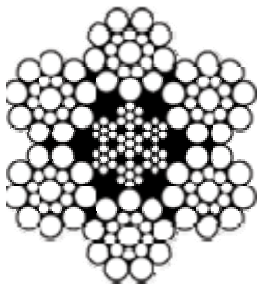




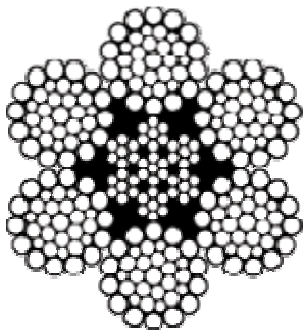
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Available galvanized at 10% lower strengths, or in equivalent strengths on special request

Minimum Breaking Force and weights for standard 6 x 19 and 6 x 36 classification ropes



6 X 19



6 X 36

6x19 & 6x36 Class Wire Rope

Diameter (in.)	Approx. wt./ft. (lbs.)	FIBER CORE		Approx. wt./ft. (lbs.)	IWRC		
		Minimum Breaking Force (tons of 2000 lbs.)			Minimum Breaking Force (tons of 2000 lbs.)		
		IPS	XIP®		IPS	XIP®	XXIP®
3/16	0.059	1.55	1.71	--	--	--	--
1/4	0.105	2.74	3.02	0.116	2.94	3.40	--
5/16	0.164	4.26	4.69	0.18	4.58	5.27	--
3/8	.0236	6.10	6.72	0.26	6.56	7.55	8.30
7/16	0.32	8.27	9.10	0.35	8.89	10.2	11.2
1/2	0.42	10.7	11.8	0.46	11.5	13.3	14.6
9/16	0.53	13.5	14.9	0.59	14.5	16.8	18.5
5/8	0.66	16.7	18.3	0.72	17.9	20.6	22.7
3/4	.095	23.8	26.2	1.04	25.6	29.4	32.4
7/8	1.29	32.2	35.4	1.42	34.6	39.8	43.8
1	1.68	41.8	46.0	1.85	44.9	51.7	56.9
1 1/8	2.13	52.6	57.8	2.34	56.5	65.0	71.5
1 1/4	2.63	64.6	71.1	2.89	69.4	79.9	87.9
1 3/8	3.18	77.7	85.5	3.50	83.5	96.0	106
1 1/2	3.78	92.0	101	4.16	98.9	114	125
1 5/8	4.44	107	118	4.88	115	132	146
1 3/4	5.15	124	137	5.67	133	153	169
1 7/8	5.91	141	156	6.50	152	174	192
2	6.72	160	176	7.39	172	198	217
2 1/8	7.59	179	197	8.35	192	221	244
2 1/4	8.51	200	220	9.36	215	247	272
2 3/8				10.4	239	274	
2 1/2				11.6	262	302	
2 5/8				12.8	288	331	
2 3/4				14.0	314	361	
2 7/8				15.3	341	392	
3				16.6	370	425	
3 1/8				18.0	399	458	
3 1/4				19.5	429	492	
3 3/8				21.0	459	529	
3 1/2				22.7	491	564	
3 5/8				24.3	523	602	
3 3/4				26.0	557	641	
3 7/8				27.7	591	680	
4				29.6	627	720	
4 1/8				31.7	658	757	
4 1/4				33.3	694	799	
4 3/8				35.4	734	844	



6x19 & 6x36 Class Wire Rope



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Standard 6 x 19 & 6 x 36 Classification Ropes

The 6 x 19 classification of wire ropes includes standard 6 strand, round strand ropes with 16 through 26 wires per strand. The 6 x 36 classification of wire ropes includes standard 6 strand, round strand ropes with 27 through 49 wires per strand. Although their operating characteristics vary, all have the same weight per foot and the same minimum breaking force, size for size.

While the 6 x 19 ropes give primary emphasis to abrasion resistance in varying degrees, the 6 x 36 ropes are important for their fatigue resistance. This fatigue resistance is made possible by the greater number of small wires per strand.

Although there are exceptions for special applications, the constructions in 6 x 36 classification are primarily designed to be the most efficient for each rope diameter. As the rope size increases, for instance, a large number of wires can be used to achieve required fatigue resistance, and still those wires will be large enough to offer adequate resistance to abrasion.

6x19 classification ropes

6x19S (Seale) In this construction, each strand has nine outer wires over nine smaller inner wires over one large center wire. A comparison of cross-sections shows that these outside wires are larger than those of the 6 x 25FW or 6 x 26WS. Therefore, its resistance to abrasion is increased, but its fatigue resistance is decreased. This is a good rope to withstand abrasion or crushing on the drum.

6x25FW (Filler Wire) To most wire rope users, 6 x 19 means 6 x 25 filler wire. It was the most common rope in the 6 x 19 classification. This rope has a good balance between both abrasion resistance and fatigue resistance in relation to other ropes.

6x26WS (Warrington Seale) This construction has better resistance to abrasion than a 6 x 25FW. It also features a compact construction with solid support for the wires; hence, it has a high resistance to crushing. Its number and relative size of the inner wires add to the stability of the strand and gives it a fatigue resistance comparable to a 6 x 25FW.

A standard 6 x 26WS construction provides the best rope for a wide range of applications. In general, we recommend the use of a 6 x 26WS in any application where a 6 x 25FW is used.

6x36 classification ropes

In most rope sizes, only one 6 x 36 classification rope is made. These constructions were selected to provide fatigue resistance without having wires that are too small.

The greater number of wires in the 6 x 36 classification makes these ropes more susceptible to crushing. This can be minimized, however, by specifying an Independent Wire Rope Core (IWRC) and by using well-designed sheaves, grooved drums and proper operating techniques.



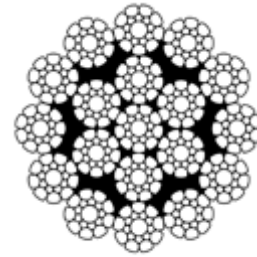
Rotation Resistant Wire Rope



HALO

Flex-X 19PS

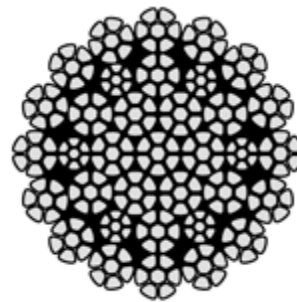
Diameter (in)	Approx. Weight (lb/ft)	Minimum Breaking Force (Tons of 2000 lb)
3/8	0.27	8.7
7/16	0.42	11.8
1/2	0.49	15.4
9/16	0.65	19.4
5/8	0.78	23.8
3/4	1.16	34.0
7/8	1.58	46.0
1	2.05	59.8
1 1/8	2.57	75.2
1 1/4	3.11	87.9



* These strengths apply only when a test is conducted with both ends fixed. When in use, the strengths of these ropes may be significantly reduced if one end is free to rotate

Flex-X 35

Diameter (mm)	Approximate Wt/Ft (lb)	Minimum breaking Force (tons of 2,000 lb)
*16	0.85	30.6
*19	1.22	42.9
22	1.65	57.2
*25.4	2.19	75.8
*26	2.30	79.3
*28	2.67	91.6
*30	3.08	105
32	3.50	119



Rotation-resistant ropes can frequently provide the best and most economical service in specific applications when you choose, handle and use them properly.

Contra-helically laid, rotation-resistant ropes are different from standard ropes because they're designed to reduce rope torque. Modes of failure and wear for rotation-resistant ropes can differ from those for standard rope constructions. The very nature of these ropes requires special handling, selection and usage not encountered with standard constructions. They are susceptible to kinking, crushing and unbalancing in the form



Rotation Resistant Wire Rope



HALO

of "core pops" and "birdcages." Use extreme care to avoid operational practices that can possibly lead to these conditions.

There are different types of rotation-resistant ropes, categorized by their resistance to rotation. Category 1 rotation-resistant rope has at least 15 outer strands, has three layers of strands (over a center) and has little or no tendency to rotate, or, if guided, transmits little or no torque. Category 2 rotation-resistant rope has 10 or more outer strands, has two or more layers of strands (over a center) and has significant resistance to rotation. Category 3 rotation-resistant has no more than 9 outer strands, has two layers of strands (over a center) and has limited resistance to rotation. For best performance, Category 2 and 3 rotation-resistant ropes should not be used with a swivel. Category 1 rotation-resistant rope may be used with a swivel.

Rotation-resistant ropes should be replaced when you see two randomly distributed crown wire breaks in six rope diameters -- or four randomly distributed crown wire breaks in 30 rope diameters. If any significant reduction in diameter is found in a short length of a rotation-resistant rope, the rope needs to be replaced.

Because rotation-resistant ropes are special, there are separate design, maintenance, inspection and removal criteria established for them by applicable industry regulations and standards.

We recommend that rotation-resistant ropes be used with a minimum design factor of 5.0.

Flex-X® 35

Tower crane and other long fall hoisting applications require superior rotation resistance and minimum torque—qualities you will find with the latest addition to our family of rotation resistant wire rope, Flex-X 35. It is a Category 1 rotation resistant rope.

Flex-X 35's unique design minimizes load-induced torque and rotation of the rope. It is engineered to give you maximum strength per diameter while providing superior fatigue resistance. Flex-X 35 also assists you in maintaining proper load control in single-part hoisting or in multi-part hoisting where block rotation is a problem.

Flex-X 35 wire rope has one of the highest strength-to-diameter ratios on the market. ASME B30.5 Mobile and Locomotive Cranes require a design factor of 3.5 for 6-strand hoist ropes. The same standard requires a design factor of 5.0 for rotation resistant ropes. This means that using rotation resistant ropes frequently reduces the lifting capabilities of your crane due to the higher design factor.

Flex-X 35 eliminates this reduction. The Minimum Breaking Force (MBF) of Flex-X 35 is such that even with the 5.0 design factor, it has lifting capacities that equal or exceed 6-strand XIP ropes utilizing a 3.5 design factor. Other ropes of similar grade and construction do not provide this benefit.

The multi-strand design of Flex-X 35 combined with compacted strands and lang lay construction helps to maximize resistance to wear by greatly increasing wire and strand surface areas that contact sheaves and drums.



Rotation Resistant Wire Rope



HALO

Internally, the enhanced surfaces of the compacted strands help minimize strand-to-strand nicking between strand layers that occurs in other rotation resistant ropes. This feature results in greater resistance to fatigue.

The characteristics of Flex-X 35 enhance its performance in multiple-layer spooling as well. The lang lay design coupled with the special Flex-X features provides excellent resistance to abrasion that occurs at kickover areas in drum spooling. The rope construction combined with the compacted strand design of Flex-X 35 results in a rope cross-section of very high density. This feature provides increased resistance to crushing.

Flex-X® 19

Flex-X 19 is made from 19 strands and is a category 2 rotation resistant rope. Six strands are laid around a core strand in one direction, then 12 Strands are laid around this first operation in the opposite direction. Because of its tightly compacted, smooth design, Flex-X 19 offers advantages:

- More crush resistance than a standard 19x 7 rope while providing the same rotation resistance.
- Higher strength-to-diameter due to compacted wires in the strands. With increased metallic area, it provides rope strengths equal to 6 strand XXIP IWRC ropes of the same diameter.
- Resistance to bending fatigue due to the uniformity of the wires within each strand. The strand's outer surface is smooth, reducing contact pressures between the rope's strands and radial pressures as it operates over sheaves and drums.
- Exceptional stability due to the higher density strands coupled with the smooth outer surface.
- Improved handling, operating and spooling characteristics.
- Reduced wear to sheaves and drums.

It's used in single-part or multi-part hoist lines wherever you encounter spooling problems, drum crushing, block twisting or have fast line speeds.

19 x7 rope

A 19X7 is made from 19 strands and is a category 2 rotation resistant rope. It is used where resistant properties are essential for rope performance. Its rotation-resistant characteristic is achieved by laying six strands around a core strand in one direction, then laying 12 strands around the first operation in the opposite direction. Thus, when the rope is in tension, opposing rotational forces are created between the inner and outer layers.

While having similar rotation resistance to a Flex-X 19, a 19X7 has a lower strength, will crush easier and is not as fatigue or wear resistant.



Swaged Wire Rope



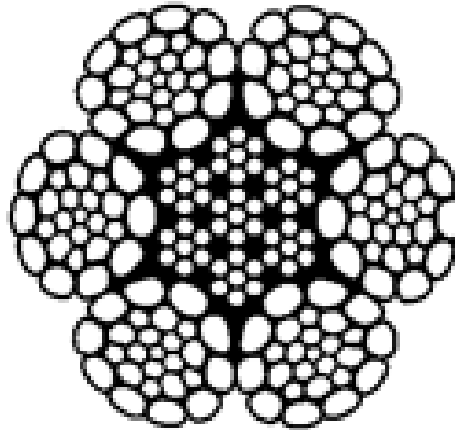
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6 x 19 and 6 x 36 classification swaged rope

These ropes offer greater strength than standard ropes of the same diameter while providing greater resistance to drum crushing, scrubbing and similar surface wear. To enhance the performance of our swaged ropes in the field, we utilize a special wire chemistry in the outer wires of the strands. Then during production, the rope is rotary swaged to produce a compact cross-section with minimum voids and greater surface area on outer wires. In addition to reducing rope surface wear, this compact design helps reduce wear to sheaves and minimizes crushing of the rope on the drum. These ropes are stiffer and less fatigue resistant than standard ropes.

Minimum breaking force and weights for 6 x 19 and 6 x 36 classification swaged wire rope

Diameter (in.)	Approximate wt./ft. (lbs.)	Minimum breaking force (tons of 2000 lbs.)
3/8	0.31	9.1
7/16	0.42	12.2
1/2	0.55	16.0
9/16	0.71	20.2
5/8	0.96	24.7
3/4	1.32	35.3
7/8	1.70	47.8
1	2.22	62.0
1 1/8	2.66	79.3
1 1/4	3.47	97.5
1 3/8	4.20	117





DY-PAC® CRANE ROPE

HALO



SURELIFT™

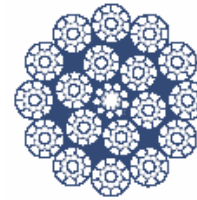
HIGH PERFORMANCE CRANE ROPES

Diameter (in.)	Rope Construction	Approx. Weight - lbs./ft.	Nominal Breaking Load (tons)
3/8"	18x7 RRL Dy-Pac	0.28	8.1
7/16"	18x7 RRL Dy-Pac	0.38	11.1
1/2"	18x7 RRL Dy-Pac	0.50	14.6
9/16"	18x7 RRL Dy-Pac	0.63	18.6
5/8"	18x19 RRL Dy-Pac	0.79	23.1
3/4"	18x19 RRL Dy-Pac	1.13	32.8
7/8"	18x19 RRL Dy-Pac	1.56	45.4
1"	18x19 RRL Dy-Pac	2.02	59
1-1/8"	18x19 RRL Dy-Pac	2.56	74.7
1-1/4"	18x19 RRL Dy-Pac	3.18	92.9

Note: Rotation resistant ropes can be used with a minimum working load limit of 5:1, in accordance with ASME B30.5, but perform best when used with higher working load factors. Breaking load values are subject to a minus tolerance of 2.5%.



Ropes that Outperform.



Certified API - 9A&Q1



18 X 7 NON-ROTATIONAL CRANE ROPE



SURELIFT™

HIGH PERFORMANCE CRANE ROPES

Diameter (in.)	Rope Construction	Approx. Weight - lbs./ft.	Nominal Breaking Load (tons)
3/8"	18x7 RRL EIPS SC	0.25	5.7
7/16"	18x7 RRL EIPS SC	0.35	7.8
1/2"	18x7 RRL EIPS SC	0.45	10.8
9/16"	18x7 RRL EIPS SC	0.58	13.6
5/8"	18x7 RRL EIPS SC	0.71	16.8
3/4"	18x7 RRL EIPS SC	1.02	24
7/8"	18x7 RRL EIPS SC	1.39	32.5
1"	18x7 RRL EIPS SC	1.82	42.2
1-1/8"	18x7 RRL EIPS SC	2.30	53.1
1-1/4"	18x7 RRL EIPS SC	2.84	65.1
1-3/8"	18x7 RRL EIPS SC	3.43	78.4
1-1/2"	18x7 RRL EIPS SC	4.08	92.8

Note: Rotation resistant ropes can be used with a minimum working load limit of 5:1, in accordance with ASME B30.5, but perform best when used with higher working load factors. Breaking load values are subject to a minus tolerance of 2.5%.



Ropes that Outperform.



Certified API - 9A&Q1

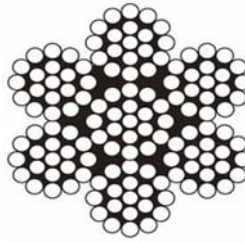




7 x 19 GALVANIZED CABLE

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Diameter	Approx. Wt. Per Foot (lbs.)	Breaking Strength in lbs.
3/32"	0.017	1000
1/8"	0.029	2000
5/32"	0.045	2800
3/16"	0.065	4200
1/4"	0.11	7000
5/16"	0.173	9800
3/8"	0.243	14400



Meets federal specification RR-W-410D.



Warning: Not for aircraft use.

7 x 19 VINYL COATED GALVANIZED CABLE

Diameter	Approx. Wt. Per Foot (lbs.)	Breaking Strength in lbs.
1/8" cable vinyl coated to 3/16"	0.036	2000
3/16" cable vinyl coated to 1/4"	0.079	4200
1/4" cable vinyl coated to 5/16"	0.123	7000
5/16" cable vinyl coated to 3/8"	0.197	9800
3/8" cable vinyl coated to 7/16"	0.270	14400



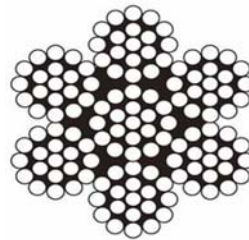
Meets federal specification RR-W-410D.



Warning: Not for aircraft use.

7 x 19 STAINLESS STEEL CABLE

Diameter	Approx. Wt. Per Foot	Breaking Strength in lbs.
3/32"	0.017	920
1/8"	0.029	1760
5/32"	0.045	2400
3/16"	0.650	3700
1/4"	0.110	6400
5/16"	0.173	9000
3/8"	0.243	12000



Type 304 ss in stock. Type 316 ss available on request.

Meets federal specification RR-W-410D.



Warning: Not for aircraft use.

7 x 19 VINYL COATED STAINLESS CABLE

Diameter	Approx. Wt. Per Foot	Breaking Strength in lbs.
1/8" cable vinyl coated to 3/16"	0.036	1760
3/16" cable vinyl coated to 1/4"	0.079	3700
1/4" cable vinyl coated to 5/16"	0.129	6400
5/16" cable vinyl coated to 3/8"	0.185	9000



Type 304 ss in stock. Type 316 ss available on request.

Meets federal specification RR-W-410D.



Warning: Not for aircraft use.