

# ELEVATOR WIRE ROPES AND RELATED PRODUCTS

## Elevator Wire Ropes

### Diameter

Each elevator is designed for a specific rope diameter. Elevator ropes are manufactured in imperial and metric sizes. Some of those are very close, but they are not interchangeable. The actual rope diameter is the diameter of the circumscribed circle of the rope. When measuring the diameter with a regular caliper, make sure to measure the largest dimension on the rope.

### Lay of Wire Rope

There are two main types of lays: Regular and Lang.

**Regular lay** - wires in strands twisted in an opposite direction than the direction of the strands. They are more flexible than Lang lay ropes and more suitable for eye splicing.

**Lang lay** - wires in strands twisted in the same direction as the strands and have longer life than Regular lay ropes as they wear out evenly. Lang lay ropes offer better fatigue and abrasion resistance than regular lay ropes due to the longer length of wires that meet the sheaves. However, Lang lay ropes stretch more and develop more torque under load than regular lay ropes.

#### Right Regular lay (RRL) (sZ)

Wires in strands (s) - left hand (left screw), parallel to rope axis.  
Strands (Z) - right hand (regular screw).

#### Left Regular lay (LRL) (zS)

Wires in strands (z) - right hand (regular screw), parallel to rope axis.  
Strands (S) - left hand, (left screw).

#### Right Lang lay (RLL) (zZ)

Wires in strands (z) - right hand (regular screw), almost parallel to rope strands,  
Strands (Z) - right hand, (regular screw).

#### Left Lang lay (LLL) (sS)

Wires in strands (s) - left hand (left screw), almost parallel to rope strands,  
Strands (S) - left hand, (left screw).

### Construction

Elevator wire ropes manufactured in a number of different constructions. The ropes differ by number of strands, the number of wires in each strand, the arrangement of the wires in the strands, and construction of the core. Ropes with six strands used on elevators mostly as governor or compensating ropes. Ropes with eight strands 8x19-Seale and 8x21-Filler have larger outer wires, making them more abrasion resistant, while 8x19-Warrington and 8x25-Filler are more flexible and more resistant to fatigue stresses. Ropes with nine strands 9x21-Filler or 9x25-Filler used on traction drive elevators, especially on high-rise installations.

### Preforming

In a preformed wire rope, the strands formed to a helix shape before they laid into position in the rope. This process reduces the internal stresses and increases the fatigue resistance. When wire breaks occur, the ends are less likely to protrude from the rope surface and cause damage to adjacent strands.

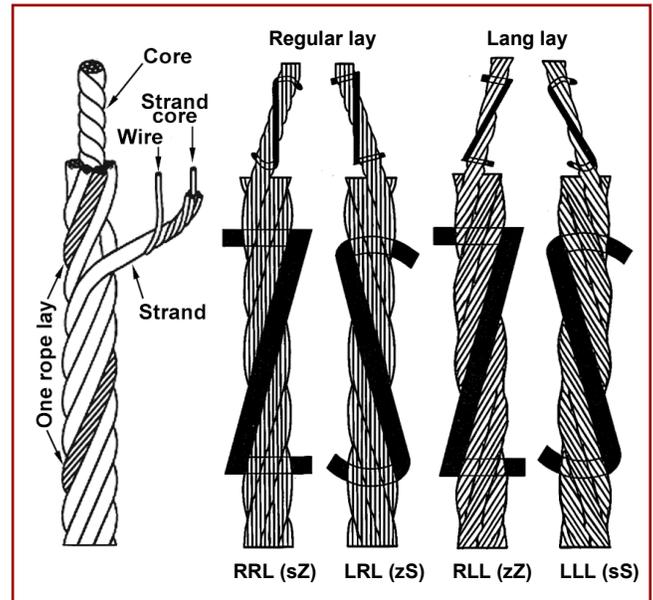
### Compacted strand ropes - MasterForm™

MasterForm™ ropes been introduced for applications where the conditions make impractical to use regular ropes or ropes with steel core. MasterForm™ 8xK19S ropes similar to 8x19S ropes but the strands are compacted during manufacture. This compacting process has many benefits.

- The minimum breaking load of this rope is much higher than a regular rope of the same diameter and grade. This means that the load on the rope will be lower as a percentage of the breaking load.
- The outer surface of the strands is smoother than in regular ropes and the surface area is larger. Larger surface area means lower pressure and as a result, lower stresses in the wires and less wear of both rope and sheave.

### Rope grade

The rope's grade is a property that refers to the type of steel from which the wires are made or more specifically, the tensile strength of this steel. In the North-American market, the common rope grades are Iron, Traction and High Strength (HS). In the metric system, rope grades designated by the minimum tensile strength of the steel measured in Newtons per square millimeter [N/mm<sup>2</sup>]. The common grades used for elevator ropes are 1370, 1570, and 1770 [N/mm<sup>2</sup>].



**Iron grade** wires are very soft and do not resist abrasion. Used primarily as **governor** and **compensating** ropes.

**Traction grade** ropes are the most commonly used as **hoist** ropes. Used as **governor** and **compensating** ropes due to their excellent combination of strength, abrasion resistance and ductility.

**High Strength** ropes used primarily on **high-rise** or **high-speed** installations of **traction** elevators

Ropes made either “**single tensile**”, meaning that all the wires forming the rope are of the same grade or “**dual tensile**”. Dual tensile ropes are made with two grades of wires. The wires of the outer layer in each strand are of a lower grade. Only these wires are contact with the sheaves. All the inner wires are of higher grade, giving the rope a higher breaking strength without compromising the fatigue resistance. In dual tensile ropes, the grade of the outer layer of wires determines the grade of the rope.

### Rope Fiber Core (FC)

The most common fiber used is sisal. The core's most important role is to provide the necessary support for the strands.

**FC** - Fiber core. The core of elevator wire ropes is usually made of natural fiber or synthetic fiber.

**NFC** - Natural fiber core, sisal used only for rope diameters above 8 mm (5/16”).

**SFC** - Synthetic fiber core, polypropylene used for rope diameters 8 mm (5/16”) and below, or for special orders.

### Rope Wire Core (WRC)

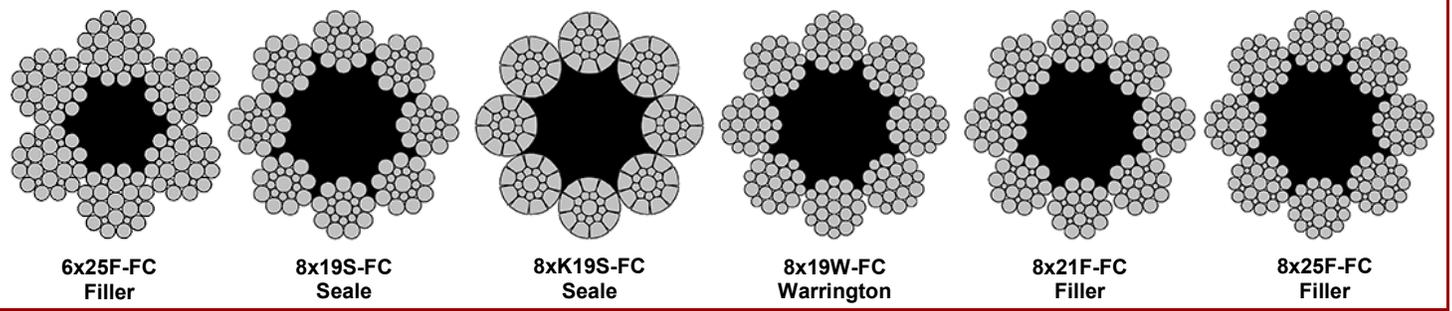
In some high-rise applications, other types of core are used. These are either full steel cores or a combination of steel and fiber. Ropes with steel core are manufactured in two different ways.

**IWRC** - Ropes with Independent wire rope core. In these ropes, the core is closed (assembled) in a separate operation, same as a wire rope, and then the outer strands of the rope are closed around the prepared core.

**PWRC** - Ropes with parallel laid core. In this case, the core is closed together with the rope strands in the same operation. The lay length of the core is the same as the lay length of the rope and the strands of the rope are laid parallel to the strands of the core. These ropes are also called “double parallel” ropes.

**Fiber Core (FC) Elevator Wire Ropes**

Wire Rope Works Messilot LTD



**6x25F-FC** - Six strands, each in Filler construction (1-6-6F-12). Fiber core. Used mostly as **compensating** rope.

**8x19S-FC** - Eight strands, each in Seale construction (1-9-9). Fiber core. Traditional construction, probably the most commonly used hoist rope on traction drive elevators worldwide. Used as **hoisting**, **compensating** or **governor** rope.

**8xK19S-FC** - MasterForm™ eight compacted strands, each in Seale construction (1-9-9). Fiber core. Similar flexibility to the traditional 8x19S but with higher breaking strength and better abrasion resistance. In most cases it can replace the traditional 8x19S without any modifications to the machine. Used as **hoist** rope.

**8x19W-FC** - Eight strands, each in Warrington construction (1-6-6+6). Fiber core. This construction is more flexible than the traditional 8x19S so it has better fatigue resistance but it is less resistant to abrasion. Used mostly as **governor** or **compensating** rope.

**8x21F-FC** - Eight strands, each in Filler construction (1-5-5F-10). Fiber core. This construction is slightly more flexible than the traditional 8x19S so it has better fatigue resistance but it is slightly less resistant to abrasion. It is becoming more and more common as **hoist** rope.

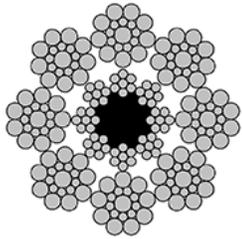
**8x25F-FC** - Eight strands, each in Filler construction (1-6-6F-12). Fiber core. A very flexible construction offering very good fatigue resistance but less resistant to abrasion. Used mostly as **compensating** rope.

Model	Size	Construction	Finish	Grade	Preform	Lay	MBL Lbs.	Lbs./100Ft.
WR14H	1/4"	8x19S-SFC	U	TRACTION	PF	RRL (sZ)	3700/4650	11
WR38GCI	3/8"	8x19S-NFC	U	IRON	PF	RRL (sZ)	4200/7200	20
WR38GCII	3/8"	6x25F-NFC	U	IRON	NPF	RRL (sZ)	5000/8200	23
WR38GCT	3/8"	8x19S-NFC	U	TRACTION	PF	RRL (sZ)	8200/10300	20
WR38GCT	3/8"	8x19W-NFC	U	TRACTION	PF	RRL (sZ)	8200/10300	20
WR38GCTG	3/8"	8x19W-NFC	G	TRACTION	PF	RRL (sZ)	8200/10300	21
WR76H	7/16"	8x19S-NFC	U	TRACTION	PF	RRL (sZ)	12000/14850	28
WR12GCIP	1/2"	8x25F-SFC	U	IRON	PF	RLL (zZ)	7200/12950	36
WR12GCI	1/2"	8x25F-NFC	U	IRON	PF	RRL (sZ)	7200/13900	36
WR12GCII	1/2"	6x25F-NFC	U	IRON	NPF	RRL (sZ)	8400/14400	40
WR12LL	1/2"	8x19S-NFC	U	TRACTION	PF	RLL (zZ)	14500/17700	36
WR12PS	1/2"	8x19S-NFC	U	TRACTION	PF-PS	RRL (sZ)	14500/18000	36
WR12H	1/2"	8x19S-NFC	U	TRACTION	PF	RRL (sZ)	14500/17850	36
WR12821H	1/2"	8x21F-NFC	U	TRACTION	PF	RRL (sZ)	14500/19404	36
WR12825H	1/2"	8x25F-NFC	U	TRACTION	PF	RRL (sZ)	14500/19550	36
WR12MF	1/2"	8xK19S-NFC	U	TRACTION	PF	RLL (zZ)	17500/20150	40
WR12HS	1/2"	8x21F-NFC	U	HIGH STRENGTH	PF	RRL (sZ)	17500/22450	36
WR916	9/16"	8x21F-NFC	U	TRACTION	PF	RRL (sZ)	18500/24300	46
WR58GCI	5/8"	8x25F-NFC	U	IRON	PF	RRL (sZ)	11200/24750	57
WR58GCII	5/8"	6x25F-NFC	U	IRON	NPF	RRL (sZ)	12800/21200	63
WR58H	5/8"	8x19S-NFC	U	TRACTION	PF	RRL (sZ)	23000/28650	57
WR58PS	5/8"	8x19S-NFC	U	TRACTION	PF-PS	RRL (sZ)	23000/28650	57
WR58LL	5/8"	8x19S-NFC	U	TRACTION	PF	RLL (zZ)	23000/28500	57
WR58821	5/8"	8x21F-NFC	U	TRACTION	PF	RRL (sZ)	23000/18800	57
WR58825H	5/8"	8x25F-NFC	U	TRACTION	PF	RRL (sZ)	23000/25300	57
WR58MF	5/8"	8xK19S-NFC	U	TRACTION	PF	RLL (zZ)	27400/30850	62
WR58HS	5/8"	8x21F-NFC	U	HIGH STRENGTH	PF	RRL (sZ)	27200/33450	57
WR1116GCI	11/16"	8x25F-NFC	U	IRON	NPF	RRL (sZ)	13600/2400	69
WR1116H	11/16"	8x19S-NFC	U	TRACTION	PF	RRL (sZ)	27000/30200	69
WR1116HS	11/16"	8x21F-NFC	U	HIGH STRENGTH	PF	RRL (sZ)	32800/40000	69
WR34	3/4"	6x25F-NFC	U	IRON	NPF	RRL (sZ)	18200/35050	90
WR34H	3/4"	8x21F-NFC	U	TRACTION	PF	RRL (sZ)	32000/41850	82
WR34825H	3/4"	8x25F-NFC	U	TRACTION	PF	RRL (sZ)	32000/43200	82
WR10MM	10mm	8x19S-NFC	U	TRACTION	PF	RRL (sZ)	9892/11806	22.8

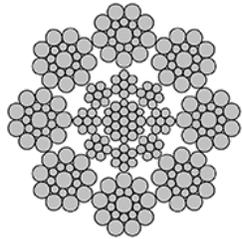
**FC** - Fiber core. **NFC** - Natural fiber core, sisal. **SFC** - Synthetic fiber core, polypropylene. **Finish** - Wire finish, **U** - Uncoated, bright, **G** - Galvanized. **Grade** - **Iron** 680/1270, **Traction** 1370/1770, **High Strength** 1570/1770, dual tensile [N/mm<sup>2</sup>] outer/inner wires. **PF** - Preformed. **NPF** - Non-preformed. **PF-PS** - Preformed and pre-stretched. **RRL (sZ)** - Right Regular lay. **RLL (zZ)** - Right Lang lay. **MBL Lbs.** - Minimum/tested breaking load. **Lbs./100Ft.** - Approximate weight Lbs./100Ft.

## Wire Core (WRC) Elevator Wire Ropes

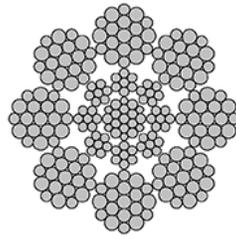
Wire Rope Works Messilot LTD



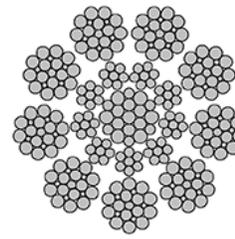
**8x19S-IWRC [8x7-SFC]**  
Seale



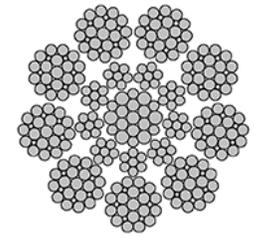
**8x19S-IWRC [8x7-WSC]**  
Seale



**8x19W-IWRC [8x7-WSC]**  
Warrington



**9x21F-PWRC [9x7-WSC]**  
Filler



**9x25F-PWRC [9x7-WSC]**  
Filler

**8x19S- IWRC [8x7-SFC]** - Eight strands, each in Seale construction (1-9-9). Core IWRC 8x7-SFC - Independent wire rope core made of 8 strands in (1-6) construction closed around a Polypropylene fiber core. The addition of steel strands to the core increases the metallic cross section and so increases the breaking force and decreases the elastic elongation (stretch) of the rope under load. Used on **traction drive** elevators, especially on **high-rise** installations, high speeds or where the ropes pass over **many deflection sheaves**.

**8x19S- IWRC [8x7-WSC]** - Eight strands, each in Seale construction (1-9-9). Core IWRC 8x7-WSC - Independent wire rope core made of 8 strands in (1-6) construction closed around a center strand in Warrington construction (1-6-6+6). The addition of steel strands to the core increases the metallic cross section and so increases the breaking force and decreases the elastic elongation (stretch) of the rope under load. Similar to ropes with combined core 8x19S-IWRC [8x7-SFC], but with higher breaking force and lower elongation. Used on **traction drive** elevators, especially on **high-rise** installations, high speeds or where the ropes pass over **many deflection sheaves**.

**8x19W- IWRC [8x7-WSC]** - Eight strands, each in Warrington construction (1-6-6+6). Core IWRC 8x7-WSC - Independent wire rope core made of 8 strands in (1-6) construction closed around a center strand in Warrington construction (1-6-6+6). The addition of steel strands to the core increases the metallic cross section and so increases the breaking force and decreases the elastic elongation (stretch) of the rope under load. Similar to ropes with combined core but with higher breaking force and lower elongation. Used on **traction drive** elevators, especially on **high-rise** installations, high speeds or where the ropes pass over **many deflection sheaves**.

**9x21F- PWRC [9x7-WSC]** - 9x21F Nine strands, each in Filler construction (1-5-5F-10). Core 9x7-WSC - The core is made of 9 strands in (1-6) construction around a center strand in Warrington construction (1-6-6+6). The core is closed together with the strands of the rope in one parallel lay operation. The parallel closed steel core maximizes the metallic cross section and also improves the fatigue resistance of the rope because it reduces the internal contact pressure between the outer strands and the core. The breaking force is significantly higher than traditional constructions or combined core ropes. Used on **traction drive** elevators, especially on **high-rise** installations, high speeds or where the ropes pass over **many deflection sheaves**. Parallel closed ropes are sensitive to externally induced torque. During installation care should be taken to avoid twisting the ropes or letting the ropes untwist under their own weight while they hang freely.

**9x25F- PWRC [9x7-WSC]** - 9x25F Nine strands, each in Filler construction (1-6-6F-12). Core 9x7-WSC - The core is made of 9 strands in (1-6) construction around a center strand in Warrington construction (1-6-6+6). The core is closed together with the strands of the rope in one parallel lay operation. The parallel closed steel core maximizes the metallic cross section and also improves the fatigue resistance of the rope because it reduces the internal contact pressure between the outer strands and the core. The breaking force is significantly higher than traditional constructions or combined core ropes. Used on **traction drive** elevators, especially on **high-rise** installations, high speeds or where the ropes pass over **many deflection sheaves**. Parallel closed ropes are sensitive to externally induced torque. During installation care should be taken to avoid twisting the ropes or letting the ropes untwist under their own weight while they hang freely.

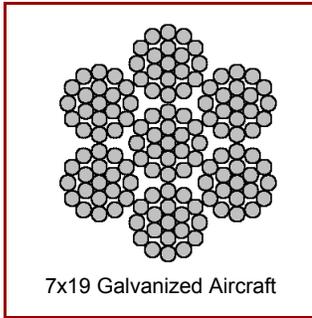
Model	Size	Construction	Finish	Grade	Preform	Lay	MBL Lbs.	Lbs./100Ft.
WR38SS	3/8"	8x19S-IWRC [8x7-WCS]	U	TRACTION	PF	RRL (sZ)	11600/12650	25.7
WR12HSC	1/2"	9x21F-PWRC [9x7-WSC]	U	HIGH STRENGTH	PF	RRL (sZ)	24600/26450	69
WR58HG	5/8"	9x21F-PWRC [9x7-WSC]	G	HIGH STRENGTH	PF	RRL (sZ)	39100/43150	110
WR58HSC-1	5/8"	9x21F-PWRC [9x7-WSC]	U	HIGH STRENGTH	PF	RRL (sZ)	39100/41750	73.9
WR58HSC	5/8"	9x25F-PWRC [9x7-WSC]	U	HIGH STRENGTH	PF	RRL (sZ)	39100/43150	110
WR6MMW	6mm	8x19W-IWRC [8x7-WCS]	U	HIGH STRENGTH	PF	RRL (sZ)	6025/6234	10.3
WR8MMW	8mm	8x19W-IWRC [8x7-WCS]	U	HIGH STRENGTH	PF	RRL (sZ)	10027/10545	18.8
WR10MMW	10mm	8x19W-IWRC [8x7-WCS]	U	HIGH STRENGTH	PF	RRL (sZ)	15600/16400	29.3
WR13MMCC	13mm	8x19S-IWRC [8x7-SFC]	U	HIGH STRENGTH	PF	RRL (sZ)	23775/24606	48.9

**WRC** - Wire rope core. **IWRC** - Independent wire rope core. **PWRC** - Parallel laid wire rope core. **WSC** - Warrington steel core. **SFC** - Steel-fiber core. **Finish** - Wire finish, **U** - Uncoated, bright, **G** - Galvanized. **Grade** - **Traction** 1370/1770, **High Strength** 1570/1770, dual tensile [N/mm<sup>2</sup>] outer/inner wires. **PF** - Preformed. **RRL (sZ)** - Right Regular lay. **MBL Lbs.** - Minimum/tested breaking load. **Lbs./100Ft.** - Approximate weight Lbs./100Ft.

### Wire Rope Manufacturer

Elevator wire ropes above Manufactured by Wire Rope Works Messilot LTD. Messilot has been in business since 1961 and accredited for ISO 9001 since 1994. Certified by API (American Petroleum Institute). The wire rope manufactured to the following standards, BS302.BS, ISA3408, DIN3051, RR-W-410 and MIL-W-83420. Working under strict technical specs according to EN 12385-4; EN 12385-5; ISO 2408; ISO 4344; ASTM A1023\A1023M; ASME A17.6 and some special ropes certified by TÜV/IFT.

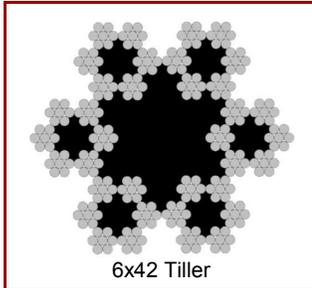
## Elevator Special Wire Ropes, Wire Rope Related Products



### 7x19 Galvanized Aircraft Cables

The 7x19 galvanized steel cables consist of 7 strands with 19 wires per strand and wound together to form a cable. Flexible, strong and corrosion resistant. Used in dumbwaiters, overhead doors, winch lines, etc.

Model	Size	Construction	Lay	Core	Lbs/100Ft.	MBL Lbs.	Material
WR332AC	3/32"	7x19	RRL (sZ)	Galv. steel	1.7	1,000	Galvanized steel
WR532AC	5/32"	7x19	RRL (sZ)	Galv. steel	4.5	2,800	Galvanized steel
A01AC002	3/16"	7x19	RRL (sZ)	Galv. steel	6.5	4,200	Galvanized steel
WR732GA	7/32"	7x19	RRL (sZ)	Galv. steel	8.6	5,600	Galvanized steel
WR14AC	1/4"	7x19	RRL (sZ)	Galv. steel	11.0	7,000	Galvanized steel
WR38719A	3/8"	7x19	RRL (sZ)	Galv. steel	24.3	14,400	Galvanized steel



### 6x42 Bronze Tiller Ropes

Commercial wire rope with extremely flexible and soft fine wires. Preformed rope with phosphorus bronze PB507 Grade E wires.

The 6x42 construction. Six strands 6x7 with fiber core, wound together around fiber core. Used in passenger and freight elevators as a hand rope connected to operating device, signaling devices, and where load is light and wearing is minimal. This rope should not be used as a hoisting rope.

Model	Size	Construction	Lay	Core	Lbs/100Ft.	MBL Lbs.	Material
WR716B	7/16"	6x42	RRL (sZ)	Fiber	23.7	3920	Phosphorus bronze
WR12B	1/2"	6x42	RRL (sZ)	Fiber	18.2	5060	Phosphorus bronze

## Wire Rope Related Products



### Wire Rope Wear Gauges

Wire rope wear gauge. Manufactured to ASME A17.1-1996 1001.2(C)(29)(C) specifications of 2011. T3 anodized aluminum with numerals acid etched on.

The easy and foolproof way to check elevator wire rope for maximum reduced diameter. No guess work, no mistakes. The gauge contact area of wire rope is from one lay to several strands, depending on rope diameter. Gauge stays parallel to rope, so you are always checking from the top of one strand to the top of the opposite strand for maximum reduced diameter. If rope fits into slot, it should be replaced.

**Model WRG-2000** • 3/8", 1/2", 9/16", and 5/8" wire rope diameters, anodized red finish, 3.5"L x 2"Dia.  
**Model WRGM** • 8mm, 10mm, 11mm, and 13mm wire rope diameters, anodized blue finish, 3.5"L x 2"Dia.



### Wire Rope Oilers and Wicks

Keeps cables lubricated for longer cable and sheave life. To determine size measure distance between outside cables and add 1" to each side.

<b>Model CO4</b>	• Oiler, 4" wick width	<b>Model CO4W</b>	• 4" Replacement wick
<b>Model CO7</b>	• Oiler, 7" wick width	<b>Model CO7W</b>	• 7" Replacement wick
<b>Model CO9</b>	• Oiler, 9" wick width	<b>Model CO9W</b>	• 9" Replacement wick
<b>Model CO12</b>	• Oiler, 12" wick width	<b>Model CO12W</b>	• 12" Replacement wick
<b>Model CO16</b>	• Oiler, 16" wick width	<b>Model CO16W</b>	• 16" Replacement wick



### Wire Rope Lubricants

Designed to clean, lubricate and protect wire ropes and cables. This non-volatile oil removes excess of dirt. 30°F pour point. Dyed bright green to distinguish it from other oils.

- It reduces the wear between ropes and sheaves.
- It reduces the friction between the wires and as a result, the stresses causing fatigue breaks.
- It keeps the sisal core in good condition.
- It helps in the prevention of corrosion resulting from atmospheric and environmental conditions at the site.

**Model Q-80** • 1 gallon  
**Model Q-80-Q** • 1 quart

**QUALITY  
 ELEVATOR PRODUCTS, INC.**