



## Elevator Wire Rope

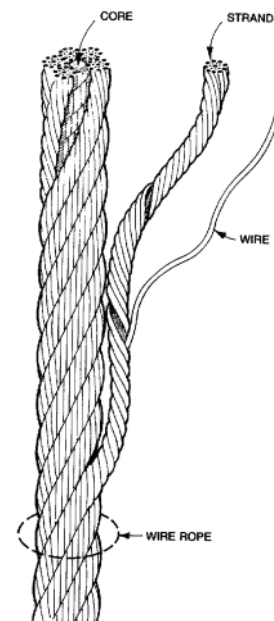
### Wire Rope Specification

Elevator Wire Rope is specified by its diameter, construction, finish, grade, lay, preforming, and core.

Diameter is expressed in inches or millimeters and is the diameter of the smallest circle which can be circumscribed about the rope. The rope construction is generally stated as the number of outside strands and the number of wires per strand.

A **Bright** finish, **Right Regular Lay**, and **Fiber Core** are understood to be specified unless otherwise stated.

Prestretching, galvanized finish, left lay, lang lay, special fiber core, non-preformed wire rope, and independent wire rope core are all available for special ordering.



### Technical Bulletins

Wire Rope Works, Inc. (manufacturer of Bethlehem Elevator Wire Rope®) publishes service and technical bulletins on topics which affect the operation and service life of elevator wire rope. These include:

- |                               |                                     |
|-------------------------------|-------------------------------------|
| 1. Elevator Rope Nomenclature | 8. Tensioning                       |
| 2. Elevator Rope Lubrication  | 9. Fatigue                          |
| 3. Elevator Rope Rouging      | 10. Sheaves and Grooves             |
| 4. Elevator Rope Slippage     | 11. Vibration                       |
| 5. Elevator Rope Stretch      | 12. Moisture                        |
| 6. Lubricant Build-Up         | SB1. Elevator Rope Investigation #1 |
| 7. Traction Sheave Hardness   | SB2. Elevator Rope Investigation #2 |

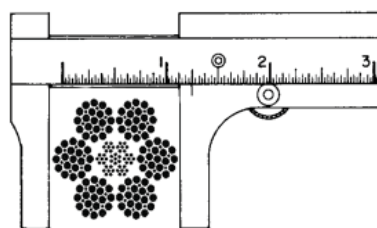


### Wire Rope Diameter

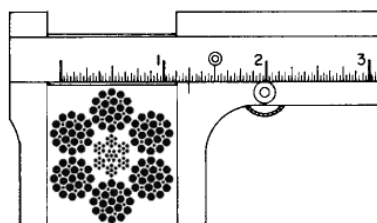
The first differentiation of wire rope is by diameter.

The diameter is measured at the diameter of the circle formed by the extreme outer dimensions of the strands (See figs. at right). New wire rope is manufactured to an oversized diameter of approximately 2-1/2%.

This allows for the normal reduction of diameter experienced when a new rope is placed under load because of constructional stretch.



The RIGHT Way



The WRONG Way



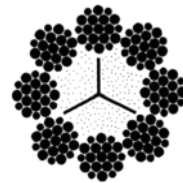
## Bethlehem 8-Strand & 6-Strand Elevator Ropes

Wirerope Works, Inc. manufactures Bethlehem Standard Elevator Rope in a variety of diameters, constructions, lays, and grades.

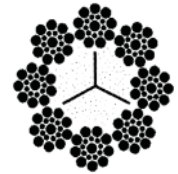


### 8 x 19 Standard Elevator Rope Technical Data

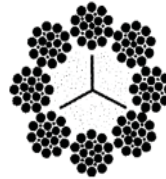
Diameter		8 x 19 Class (8x19 Warrington, 8x19 Seale, 8x19 Filler Wire, 8x25 Filler Wire)			
		Approx. Wt. (lb/ft)	Nominal Strength (lb)		
in	mm		Iron	Traction	EHS Traction
1/4	6.5	0.09	1,800	3,600	4,500
5/16	8.0	0.14	2,900	5,600	6,900
3/8	9.5	0.20	4,200	8,200	9,900
7/16	11.0	0.28	5,600	11,000	13,500
1/2	13.0	0.36	7,200	14,500	17,500
9/16	14.5	0.46	9,200	18,500	22,100
5/8	16.0	0.57	11,200	23,000	27,200
11/16	17.5	0.69	-	27,000	32,800
3/4	19.0	0.82	16,000	32,000	38,900
13/16	20.6	0.96	-	37,000	46,000
7/8	22.0	1.11	21,400	42,000	52,600
15/16	23.5	1.27	-	48,000	60,000
1	26.0	1.45	28,000	54,000	68,400
1-1/16	27.0	1.64	-	61,000	77,000



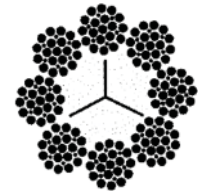
**8 x 19 Warrington**  
through 7/16" diameter



**8 x 19 Seale**  
3/8" diameter and larger



**8 x 21 Filler Wire**  
1/2" diameter and larger

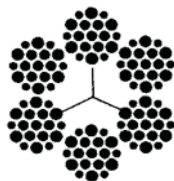


**8 x 25 Filler Wire**  
1/2" diameter and larger

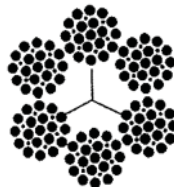
For information about sizes larger than 1-1/16"  
contact your ALP Sales Representative.

### 6 x 19 Standard Elevator Rope Technical Data

Diameter		6 x 19 Class (6x19 Warrington, 6x25 Filler Wire)			
		Approx. Wt. (lb/ft)	Nominal Strength (Tons)		
in	mm		Iron	Traction	EHS Traction
1/4	6.5	0.10	2,200	3,600	6,200
5/16	8.0	0.16	3,200	5,600	8,100
3/8	9.5	0.23	5,000	8,200	11,600
7/16	11.0	0.31	6,400	11,000	15,700
1/2	13.0	0.40	8,400	14,500	20,400
9/16	14.5	0.51	10,600	18,500	25,700
5/8	16.0	0.63	12,800	23,000	31,600
11/16	17.5	0.76	15,500	27,000	38,200
3/4	19.0	0.90	18,200	32,000	45,200
13/16	20.6	1.06	21,500	37,000	52,900
7/8	22.0	1.23	24,800	42,000	61,200
15/16	23.5	1.41	28,500	48,000	70,000
1	26.0	1.60	32,000	54,000	79,500
1-1/16	27.0	1.81	-	61,000	89,400



**6 x 19 Warrington**  
through 5/16" diameter



**6 x 25 Filler Wire**  
3/8" diameter and larger

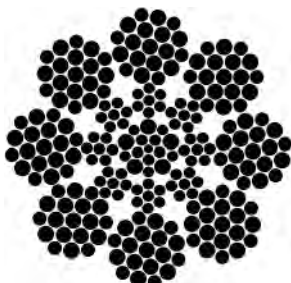
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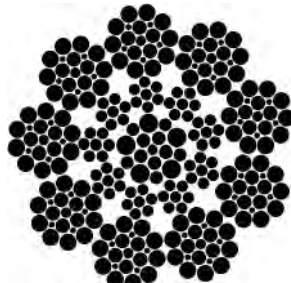
## Bethlehem 8-Strand & 9-Strand IWRC Elevator Hoist Ropes

**Steel Core Elevator Hoist Ropes** are used where additional strength is required without increasing the diameter of the wire rope. An additional benefit of the steel core is that these ropes will exhibit somewhat reduced stretch when compared with that of fiber core ropes.

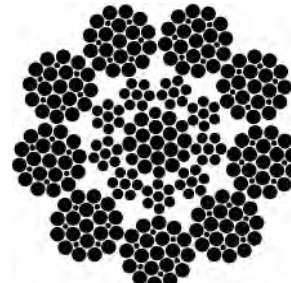
Equipment utilizing steel core elevator hoist ropes are specifically designed with the steel core in mind. Steel core ropes should not be used on equipment designed for fiber core ropes. Likewise fiber core ropes should not be used on equipment designed for steel core ropes.



**10 mm 8x19 Warr BRT  
EHS RR FS IWRC**



**1/2" 9x21F  
BRT EHS RR FS IWRC**



**16 mm 9x25F BRT EHS  
RR FS IWRC**

**Elevator Hoist Ropes with Steel Core (IWRC)**

Diameter		Construction	Approx. Wt. (lb/ft)	Nominal Strength (lb)	Load on Rope	Diameter Tolerance		Out-of-Round Tolerance
in	mm					Min.	Max.	
5/16	8	8x19 Warr BRT EHS RR FS IWRC	0.184	9,740	010%	0%-1%	3%2%	2.5%1.5%
	10	8x19 Warr BRT EHS RR FS IWRC	0.285	15,220	010%	0%-1%	3%2%	2.5%1.5%
1/2	12.7	9x21F BRT EHS RR FS IWRC	0.473	23,820	010%	0%-1%	3%2%	2.5%1.5%
	13	9x21F BRT EHS RR FS IWRC	0.486	25,200	010%	0%-1%	3%2%	2.5%1.5%
5/8	16	9x25F BRT EHS RR FS IWRC	0.729	39,120	010%	0%-1%	3%2%	2.5%1.5%
3/4	19	9x25F BRT EHS RR FS IWRC	1.021	55,200	010%	0%-1%	3%2%	2.5%1.5%



## Bethlehem Liftpac Elevator Rope

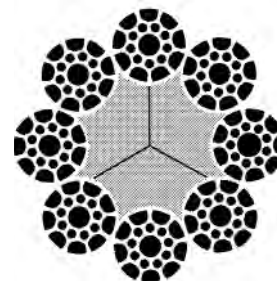
**Liftpac** is designed for use wherever elevator hoist ropes exhibit short service life. Liftpac is recommended for those applications where 1) adverse operating conditions exist, such as where loads and groove pressures are high; 2) reverse bends exist, and/or; 3) fatigue breakage with minimal surface wear is the primary factor for retirement.

**Liftpac is not designed to remedy poor rope performance due to worn sheaves and/or differential groove depths. Under these conditions, unsatisfactory rope performance will still result.**



**Liftpac Elevator Rope Technical Data**

Diameter		Liftpac		
		Approx. Wt. (lb/ft)	Nominal Strength (lb)	
in	mm		Traction	EHS Traction
3/8	9.5	0.23	9,000	11,000
1/2	13.0	0.39	16,000	19,400
5/8	16.0	0.62	25,400	30,800



### FEATURES

**Fatigue Resistance** - The compacted strand surface minimizes the interstrand and interlayer nicking that takes place in elevator ropes, dramatically decreasing the amount of internal breaks. This reduction of internal wire breakage can also be expressed as an increase in reserve strength. By decreasing internal breakage at the interstrand contact points, Liftpac maintains its strength longer than standard elevator rope in severe bending applications.

**Abrasion Resistance** - Liftpac's compacted strand design provides improved abrasion resistance when compared with 8-strand ropes because of the increased wire and strand surfaces contacting the sheaves and drums.

**Resistance To Diameter Reduction** - Liftpac's compacted design resists diameter reduction due to the higher metallic content and less core deterioration at the strand contact area.

**Noise Reduction** - Liftpac's compacted surface passes smoothly over drums and sheaves, allowing for an extremely quiet running rope.

### INSPECTION

Due to Liftpac's compacted strands, its slightly flattened crown appearance should not be misconstrued as wear. Two methods may be used during inspection to make a distinction between Liftpac and a standard worn rope.

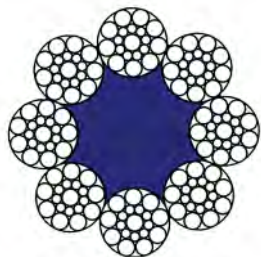
- 1) Check the outer wires in the strand valleys. The crown wires of a worn standard rope will obviously be abraded or worn. As these wires travel into the valleys, however, they resume their normal rounded shape. The wires in a Liftpac rope retain their die drawn state throughout the crown and valleys.
- 2) Check the ropes at the shackles. If Liftpac is being used, the rope wires at the shackles will have the same flattened crown appearance. If the standard rope is worn, the rope wires at the shackles will be rounded.

ASME and CAN/CSA inspection and removal criteria apply.

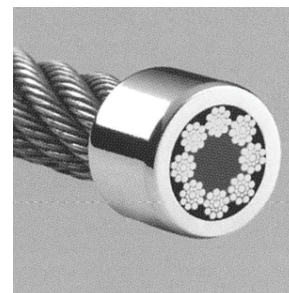


## Usha Martin Elevator Wire Rope

Manufactured by Usha Martin Ltd., one of the world's largest producers of wire and wire rope products.



- Metric & Imperial diameters
- Manufactured to International Standards ISO 4344 or EN 12385-5
- Dual Tensile design to reduce concerns of excessive sheave wear
- Post Production Prestretch to minimize constructional stretch
- Also available in 6-Strand, Galvanized, and Lang Lay upon request

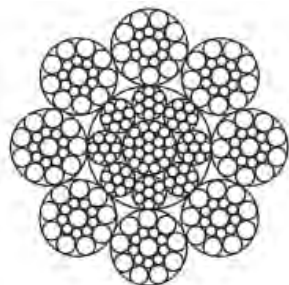


### 8x19 Class Right Regular Lay Fiber Core

Diameter		Approx. Wt.		Min. Break Force - Traction (1370/1770)		Min. Break Force - EHS (1570/1770)	
mm	in	kg/100m	lb/ft	kN	lb	kN	lb
8	5/16	21.8	0.15	28.1	6,320	30.8	6,920
9.5	3/8	30.7	0.21	39.7	8,930	43.6	9,800
10	-	34.0	-	44.0	-	48.1	-
11	7/16	41.1	0.28	53.2	11,960	58.1	13,060
12.7	1/2	54.8	0.37	70.9	15,940	77.5	17,420
13	-	57.5	-	74.3	-	81.2	-
14.3	9/16	69.5	0.47	82.1*	20,210	98.3	22,100
16	5/8	87.0	0.58	113	25,400	123	27,650
19	3/4	123	0.83	159	35,750	173	38,890

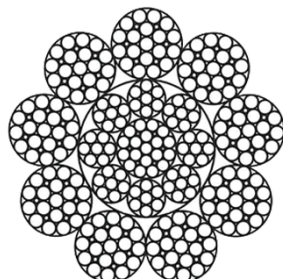
\* Available only as 1180/1770 Grade

### 8x19 Class EHS Right Regular Lay IWRC



Diameter		Approx. Wt.		Min. Break Force - EHS (1570/1770)	
mm	in	kg/100m	lb/ft	kN	lb
8	5/16	26.0	0.17	38.0	8,540
9.5	3/8	36.7	0.25	53.7	12,070
10	-	40.7	--	59.5	-
11	7/16	49.2	0.33	71.9	16,160
12.7	1/2	65.6	0.44	95.9	21,560
13	-	68.8	-	100	-

### 9x19 Class EHS Right Regular Lay IWRC



Diameter		Approx. Wt.		Min. Break Force - EHS (1570/1770)	
mm	in	kg/100m	lb/ft	kN	lb
11	7/16	52.6	0.35	79.6	17,900
12.7	1/2	70.2	0.47	106	23,860
13	-	73.5	-	111	-
16	5/8	111	0.75	168	37,870
19	3/4	157	1.06	238	53,400





## Tiller Rope

**Tiller Rope** is one of the most flexible wire ropes made. However, because of its fine wires, it should be used only where loads are light and abrasion and crushing are at a minimum.

The 6x42 construction is comprised of 6 strands of 6x7 fiber core around a fiber core center. Manufactured in both Phosphor Bronze or Galvanized Steel, this rope is used as a hand rope in connection with the operating device of passenger and freight elevators, as steering cable on small boats and steamers, and for industrial and mining signaling devices.

**Tiller Rope should NOT be used as a hoisting rope where breakage will endanger life or property.**



**6x42 Tiller Rope**

Diameter in (mm)	Phosphor Bronze			Galvanized Steel		
	P/N	Min. Break Str.	Wt. M/ft	P/N	Min. Break Str.	Wt. M/ft
3/8" (9.5 mm)		2,960	180 lb		2,600	160 lb
7/16" (11 mm)		4,020	240 lb		3,540	210 lb
1/2" (12.7 mm)		5,190	305 lb		4,600	280 lb

## Galvanized Aircord

Small diameter galvanized wire rope, sometimes called **Galvanized Aircord**, is used in many applications including small winch lines, overhead doors, yacht rigging, and, even clothes line.

**Selector Cable** is a special application of 1/8" 7x19 Galvanized Aircord that has been specially lubricated and conforms to the MIL-W-83420 military specification.

**7x19 Galvanized Aircord**

Diameter (in)	Nominal Strength (lb)	Approx. Wt. lb/100 ft
1/8"	2,000	2.90
5/32"	2,800	4.50
3/16"	4,200	6.50
7/32"	5,600	8.60
1/4"	7,000	11.0
5/16"	9,800	17.3
3/8"	14,400	24.3



## Wire Rope Go-NoGo Gauge

The **Go-NoGo Gauge** is designed for quick checks and is not meant to replace accurate diameter measuring techniques. To use the Go-NoGo Gauge, slip the elevator rope into the corresponding diameter groove. If the rope slides in, the diameter has reduced and the rope should be retired under the criteria established by ASME specifications for diameter reduction. Before final condemnation, use a caliper or other accurate diameter measuring tool to confirm the measurement.

- Manufactured with anodized aluminum for lightweight, durable construction
- More accurate than plastic models - diameter grooves will not wear as readily, nor will the grooves accommodate a rope whose diameter is still within acceptable limits under A17.6 specifications
- Nominal diameter provided on one side, ASME diameter reduction criteria for rope retirement on the other side
- ATL00I is Red in color and has 7 slots designed to gauge wire ropes from 3/8" to 3/4" in 1/16" increments
- ATL00KM is Blue in color and has 8 slots designed to gauge wire rope of 6 mm, 8 mm, 9.5 mm, 10 mm, 11 mm, 13 mm, 16 mm, and 19 mm diameters



**ATL00I Wire Rope Gauge**  
(Imperial - Red)



**ATL00KM Wire Rope Gauge**  
(Metric - Blue)

## Wide-Jaw Wire Rope Caliper

- Stainless Steel Digital Caliper with 30 mm x 40 mm faces specifically designed to accurately determine wire rope diameters
- Measuring range is 0 - 150 mm (up to 6 inches)
- Accuracy is to within +/- 0.03 mm ( +/- 0.0012")
- Zero setting at any position
- Convenient switch to change from inches to millimeters
- Uses SR 44 Watch Battery (included)

