

# Minimum Bend Recommended to Maximize Wire Rope Life & Strength for Cycling Applications

Wire Rope Constructions 3×7, 6×7, 6×42, 7×3, and 7×7		
Dia.	Min. Recommended Drum/Pulley Tread Dia.	Approx. Bend Radius
0.009"	3/8"	3/16"
0.014"	5/8"	5/16"
0.018"	13/16"	13/32"
0.024"	1"	1/2"
0.027"	1 5/32"	37/64"
0.030"	1 9/32"	41/64"
1/32"	1 5/16"	21/32"
0.032"	1 1/32"	43/64"
0.035"	1 1/2"	3/4"
0.036"	1 17/32"	49/64"
3/64"	2"	1"
1/16"	2 5/8"	1 5/16"
5/64"	3 9/32"	1 41/64"
3/32"	3 15/16"	1 31/32"
1/8"	5 1/4"	2 5/8"
5/32"	6 9/16"	3 9/32"
3/16"	7 7/8"	3 15/16"
1/4"	10 1/2"	5 1/4"
5/16"	13 1/8"	6 9/16"
3/8"	15 3/4"	7 7/8"

Wire Rope Constructions 6×19, 7×19, and 19×7		
Dia.	Min. Recommended Drum/Pulley Tread Dia.	Approx. Bend Radius
0.024"	19/32"	19/64"
0.027"	21/32"	21/64"
0.032"	25/32"	25/64"
0.036"	7/8"	7/16"
0.038"	15/16"	15/32"
3/64"	1 1/8"	9/16"
1/16"	1 1/2"	3/4"
3/32"	2 1/4"	1 1/8"
1/8"	3"	1 1/2"
5/32"	3 3/4"	1 7/8"
3/16"	4 1/2"	2 1/4"
7/32"	5 1/4"	2 5/8"
1/4"	6"	3"
5/16"	7 1/2"	3 3/4"
3/8"	9"	4 1/2"
7/16"	10 1/2"	5 1/4"
1/2"	12"	6"
9/16"	13 1/2"	6 3/4"
5/8"	15"	7 1/2"

Wire Rope Constructions 6×37 and 8×19		
Dia.	Min. Recommended Drum/Pulley Tread Dia.	Approx. Bend Radius
3/16"	2 1/4"	1 1/8"
1/4"	3"	1 1/2"
5/16"	3 3/4"	1 7/8"
3/8"	4 1/2"	2 1/4"
7/16"	5 1/4"	2 5/8"
1/2"	6"	3"
9/16"	6 3/4"	3 3/8"
5/8"	7 1/2"	3 3/4"

# Breaking Strength Selection Criteria

The table at right gives approximate factor values to apply for some specific applications.

*Note:* These guidelines should be applied with caution because specific applications may often have more stringent requirements. To determine breaking strength, multiply your factor and maximum load together:

$$\text{Factor} \times \text{Maximum Load} = \text{Breaking Strength}$$

For example, if you are using a gantry crane, which has a factor of 5, and your maximum load is 1000 lbs., you'll need a wire rope with a minimum 5000 lbs. breaking strength:

$$5 \times 1000 = 5000.$$

Type of Service	Minimum Factor Value
Guy Ropes	3.5
Wire Rope Slings	5
Overhead and Gantry Cranes	5
Small Electric and Air Hoists	5

# Construction Class Selection Criteria

Construction is the number of strands, the number of wires per strand, and the core composition used to make the wire rope. For example, a 6×7 fiber core wire rope consists of six strands, each made with seven wires, and formed around a fiber core. The following common wire rope constructions are known as class constructions: 6×7, 6×19, 6×37, 7×19, and 8×19. Within a given class construction, the number of wires is allowed to vary within established industry guidelines. For example, a 6×37 class fiber core rope may have 27 to 49 wires in one strand.

Construction Class	Features	Uses
1×7	Characterized by relatively low flexibility, these single-strand constructions are not suitable for use with drums and pulleys	Straight load applications such as bracing, guying, and standing rigging.
1×19		
6×7	As the number of wires per strand increases, flexibility increases but crush resistance and abrasion resistance decrease. IWRC constructions offer higher strength and more crush resistance than fiber cores. Six-strand wires have better crush resistance than seven-strand wires.	6×7 and 7×7 constructions are relatively less flexible and best suited for guying, lanyards, and mechanical power transmission applications. All other constructions are commonly used for slings, hoisting, and running rigging. As drum and pulley diameters decrease, you should use more flexible constructions.
6×19		
6×37		
7×7		
7×19		
3×7	Offered only in small diameters, constructions in this range are extremely flexible.	Fishing cable, dial cable, and light duty controls.
7×3		
6×42	Most flexible of the six-strand constructions, but with lower strength and less abrasion resistance.	Ideal for hand lines and steering controls.
8×19	Offers maximum flexibility. <i>Note:</i> Fiber core rope should not be used under heavy crushing loads.	Flexibility makes this rope well suited for use with drums and pulleys.
19×7	The outer strands lay in the opposite direction of the inner strands, creating a rope that resists rotation under load.	Effective in single-line hoist applications and where rotation resistant properties are essential.