	2.74	120×60	6×19(b)
8-001F-02	7	3.52	3.72	140×70	
8-001F-03	8	4.60	4.86	160×80	
8-001F-04	9	5.82	6.16	180×90	
8-001F-05	10	7.16	7.60	200×100	
8-001F-06	11	8.68	9.20	220×110	
8-001F-07	12	10.3	10.9	240×120	
8-001F-08	13	12.1	12.9	260×130	
8-001F-09	14	14.0	14.8	280×140	
8-001F-10	16	17.7	18.6	320×160	6×37(b)
8-001F-11	18	22.3	23.6	360×180	
8-001F-12	20	27.6	29.2	400×200	
8-001F-13	22	33.4	35.2	440×220	
8-001F-14	24	39.6	42.0	480×240	
8-001F-15	26	46.6	49.0	520×260	
8-001F-16	28	54.1	57.2	560×280	
8-001F-17	30	62.1	65.6	600×300	
8-001F-18	32	70.6	74.8	640×320	
8-001F-19	34	79.6	84.4	680×340	
8-001F-20	36	89.4	94.6	720×360	
8-001F-21	38	99.6	105	760×380	
8-001F-22	40	110	117	800×400	
8-001F-23	44	134	141	880×440	
8-001F-24	48	158	168	960×480	
8-001F-25	52	179	190	1040×520	6×61(b)
8-001F-26	56	207	220	1120×560	
8-001F-27	60	238	252	1200×600	
8-001F-28	64	271	287	1280×640	
8-001F-29	68	306	324	1360×680	
8-001F-30	72	343	364	1440×720	
8-001F-31	76	382	405	1520×760	
8-001F-32	80	423	449	1600×800	
8-001F-33	90	536	568	1800×900	

## Wire Rope Rigging

Wire rope slings--Braider clips (steel core)

Implementation standards GB/T 16271, GB/T 16762

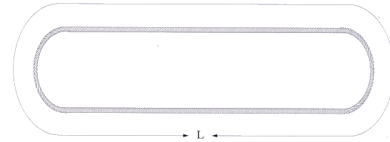


Encodings	Nominal diameter of wire rope	WLL kN		Length A×B	classification
	mm	1670N/mm <sup>2</sup>	1770 N/mm <sup>2</sup>	mm	
8-002I-01	6	2.78	2.96	120×60	6×19(b)
8-002I-02	7	3.80	4.02	140×70	
8-002I-03	8	4.96	5.26	160×80	
8-002I-04	9	6.28	6.66	180×90	
8-002I-05	10	7.76	8.22	200×100	
8-002I-06	11	9.40	10.0	220×110	
8-002I-07	12	11.2	11.8	240×120	
8-002I-08	13	13.0	13.9	260×130	
8-002I-09	14	15.0	16.1	280×140	
8-002I-10	16	19.0	20.2	320×160	6×37(b)
8-002I-11	18	24.0	25.40	360×180	
8-002I-12	20	29.8	31.6	400×200	
8-002I-13	22	36.0	38.2	440×220	
8-002I-14	24	42.8	45.6	480×240	
8-002I-15	26	50.4	53.4	520×260	
8-002I-16	28	58.4	61.8	560×280	
8-002I-17	30	67.0	71.2	600×300	
8-002I-18	32	76.4	81.0	640×320	
8-002I-19	34	86.0	91.2	680×340	
8-002I-20	36	96.6	102	720×360	
8-002I-21	38	108	114	760×380	
8-002I-22	40	119	126	800×400	
8-002I-23	44	144	153	880×440	
8-002I-24	48	171	182	960×480	
8-002I-25	52	193	205	1040×520	6×61(b)
8-002I-26	56	224	238	1120×560	
8-002I-27	60	258	273	1200×600	
8-002I-28	64	293	311	1280×640	
8-002I-29	68	331	351	1360×680	
8-002I-30	72	372	394	1440×720	
8-002I-31	76	413	438	1520×760	
8-002I-32	80	458	485	1600×800	
8-002I-33	90	579	614	1800×900	

## Wire Rope Rigging

Wire rope spliceless braiding rigging

Implementation standards DIN 3089 portion 2 – 84

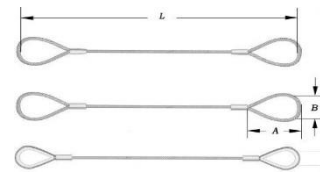


Encodings	Nominal diameter of wire rope	WLL kN	WLL kN
	mm	1670N/mm <sup>2</sup>	1770 N/mm <sup>2</sup>
8-003E-01	9	9.20	9.75
8-003E-02	10	11.4	12.0
8-003E-03	11	13.7	14.6
8-003E-04	12	16.4	17.3
8-003E-05	13	19.2	20.3
8-003E-06	14	22.3	23.6
8-003E-07	16	29.1	30.8
8-003E-08	18	36.8	39.0
8-003E-09	20	45.4	48.1
8-003E-10	22	55.0	58.3
8-003E-11	24	65.4	69.3
8-003E-12	26	76.8	81.3
8-003E-13	28	89.0	94.3
8-003E-14	30	102	108
8-003E-15	32	116	123
8-003E-16	34	131	139
8-003E-17	36	147	156
8-003E-18	38	164	174
8-003E-19	40	182	193
8-003E-20	42	200	212
8-003E-21	44	220	233
8-003E-22	46	240	255
8-003E-23	48	262	277
8-003E-24	50	284	301
8-003E-25	52	307	325
8-003E-26	54	331	351
8-003E-27	58	382	405
8-003E-28	62	437	463
8-003E-29	66	495	524
8-003E-30	70	556	590
8-003E-31	80	727	770
8-003E-32	90	920	975
8-003E-33	110	1370	1460

## Wire Rope Rigging

Aluminum alloy compression fitting for steel wire rope (fiber core)

Implementation standards GB 6946, GB/T 16762

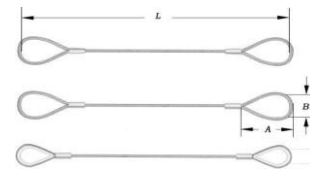


Encodings	Nominal diameter of wire rope	WLL kN		Length A×B	classification
	mm	1670N/mm <sup>2</sup>	1770 N/mm <sup>2</sup>	mm	
9-001F-01	6	3.32	3.52	120×60	6×19 (b)
9-001F-02	7	4.52	4.79	140×70	
9-001F-03	8	5.91	6.26	160×80	
9-001F-04	9	7.48	7.92	180×90	
9-001F-05	10	9.23	9.78	200×100	
9-001F-06	11	11.2	11.8	220×110	
9-001F-07	12	13.3	14.1	240×120	
9-001F-08	13	15.6	16.5	260×130	
9-001F-09	14	18.1	19.2	280×140	
9-001F-10	16	22.7	24.1	320×160	6×37 (b)
9-001F-11	18	28.7	30.4	360×180	
9-001F-12	20	35.5	37.6	400×200	
9-001F-13	22	42.9	45.5	440×220	
9-001F-14	24	51.1	54.1	480×240	
9-001F-15	26	59.9	63.5	520×260	
9-001F-16	28	69.5	73.7	560×280	
9-001F-17	30	79.8	84.6	600×300	
9-001F-18	32	90.8	96.2	640×320	
9-001F-19	34	103	109	680×340	
9-001F-20	36	115	122	720×360	
9-001F-21	38	128	136	760×380	
9-001F-22	40	142	150	800×400	
9-001F-23	42	156	166	840×420	
9-001F-24	44	172	182	880×440	
9-001F-25	46	180	191	920×460	6×61 (b)
9-001F-26	50	213	225	1000×500	
9-001F-27	54	248	263	1080×540	
9-001F-28	58	286	303	1160×540	
9-001F-29	62	327	347	1240×620	
9-001F-30	64	348	369	1280×640	
9-001F-31	68	394	417	1360×680	
9-001F-32	72	441	467	1440×720	
9-001F-33	76	491	521	1520×760	

## Wire Rope Rigging

Aluminum alloy compression fitting for steel wire rope (steel core)

Implementation standards GB 6946, GB/T 16762



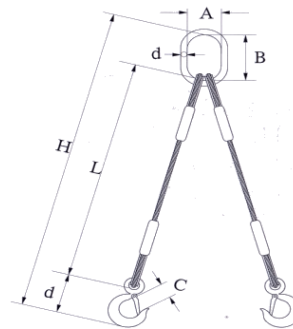
Encodings	Nominal diameter of wire rope	WLL kN		Length A×B	classification
	mm	1670N/m m <sup>2</sup>	1770 N/mm <sup>2</sup>	mm	
9-002I-01	6	3.59	3.81	120×60	6×19(b)
9-002I-02	7	4.89	5.18	140×70	
9-002I-03	8	6.39	6.77	160×80	
9-002I-04	9	8.08	8.57	180×90	
9-002I-05	10	9.98	10.6	200×100	
9-002I-06	11	12.1	12.8	220×110	
9-002I-07	12	14.4	15.2	240×120	
9-002I-08	13	16.9	17.9	260×130	
9-002I-09	14	19.6	20.7	280×140	
9-002I-10	16	24.6	26.0	320×160	6×37(b)
9-002I-11	18	31.1	32.9	360×180	
9-002I-12	20	38.4	40.6	400×200	
9-002I-13	22	46.4	49.2	440×220	
9-002I-14	24	55.2	58.5	480×240	
9-002I-15	26	64.8	68.7	520×260	
9-002I-16	28	75.1	79.7	560×280	
9-002I-17	30	86.3	91.5	600×300	
9-002I-18	32	98.2	104	640×320	
9-002I-19	34	111	117	680×340	
9-002I-20	36	124	132	720×360	
9-002I-21	38	138	147	760×380	
9-002I-22	40	153	163	800×400	6×61(b)
9-002I-23	42	169	179	840×420	
9-002I-24	44	186	197	880×440	
9-002I-25	46	195	206	920×460	
9-002I-26	50	230	244	1000×500	
9-002I-27	54	268	284	1080×540	
9-002I-28	58	309	328	1160×540	
9-002I-29	62	354	375	1240×620	
9-002I-30	64	377	399	1280×640	
9-002I-31	68	425	451	1360×680	
9-002I-32	72	477	505	1440×720	
9-002I-33	76	531	563	1520×760	

## Wire Rope Rigging

Double-limbed rigging sets

Wire rope level T/S 1670N/mm<sup>2</sup>

Implementation standards GB 6946, GB/T 16762



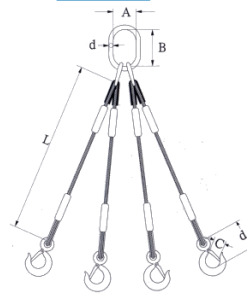
Encodings	Nominal diameter of wire rope mm	WLL kN		Parameters of lifting ring A×B×d mm	Hook opening C mm	classification
		0°~90°	90°~120°			
9-003F-01	6	4.65	3.32	65×128×12	22	6×19 (b)
9-003F-02	7	6.33	4.52	65×128×12	22	
9-003F-03	8	8.27	5.91	65×128×12	22	
9-003F-04	9	10.5	7.48	65×128×12	22	
9-003F-05	10	12.9	9.23	65×128×12	24	
9-003F-06	11	15.6	11.2	65×128×12	26	
9-003F-07	12	18.6	13.3	95×165×20	26	
9-003F-08	13	21.8	15.6	95×165×20	27	
9-003F-09	14	25.3	18.1	95×165×20	27	
9-003F-10	16	33.8	22.7	105×205×26	31	6×37 (b)
9-003F-11	18	40.2	28.7	105×205×26	31	
9-003F-12	20	49.7	35.5	105×205×26	38	
9-003F-13	22	60.1	42.9	105×205×26	38	
9-003F-14	24	71.5	51.1	115×222×32	47	
9-003F-15	26	83.9	59.9	115×222×32	47	
9-003F-16	28	97.3	69.5	115×222×32	57	
9-003F-17	30	112	79.8	155×305×38	57	
9-003F-18	32	127	90.8	155×305×38	57	
9-003F-19	34	144	103	155×305×42	105	
9-003F-20	36	161	115	155×305×42	105	
9-003F-21	38	179	128	155×305×45	105	
9-003F-22	40	199	142	178×356×45	105	
9-003F-23	42	219	156	178×356×45	108	
9-003F-24	44	240	172	178×356×50	108	
9-003F-25	46	252	180	205×406×58	108	
9-003F-26	48	274	196	205×406×58	108	
9-003F-27	50	298	213	205×406×58	108	
9-003F-28	52	322	230	205×406×58	108	
9-003F-29	54	347	248	205×406×64	108	
9-003F-30	56	373	267	205×406×64	108	

## Wire Rope Rigging

Extremity rigging

Wire rope level T/S 1670N/mm<sup>2</sup>

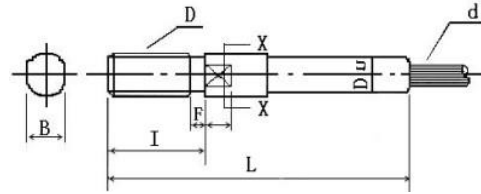
Implementation standards GB 6946, GB/T 16762



Encodings	Nominal diameter of wire rope	WLL kN		Parameters of lifting ring A×B×d	Hook opening C	classification
		0°~90°	90°~120°			
	mm			mm	mm	
9-004F-01	6	6.98	4.98	65×128×12	22	6×19(b)
9-004F-02	7	9.50	6.78	65×128×12	22	
9-004F-03	8	12.4	8.86	65×128×12	22	
9-004F-04	9	15.7	11.2	65×128×12	22	
9-004F-05	10	19.4	13.8	65×128×12	24	
9-004F-06	11	23.4	16.7	65×128×12	26	
9-004F-07	12	27.9	19.9	95×165×20	26	
9-004F-08	13	32.8	23.4	95×165×20	27	
9-004F-09	14	38.0	27.1	95×165×20	27	
9-004F-10	16	47.7	34.0	105×205×26	31	6×37(b)
9-004F-11	18	60.3	43.1	105×205×26	31	
9-004F-12	20	74.5	53.2	105×205×26	38	
9-004F-13	22	90.1	64.4	105×205×26	38	
9-004F-14	24	107	76.6	115×222×32	47	
9-004F-15	26	126	89.9	115×222×32	47	
9-004F-16	28	146	104	115×222×32	57	
9-004F-17	30	168	120	155×305×38	57	
9-004F-18	32	191	136	155×305×38	57	
9-004F-19	34	215	154	155×305×42	105	
9-004F-20	36	241	172	155×305×42	105	
9-004F-21	38	269	192	155×305×45	105	
9-004F-22	40	298	213	178×356×45	105	
9-004F-23	42	328	235	178×356×45	108	
9-004F-24	44	360	258	178×356×50	108	
9-004F-25	46	394	281	205×406×58	108	
9-004F-26	48	429	306	205×406×58	108	
9-004F-27	50	466	332	205×406×58	108	
9-004F-28	52	504	360	205×406×58	108	
9-004F-29	54	543	388	205×406×64	108	
9-004F-30	56	584	417	205×406×64	108	

## Wire Rope Rigging

Spiral Connectors Wire Rope Compression Rigging

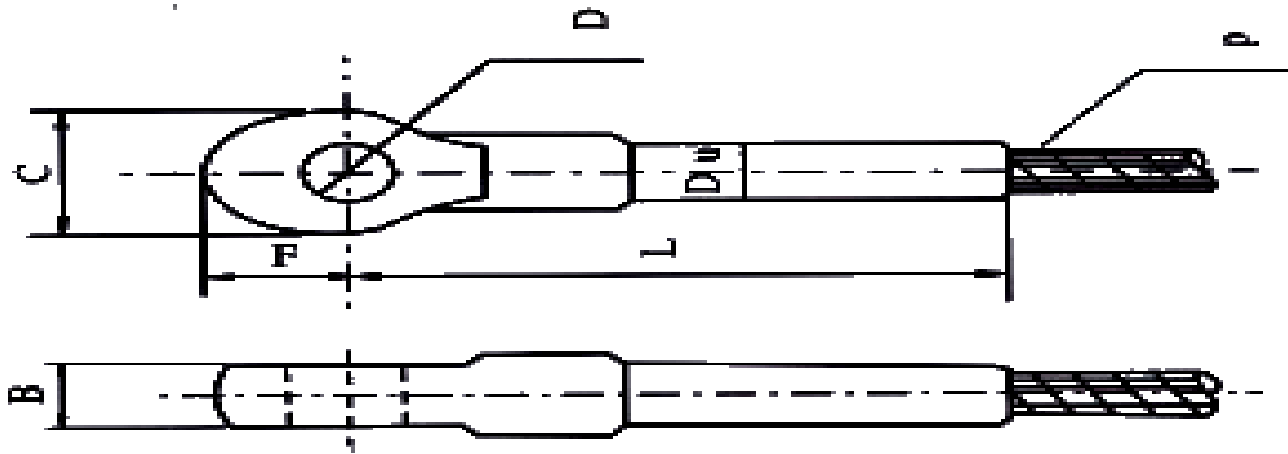


Encodings	Rope Diameter (mm)	B	D	Du	E	F	I	reference length L
9-005-01	8	12	M14×2.0	12	8	7	39	114
9-005-02	9	14	M16×2.0	14	10	8	45	129
9-005-03	10	14	M16×2.0	16	10	8	45	137
9-005-04	11	17	M18×2.0	18	11	9	50	151
9-005-05	12	19	M20×2.5	20	12	10	56	164
9-005-06	12.5	19	M20×2.5	20	12	10	56	164
9-005-07	14	22	M22×2.5	22	13	11	62	185
9-005-08	16	24	M27×3.0	26	16	14	76	216
9-005-09	18	24	M27×3.0	28	16	14	76	231
9-005-10	20	30	M33×3.5	32	20	17	92	265
9-005-11	22	30	M33×3.5	34	20	17	92	279
9-005-12	22.5	32	M36×4.0	34	22	18	101	293
9-005-13	24	32	M36×4.0	38	22	18	101	305
9-005-14	25	36	M39×4.0	38	23	20	109	321
9-005-15	26	36	M39×4.0	40	23	20	109	328
9-005-16	28	41	M45×4.5	44	27	23	126	363
9-005-17	30	41	M45×4.5	46	27	23	126	378
9-005-18	31.5	46	M48×5.0	48	29	24	134	398
9-005-19	32	46	M48×5.0	50	29	24	134	402
9-005-20	33.5	50	M52×5.0	52	31	26	146	427
9-005-21	34	50	M52×5.0	52	31	26	146	430
9-005-22	35.5	55	M56×5.5	54	34	28	157	455
9-005-23	36	55	M56×5.5	56	34	28	157	458
9-005-24	37.5	55	M56×5.5	58	34	28	157	469
9-005-25	38	55	M56×5.5	58	34	28	157	473
9-005-26	40	55	M60×5.5	62	36	30	168	500
9-005-27	42	60	M64×6.0	66	38	32	179	527
9-005-28	42.5	60	M64×6.0	66	38	32	179	531
9-005-29	44	65	M68×6.0	68	41	34	190	556
9-005-30	45	65	M68×6.0	70	41	34	190	563
9-005-31	46	65	M68×6.0	70	41	34	190	570
9-005-32	48	65	M68×6.0	72	41	34	190	584
9-005-33	50	70	M72×6.0	78	43	36	202	613



## Wire Rope Rigging

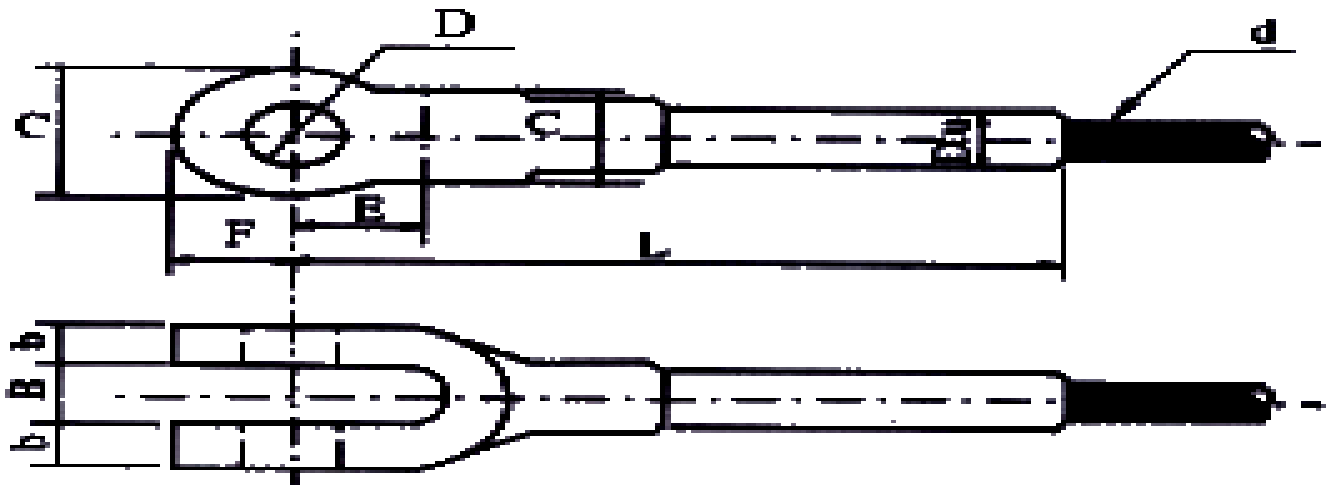
### Crimp Connectors Wire Rope Crimping Rigging



Encodings	Rope Diameter (mm)	L	D	B	D1	d	L1	H	K
		mm							
9-006-01	6-7	110	13	35	19	7	54	13	89
9-006-02	8	140	20	41	22	9	80	17	114
9-006-03	9-10	140	20	41	22	11	80	17	114
9-006-04	11-12	176	25	51	27	12	108	22	146
9-006-05	13	176	25	51	27	14	108	22	146
9-006-06	14-15	221	32	61	32	15	135	29	185
9-006-07	16	221	32	61	32	17	135	29	217
9-006-08	18-20	259	39	73	36	20	162	33	258
9-006-09	22-23	304	43	79	43	24	189	38	293
9-006-10	24-25	342	50	92	52	27	216	45	293
9-006-11	28	382	57	102	59	30	243	51	323
9-006-12	32	431	64	114	65	34	270	57	364
9-006-13	35-36	475	71	127	65	37	297	57	402
9-006-14	44-45	598	86	159	90	47	378	76	508
9-006-15	48-51	702	100	184	97	54	432	83	584

## Wire Rope Rigging

Spiral Connectors Wire Rope Compression Rigging

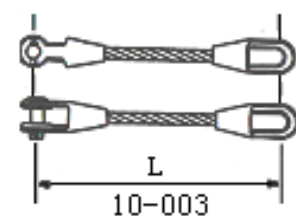
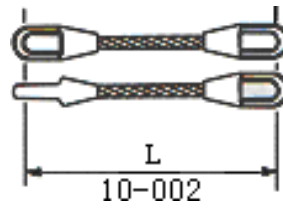
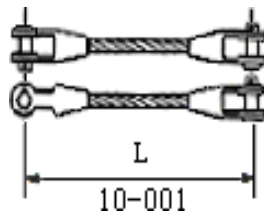


Encodings	Rope Diameter (mm)	L	D	B	D1	d	L1	W	K	C	A
		mm									
9-007-01	6-7	122	13	35	18	7	55	17	102	9	38
9-007-02	8	159	20	42	21	9	80	20	135	12	45
9-007-03	9-10	159	20	42	21	10	80	20	135	12	45
9-007-04	11-12	199	25	50	25	12	110	25	174	14	50
9-007-05	13	199	25	50	25	14	110	25	174	14	50
9-007-06	14-15	240	32	60	30	15	135	31	210	17	57
9-007-07	16	240	32	60	30	17	135	31	210	17	57
9-007-08	10-20	295	37	70	35	20	161	38	256	20	70
9-007-09	22-23	340	43	80	41	24	189	45	300	24	82
9-007-10	24-25	395	50	100	51	27	216	50	345	26	98
9-007-11	28	442	57	103	57	30	238	57	383	30	108
9-007-12	32	484	64	113	64	34	269	63	419	34	120
9-007-13	35-36	534	71	127	64	37	297	64	463	35	132
9-007-14	38	581	78	140	70	40	315	76	502	43	146
9-007-15	44-45	674	86	170	89	47	378	89	584	54	171
9-007-16	48-51	798	100	203	95	54	431	101	682	60	203

## Wire Rope Rigging

Wire rope hot casting, cold casting rigging (steel core)

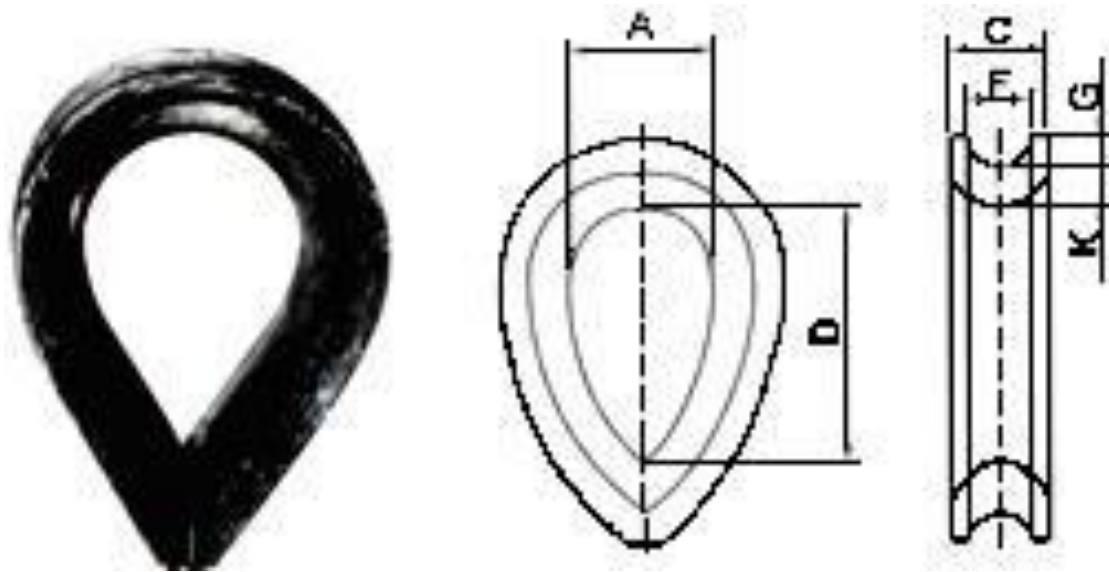
Implementation standards ISO 7595 Molten alloy sockets, ISO/TR7596 Resin Sleeve



Encodings	Nominal diameter of wire rope	WLL kN		classification
	mm	1770 N/mm <sup>2</sup>	1870 N/mm <sup>2</sup>	
10-001-01	20	50.4	53.3	6×37(a)
10-001-02	22	61.0	64.4	
10-001-03	24	72.6	76.7	
10-001-04	26	85.2	90.0	
10-001-05	28	98.8	104	
10-001-06	30	113	120	
10-001-07	32	129	136	
10-001-08	34	146	154	
10-001-09	36	163	173	
10-001-10	38	182	192	
10-001-11	40	201	213	
10-001-12	44	244	257	
10-001-13	48	290	307	6×37(a) 6×61(a)
10-001-14	52	341	360	
10-001-15	56	395	417	
10-001-16	60	452	479	8×37(a)
10-001-17	64	516	545	
10-001-18	68	582	615	
10-001-19	72	635	671	8×61(a)
10-001-20	76	707	747	
10-001-21	80	784	828	
10-001-22	84	864	913	8×61(ab) 8×91(ab)
10-001-23	88	949	1000	
10-001-24	92	1040	1100	
10-001-25	96	1100	1160	
10-001-26	100	1190	1260	
10-001-27	114	1550	1630	

## Wire Rope Rigging

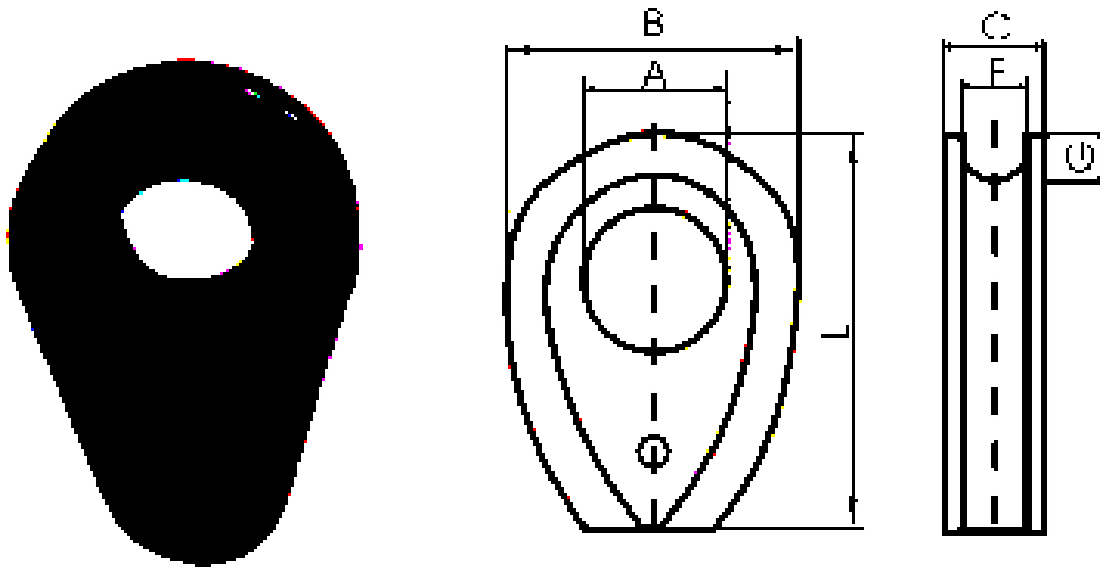
General purpose thimbles for use with steel wire ropes (GB5974.1-86)



Applicable rope diameter	F	C	A	D	G	K	Weights (kg)
16	18.4	28.0	40	72	8.8	11.2	0.6
18	20.7	31.5	45	81	9.9	12.6	0.9
20	23.0	35.0	50	90	11.0	14.0	1.2
22	25.3	38.5	55	99	12.1	15.4	1.6
24	27.6	42.0	60	108	13.2	16.8	2.0
26	29.9	45.5	65	117	14.3	18.2	2.7
28	32.2	49.0	70	126	15.4	19.6	3.3
32	36.8	56.0	80	144	17.6	22.4	4.9
36	41.4	63.0	90	162	19.8	25.2	7.0
40	46.0	70.0	100	180	22.0	28.0	9.6
44	50.6	77.0	110	198	24.2	30.8	12.8
48	55.2	84.0	120	216	26.4	33.6	21.0
52	59.8	91.0	130	234	28.6	36.4	21.0
56	64.4	98.0	140	252	30.8	39.2	26.5
60	69.0	105.0	150	270	33.0	42.0	32.0

## Wire Rope Rigging

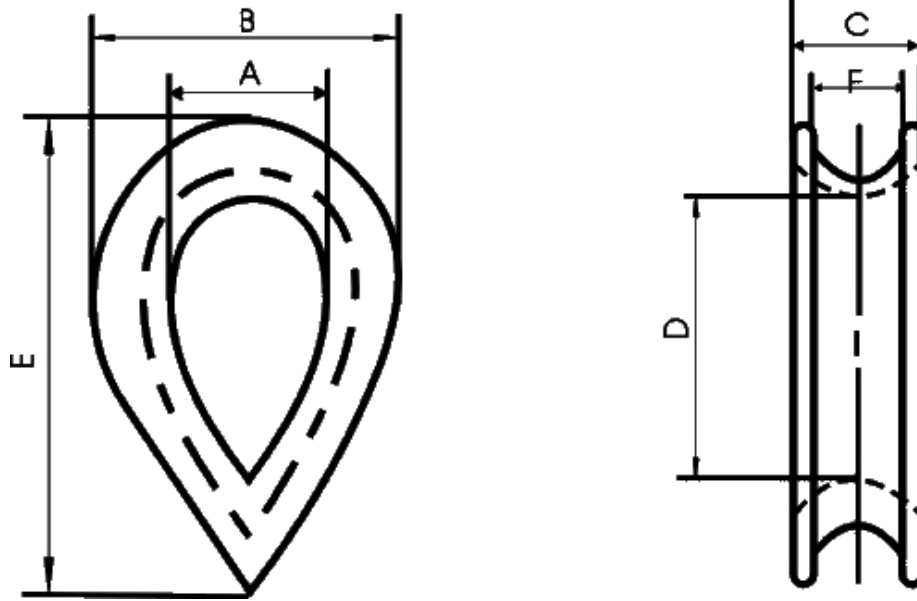
Heavy thimbles for use with steel wire ropes (GB5974.2-86)



Applicable rope diameter	F	C	A	B	L	Weight (kg)
16	18.4	28	40	80	112	12.0
18	20.7	31.5	45	90	126	13.5
20	23.0	35	50	100	140	15.0
22	25.3	38.5	55	110	154	16.5
24	27.6	42	60	120	168	18.0
26	29.9	45.5	65	130	182	19.5
28	32.2	49	70	140	196	21.0
32	36.8	56	80	160	224	24.0
36	41.4	63	90	180	252	27.0
40	46.0	70	100	200	280	30.0
44	50.6	77	110	220	308	33.0
48	55.2	84	120	240	336	36.0
52	59.8	91	130	260	364	39.0
56	64.4	98	140	280	392	42.0
60	69.0	105	150	300	420	45.0

## Wire Rope Rigging

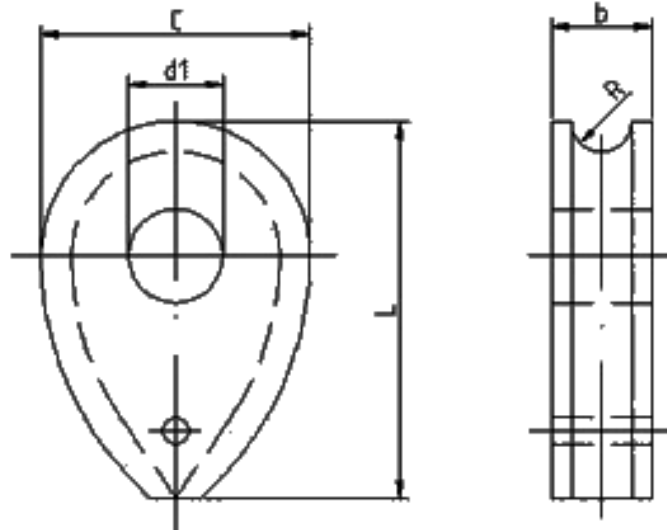
Wire Rope Grommets (GB560-87)



model number	Applicable rope diameter	permissible load	A	B	C	D	E	F
Type	Wire Rope Dia.(mm)	S.W.L. kN (t)	mm					
WT4	4	1.67(0.17)	10	19	6	20	32	4.4
WT5	5	2.45(0.25)	12.5	23.5	7.5	25	40	5.5
WT6	6	3.43(0.35)	15	28	9	30	47	6.6
WT8	8	6.27(0.64)	20	37	12	40	63	8.8
WT10	9~10	9.8(1.00)	25	46	15	50	79	11
WT12	11~12	14.7(1.5)	30	56	18	60	95	13
WT14	13~14	19.6(2.0)	35	65	21	70	111	15
WT16	16	26.46(2.7)	40	74	24	80	126	18
WT18	18	33.32(3.4)	45	83	27	90	142	20
WT20	20	40.18(4.1)	50	92	30	100	158	22
WT22	22	49.0(5.0)	55	101	33	110	174	24
WT25	24	63.7(6.5)	62	115	38	125	198	28
WT28	26~28	80.36(8.2)	70	129	42	140	221	31
WT32	32	104.86(10.7)	80	147	48	160	253	35
WT36	36	132.3(13.5)	90	166	54	180	284	40
WT40	40	166.6(17.0)	100	184	60	200	316	44
WT45	44	205.8(21.0)	112	207	68	225	356	50
WT50	48	264.6(27.0)	125	231	75	250	395	55
WT56	52~56	323.4(33.0)	140	258	84	280	442	62
WT63	60	392.0(40.0)	158	291	94	315	498	69

## Wire Rope Rigging

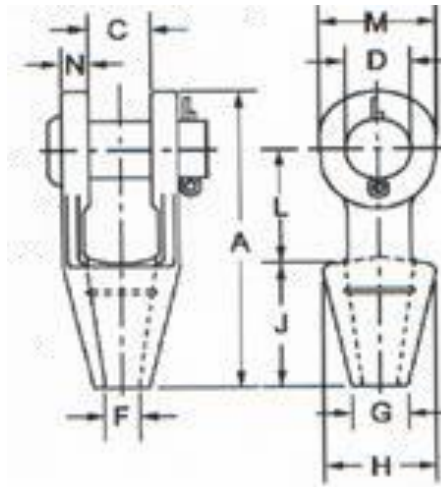
Steel wire rope thimbles (DIN3091)



Size	L	C	d1	b	R
	mm				
8	56	40	14	15	48
10	70	50	18	17.5	60
12	84	60	21	20	72
14	98	70	25	23.5	84
16	110	80	28	26	96
18	130	90	31	28.5	110
20	140	100	35	31	120
22	150	110	38	33.5	130
24	170	120	41	36	140
26	180	130	44	39.5	160
28	200	140	47	42	170
32	220	160	53	47	190
36	250	180	59	53	220
40	280	200	65	58	240
44	310	220	70	63	260
48	340	240	76	69	290
52	360	260	81	74	310
56	390	280	86	80	340
64	450	320	95	90	380
72	500	360	104	101	430
80	560	400	112	112	480

## Wire Rope Rigging

U.S. Type open spelter sockets (G416)

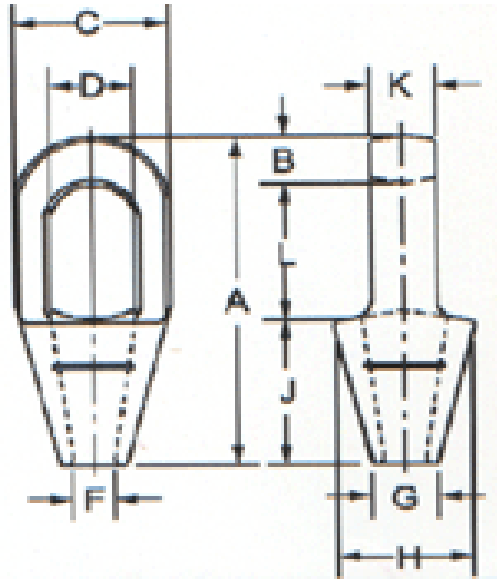


Applicable rope diameter (mm)	A	C	D	F	G	H	J	L	M	N
	mm									
6	116	23	17	10	18	41	57	40	33	9
8-10	123	21	21	13	21	43	57	44	38	11
11-13	142	25	25	15	24	51	64	51	48	13
14-16	172	32	30	18	29	60	76	64	57	14
18	202	38	35	21	32	70	89	76	67	16
22	235	44	41	24	38	84	102	89	80	20
26	269	51	51	29	44	95	114	102	95	22
28	303	57	57	32	51	107	127	117	105	25
32-35	335	64	64	38	57	122	140	127	121	29
38	384	76	70	41	70	136	152	152	137	30
42	412	76	76	44	76	142	168	165	146	33
44-48	464	89	89	51	80	169	191	178	165	40
50-54	545	102	95	57	95	194	228	228	178	46
56-60	606	114	108	64	102	222	254	254	197	54
64-68	654	127	121	73	114	247	273	173	216	60
70-74	692	133	127	79	124	279	279	279	229	73
76-80	737	146	133	86	133	298	305	286	241	76
82-86	784	159	140	92	146	317	328	298	254	79
88-92	845	172	152	99	165	338	360	318	273	83
96-102	912	191	178	108	184	369	389	343	318	89



## Wire Rope Rigging

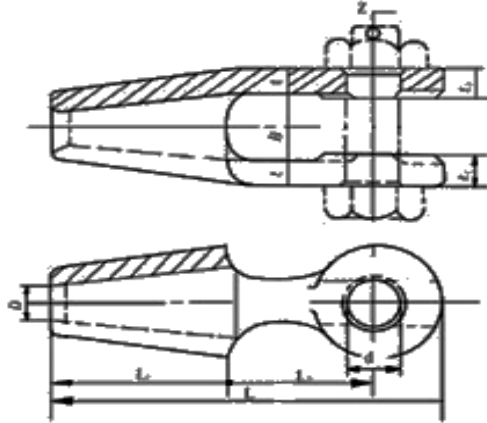
U.S. Type closed spelter sockets (G417)



Applicable rope diameter (mm)	A	B	C	D	F	G	H	J	K	L
	mm									
6	114	13	40	22	10	18	40	57	13	44
8-10	124	16	43	25	13	21	43	57	18	51
11-13	138	18	51	30	15	24	51	63	22	57
14-16	160	21	67	36	18	28	67	76	25	63
18	193	27	76	42	21	32	76	90	32	76
22	223	32	92	48	24	38	92	102	38	89
26	250	35	105	58	29	44	105	113	44	102
28	279	38	114	65	32	51	114	127	51	114
32-35	308	41	135	71	38	57	135	140	57	127
38	354	50	135	81	41	70	135	152	64	152
42	384	54	146	83	44	76	146	165	70	165
44-48	439	56	171	95	51	80	171	191	76	192
50-54	495	62	194	111	57	95	194	216	83	217
56-60	537	67	216	127	64	102	216	229	92	241
64-68	597	79	241	140	73	114	241	248	102	270
70-74	644	79	273	159	79	124	273	279	124	286
76-80	686	83	292	171	86	133	292	305	133	298
82-86	743	102	311	184	92	146	311	330	146	311
88-92	788	102	330	197	99	165	330	356	159	330
96-102	845	108	362	216	108	184	362	381	178	356

## Wire Rope Rigging

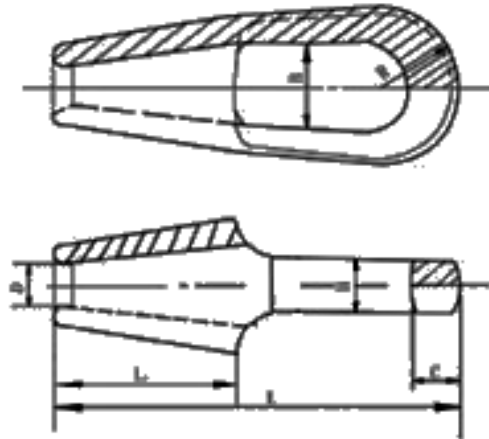
JIS open wire rope sockets (JIS F3432) idt (CB\*654-84)



norm	Applicable rope diameter	Safe Work Negative work safety	D	d	B	L	L1	L3	t	t1
Size	Wire Rope Dia. (mm)	S.W.L (t)	mm							
10	10.5	1.2	14	19	33	144	66	56	6	8
12	12	1.7	16	21	35	159	73	61	7	9
14	14	2.2	18	23	37	176	81	67	8	11
16	16	2.6	20	25	40	193	88	74	9	13
18	18	3.3	23	28	43	210	95	81	11	15
20	20	4.1	25	31	47	227	103	86	13	18
22	22.5	5.1	30	34	52	245	111	98	16	22
25	25	6.9	33	40	60	281	127	106	18	24
28	28	8	36	43	65	298	135	111	19	26
30	30	9.2	38	46	68	316	143	118	21	28
32	31.5	10.5	40	49	72	335	151	125	23	31
34	33.5	11.5	42	52	75	353	159	131	25	33
36	36	13	44	55	80	373	168	138	26	35
38	37.5	14.5	47	58	84	392	177	144	27	36
40	40	16.5	49	61	88	413	186	153	29	38
42	42	18.5	52	64	92	434	196	160	30	40
45	45	21	54	70	101	474	214	175	33	44
48	47.5	23	57	73	104	494	223	183	35	46
50	50	25.5	60	76	109	516	233	191	36	48
53	53	28	63	79	113	536	242	199	38	50
56	56	31.5	66	83	119	567	256	211	40	53
60	60	36	70	90	129	619	279	232	43	57
63	63	40	74	93	133	641	289	240	44	58

## Wire Rope Rigging

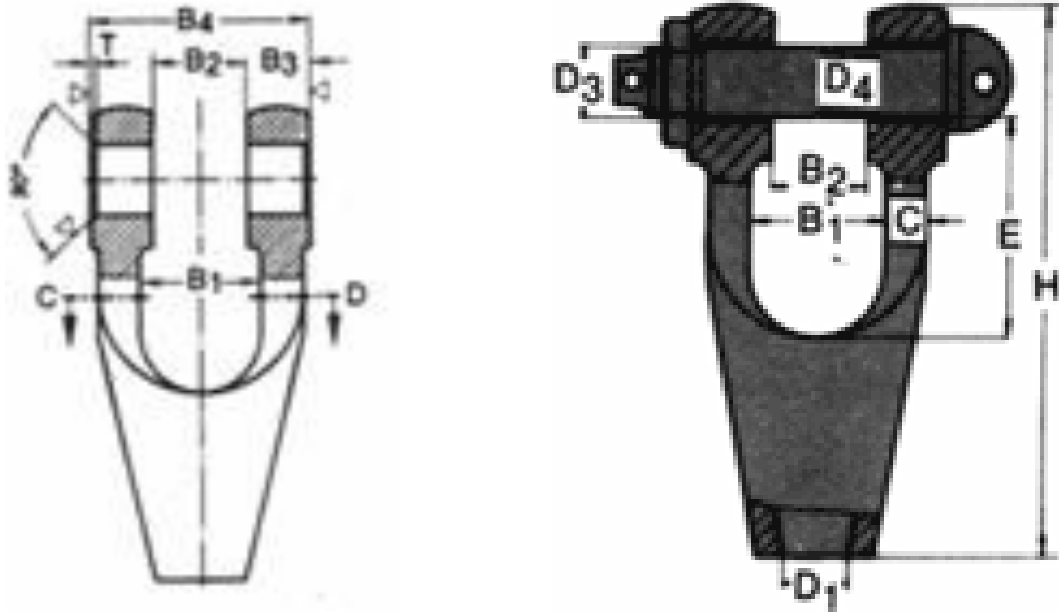
JIS closed wire rope sockets (JIS F3432) idt (CB\*654-84)



norm	Applicable rope diameter	Safe workload	D	B	C	L	L1	H	R
Size	Wire Rope Dia.(mm)	S.W.L(t)	mm						
10	10.5	1.2	14	32	15	144	66	18	28
12	12	1.7	16	34	17	159	73	20	32
14	14	2.2	18	37	19	176	81	22	35
16	16	2.6	20	40	21	193	88	24	38
18	18	3.3	23	43	24	210	95	27	41
20	20	4.1	25	47	26	227	103	30	44
22	22.5	5.1	30	52	29	245	111	33	48
24	24	5.9	32	56	31	262	119	36	51
25	25	6.9	33	60	34	281	127	39	54
28	28	8	36	65	36	298	135	41	58
30	30	9.2	38	68	39	316	143	44	61
32	31.5	10.5	40	72	42	335	151	47	64
34	33.5	11.5	42	75	44	353	159	50	68
36	36	13	44	80	47	373	168	53	72
38	37.5	14.5	47	84	47	392	177	56	75
40	40	16.5	49	88	52	413	186	59	79
42	42	18.5	52	92	54	434	196	61	83
45	45	21	54	100	60	474	214	67	91
48	47.5	23	57	104	62	494	223	70	95
50	50	25.5	60	108	65	516	233	73	99
53	53	28	63	113	67	536	242	76	103
56	56	31.5	66	119	71	567	256	80	109
60	60	36	70	129	78	619	279	87	119
63	63	40	74	133	81	641	289	90	123

## Wire Rope Rigging

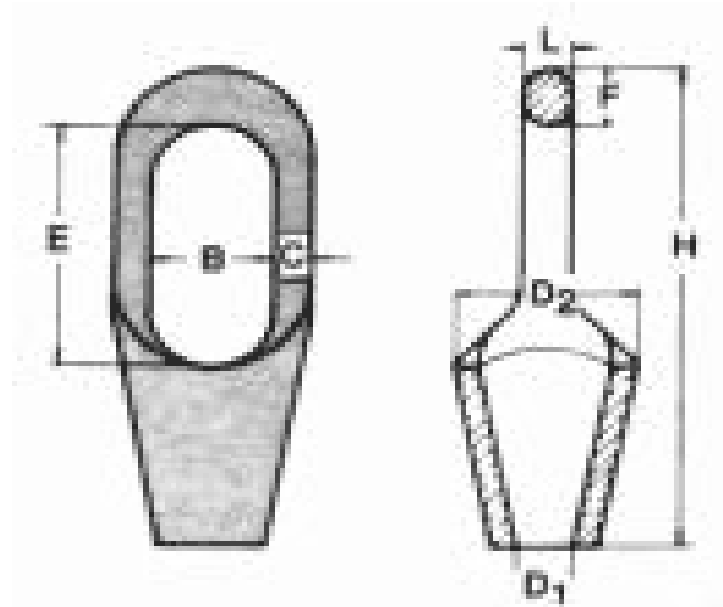
Open spelter sockets (DIN83313 FormB/C)



norm	Applicable rope diameter	Safe workload	B	C	D1	D2	E	F	H	L
Size	Wire Rope Dia. (mm)	S.W. L (t)	mm							
1.6	12-14	1.60	37	12	17	55	76	19	155	15
2.5	14-18	2.50	45	14	20	62	89	24	182	19
3	16-20	3.15	50	16	22	69	98	26	202	21
4	18-22	4.00	54	18	24	76	106	30	220	24
5	20-24	5.00	60	20	27	85	117	34	245	27
6	22-28	6.30	67	23	30	94	131	38	275	30
8	26-30	8.00	73	26	33	103	143	42	300	33
10	28-34	10.00	80	29	36	112	160	45	330	36
12	32-38	12.50	89	32	40	125	179	51	370	41
16	36-44	16.00	100	35	48	140	200	56	415	46
20	40-50	20.00	110	40	56	156	224	62	460	50
25	44-54	25.00	120	43	60	173	246	67	505	55
32	50-62	31.50	132	48	68	188	270	76	555	61
40	58-72	40.00	150	54	78	212	308	85	630	68
50	62-76	50.00	165	60	82	235	339	94	695	77

## Wire Rope Rigging

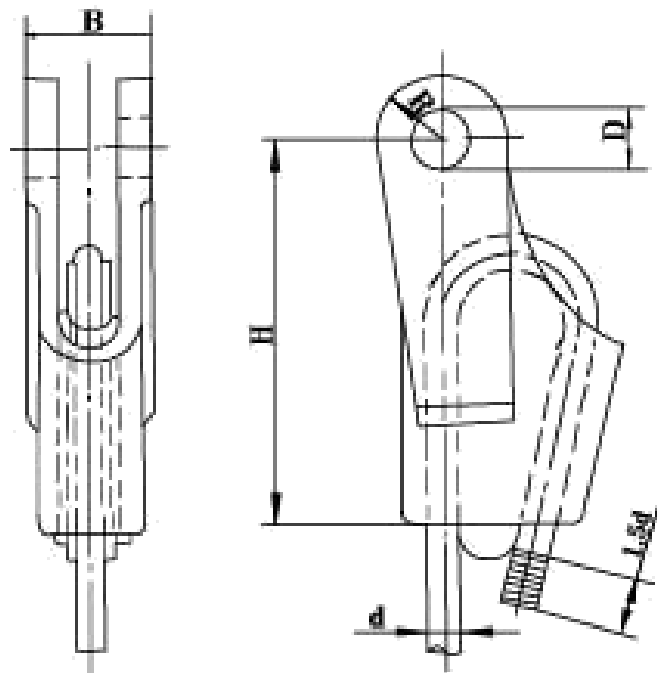
Closed spelter sockets (DIN83313 FormA)



norm	Applicable rope diameter	Safe workload	B	C	D1	D2	E	F	H	L
Size	Wire Rope Dia. (mm)	S.W. L (t)	mm							
1.6	12-14	1.60	37	12	17	55	76	19	155	15
2.5	14-18	2.50	45	14	20	62	89	24	182	19
3	16-20	3.15	50	16	22	69	98	26	202	21
4	18-22	4.00	54	18	24	76	106	30	220	24
5	20-24	5.00	60	20	27	85	117	34	245	27
6	22-28	6.30	67	23	30	94	131	38	275	30
8	26-30	8.00	73	26	33	103	143	42	300	33
10	28-34	10.00	80	29	36	112	160	45	330	36
12	32-38	12.50	89	32	40	125	179	51	370	41
16	36-44	16.00	100	35	48	140	200	56	415	46
20	40-50	20.00	110	40	56	156	224	62	460	50
25	44-54	25.00	120	43	60	173	246	67	505	55
32	50-62	31.50	132	48	68	188	270	76	555	61
40	58-72	40.00	150	54	78	212	308	85	630	68
50	62-76	50.00	165	60	82	235	339	94	695	77

## Wire Rope Rigging

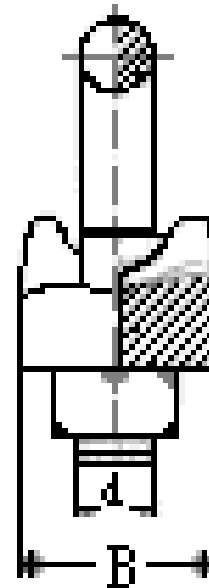
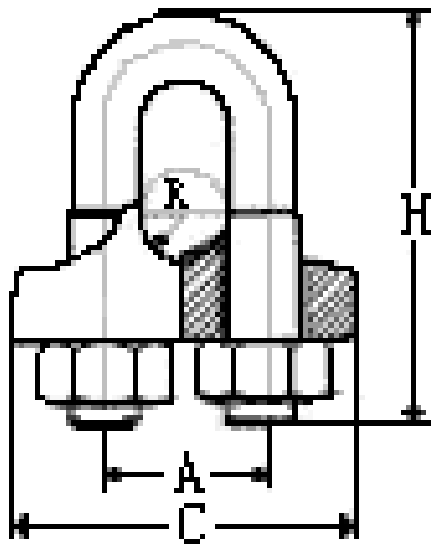
Wire Rope Wedge Splices (GB5973-86)



Applicable rope diameter	Safe workload	B	D	H	R
Wire Rope Dia (mm)	S.W. L (t)	mm			
6	1	29	16	90	16
8	1	31	18	100	25
10	1.5	38	20	120	25
12	2	44	25	155	30
14	2.5	51	30	185	35
16	3	60	34	195	42
18	3.5	64	36	195	44
20	5	72	38	220	50
22	5.5	76	40	240	52
24	6.5	83	50	260	60
26	7.5	92	55	280	65
28	9.5	94	55	305	70
32	12	110	65	360	77
36	15.5	122	70	390	85
40	20	145	75	470	90

## Wire Rope Rigging

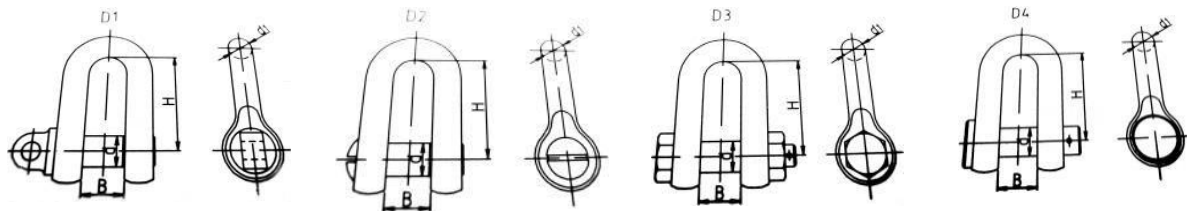
Wire Rope Clip (GB5976-86)



Applicable wire rope diameter	Size (mm)					nut
	A	B	C	R	H	
Wire Rope Dia (mm)						d
6	13.0	14	27	3.5	31	M6
8	17.0	19	36	4.5	41	M8
10	21.0	23	44	5.5	51	M10
12	25.0	28	53	6.5	62	M12
14	29.0	32	61	7.5	72	M14
16	31.0	32	63	8.5	77	M14
18	35.0	37	72	9.5	87	M16
20	37.0	37	74	10.5	92	M16
22	43.0	46	89	12.0	108	M20
24	45.5	46	91	13.0	113	M20
26	47.5	46	93	14.0	117	M20
28	51.5	51	102	15.0	127	M22
32	55.5	51	106	17.0	136	M22
36	61.5	55	116	19.5	151	M24
40	69.0	62	131	21.5	168	M27
44	73.0	62	135	23.5	178	M27
48	80.0	69	149	25.5	196	M30
52	84.5	69	153	28.0	205	M30
56	88.5	69	157	30.0	214	M30
60	98.5	83	181	32.0	237	M36

## Wire Rope Rigging

Marine unloading buckle (GB559-87)

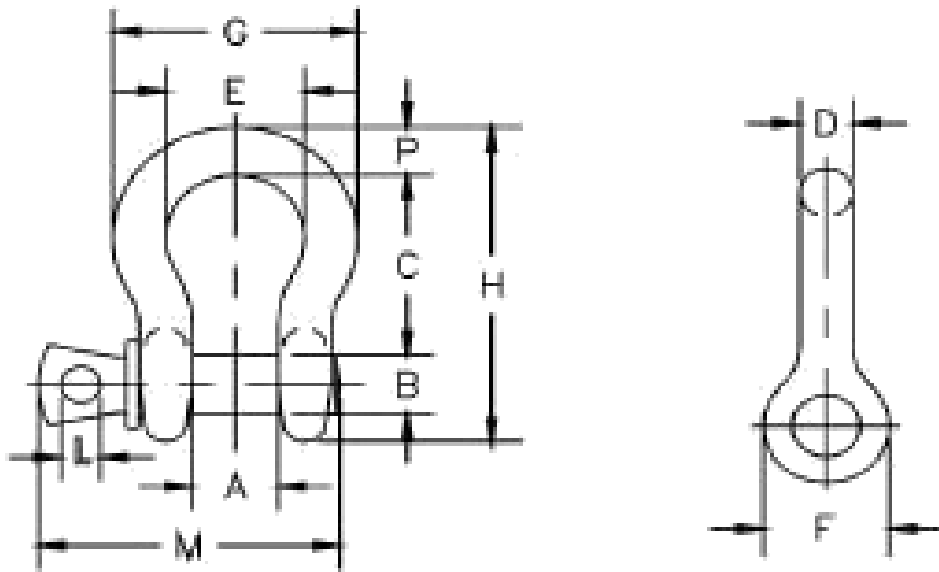


Safe workload S.W.L kN (T)	Specification TYPE D1 D2 D3 D4				Specification TYPE C1 C2 C3 C4				Specification TYPE CE1 CE2 CE3 CE4			
	d	d1	B	H	d	d1	B	H	d	d1	B	H
3.29(0.40)	9	8	13	33	10	9	13	37.5	11	10	18	50.5
4.90(0.50)	10	9	14	36	11	10	14	40.5	12	11	20	56
6.27(0.64)	12	10	16	41	12	11	16	46	14	13	23	64.5
7.84(0.80)	14	12	18	46.5	14	12	18	53	15	14	25	70
9.80(1.00)	15	13	20	51.5	16	14	20	58	17	16	28	79.5
12.25(1.25)	17	15	22	57.5	18	16	22	64	19	18	32	88.5
15.68(1.60)	19	17	25	64.5	20	18	25	73	22	20	36	101
19.60(2.00)	21	19	28	72.5	22	20	28	81	25	23	40	112.5
24.50(2.50)	24	21	31	81	25	23	31	90.5	28	25	45	126.5
31.36(3.20)	27	24	35	91.5	28	25	35	103	31	29	51	141.5
39.20(4.00)	30	26	40	102	31	28	40	114.5	35	32	57	159.5
49.00(5.00)	33	29	44	113.5	35	32	44	128.5	39	36	63	177.5
61.74(6.30)	37	33	50	127.5	39	36	50	143.5	44	40	71	200
78.40(8.00)	42	37	56	144	44	40	56	162	49	45	80	224.5
98.00(10.00)	47	41	63	161.5	49	45	63	181.5	55	50	90	251.5
122.50(12.50)	53	46	70	180.5	55	50	70	202.5	62	56	100	281
156.80(16.00)	60	52	79	204	62	56	79	229	70	64	113	318
196.00(20.00)	67	59	89	228.5	69	63	89	255.5	78	71	126	355
245.00(25.00)	75	65	99	253.5	77	70	99	286.5	87	79	142	397.5
313.60(32.00)	84	74	112	289	87	80	112	323.5				
392.00(40.00)	94	83	125	322	98	89	125	362				
490.00(50.00)	106	92	140	361	109	99	140	404.5				
617.40(63.00)	119	104	157	405.5	123	112	157	455.5				
784.00(80.00)	134	117	177	457	138	126	177	513				



## Wire Rope Rigging

U.S. Type shackle (G209)



norm (in.)	S.W.L (t)*	Size (in.)										
		A	B	C	D	E	F	G	H	L	M	P
3/16	1/3	0.38	0.25	0.88	0.19	0.60	0.56	0.98	1.47	0.16	1.12	0.19
1/4	1/2	0.47	0.31	1.13	0.25	0.78	0.61	1.28	1.84	0.19	1.38	0.25
5/16	3/4	0.53	0.38	1.22	0.31	0.84	0.75	1.47	2.09	0.22	1.66	0.31
3/8	1	0.66	0.44	1.44	0.38	1.03	0.91	1.78	2.49	0.25	2.03	0.38
7/16	1-1/2	0.75	0.50	1.69	0.44	1.16	1.06	2.03	2.91	0.31	2.38	0.44
1/2	2	0.81	0.63	1.88	0.50	1.31	1.19	2.31	3.28	0.38	2.69	0.50
5/8	3-1/4	1.06	0.75	2.38	0.63	1.69	1.50	2.94	4.19	0.44	3.34	0.69
3/4	4-3/4	1.25	0.88	2.81	0.75	2.00	1.81	3.50	4.97	0.50	3.97	0.81
7/8	6-1/2	1.44	1.00	3.31	0.88	2.28	2.09	4.03	5.83	0.50	4.50	0.97
1	8-1/2	1.69	1.13	3.75	1.00	2.69	2.38	4.69	6.56	0.56	5.07	1.06
1-1/8	9-1/2	1.81	1.25	4.25	1.16	2.91	2.69	5.16	7.47	0.63	5.59	1.25
1-1/4	12	2.03	1.38	4.69	1.29	3.25	3.00	5.75	8.25	0.69	6.16	1.38
1-3/8	13-1/2	2.25	1.50	5.25	1.42	3.63	3.31	6.38	9.16	0.75	6.84	1.50
1-1/2	17	2.38	1.63	5.75	1.54	3.88	3.63	6.88	10.00	0.81	7.35	1.62
1-3/4	25	2.88	2.00	7.00	1.84	5.00	4.19	8.86	12.34	1.00	9.08	2.25
2	35	3.25	2.25	7.75	2.08	5.75	4.81	9.97	13.68	1.22	10.34	2.40
2-1/2	55	4.13	2.75	10.50	2.71	7.25	5.69	12.87	17.84	1.38	13.00	3.13

## 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.

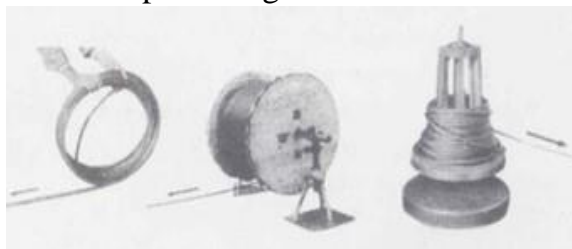


Figure 1: Rope release method Figure

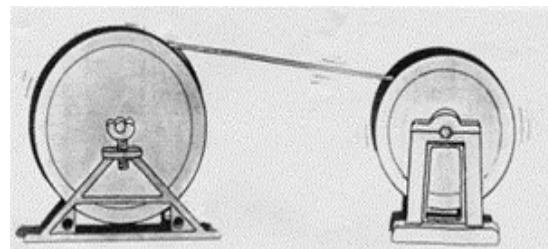


Figure 2: Rope reeling method

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.

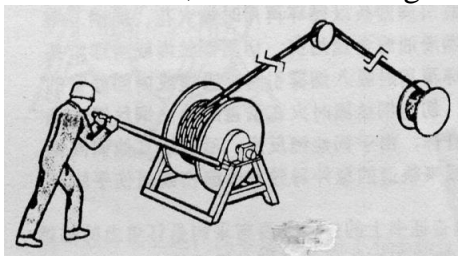


Figure 3

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.

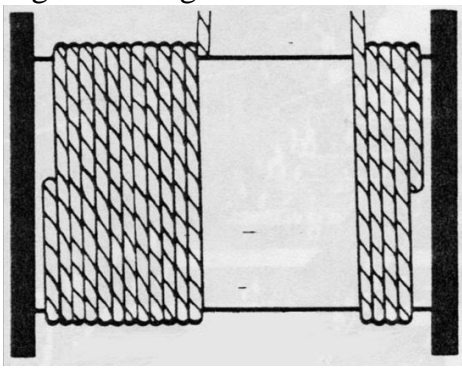


Figure 4: Left twisted wire rope

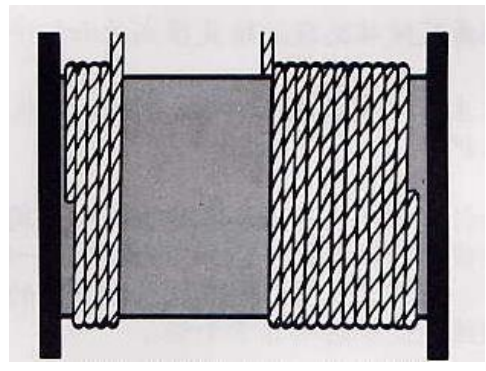


Figure 5: Right twisted wire rope

**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.

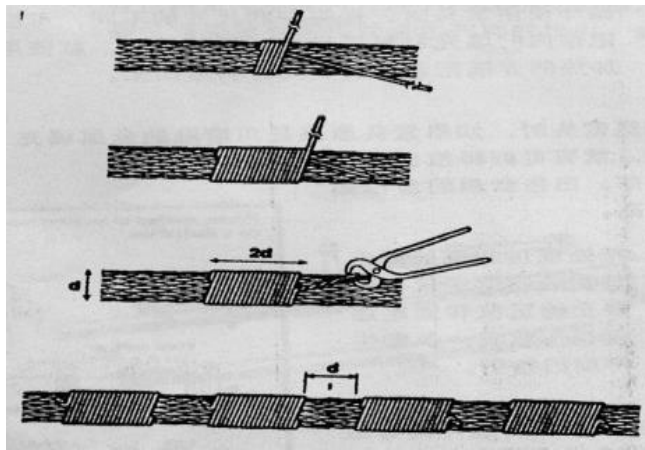


Figure 6

### 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.

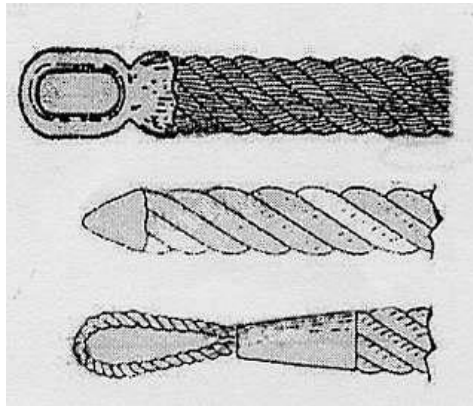


Figure 7

### 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:  
 $R/D=0.525\sim 0.550$

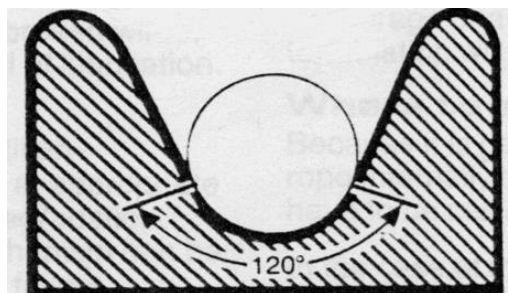


Figure 8 correct

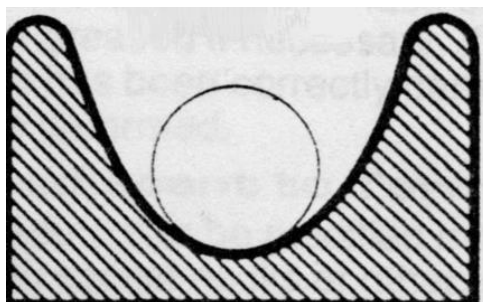


Figure 9 Error

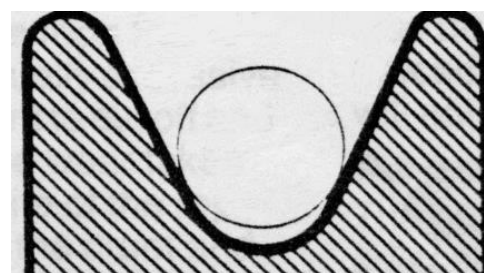


Figure 10 Error

### 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  $<1.5^\circ$ , and the angle of the grooved drum is  $<2.5^\circ$ .

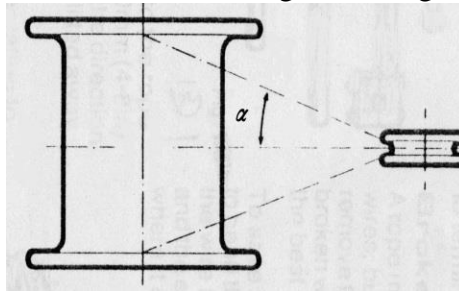


Figure 11

### 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.

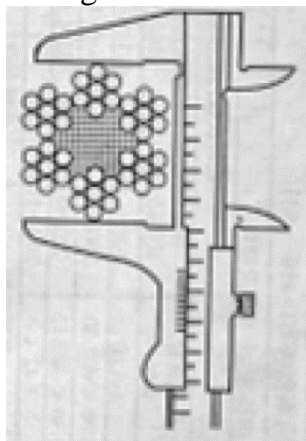


Figure 14

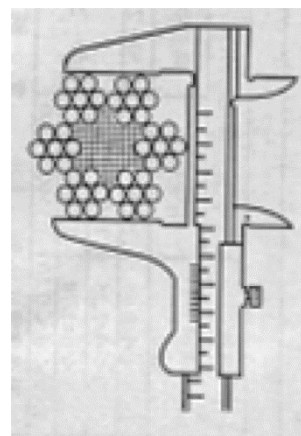


Figure 15

### Minimum wire rope reel and sheave diameter

Tectonic		Minimum reel, pulley diameter (mm) (D-Nominal diameter of wire rope)
Rotating wire rope	6×7、6×7+IWS	42×D
	6×19、6×19S、6×19W	30×D
	6×26WS	28×D
	6×25Fi、6×31WS	25×D
	6×37、6×36WS	22×D
	6×41WS、6×49SWS	19×D
	8×19S、8×19W	25×D
	8×26WS	24×D
	8×25Fi、8×31WS	20×D
	8×36WS	18×D
	6V×30、6V×34、6V×37	30×D
Micro-rotating wire rope	18×7、18×7+IWS	34×D
	18×19S、18×19W	26×D
	18×26WS	24×D
	4V×39S、4V×48S、4×36WS	26×D
Non-rotating wire rope	35W×7	27×D
	3×36WS	32×D
	Single strand wire rope	50×D
	Sealed wire rope	50×D

Note: Minimum reel and pulley diameters of wire ropes for coal mines are according to the Coal Mine Safety Regulations.

# Warning!

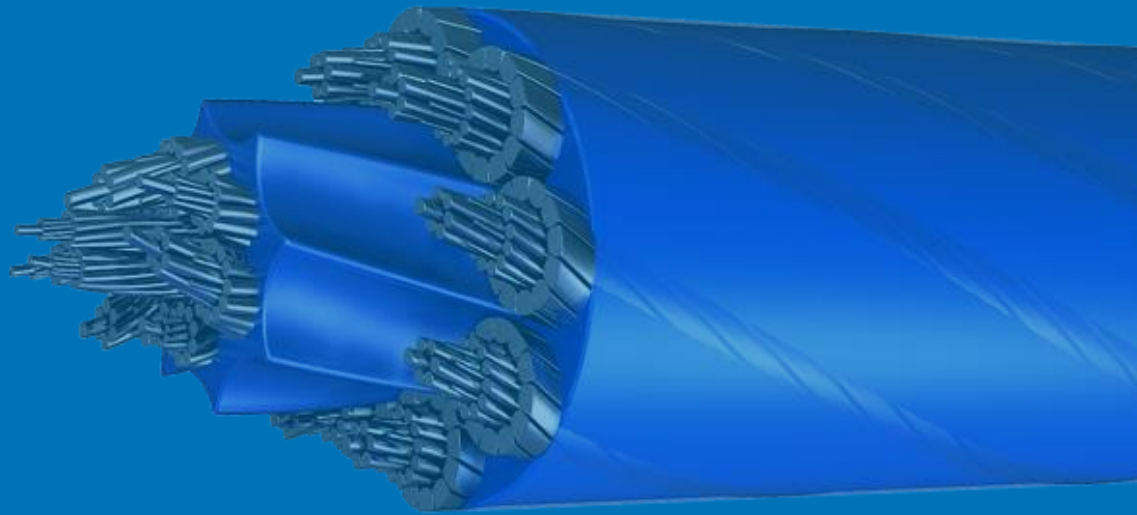
**Overweight, wear and tear, misuse, damage and improper maintenance will cause the rope to fail. For your safety and the protection of other equipment.**

**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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