



**FELSTED®**

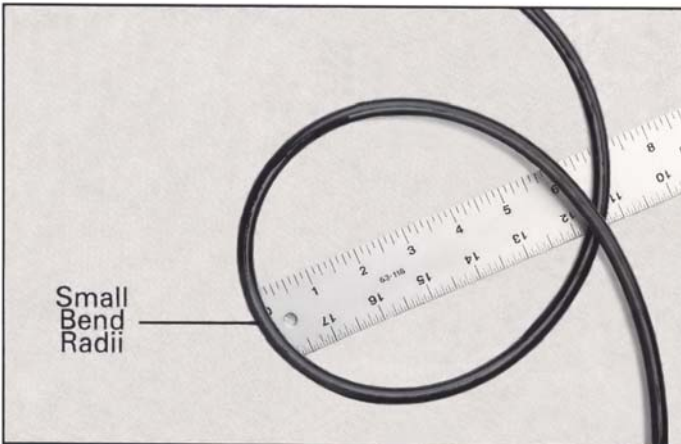
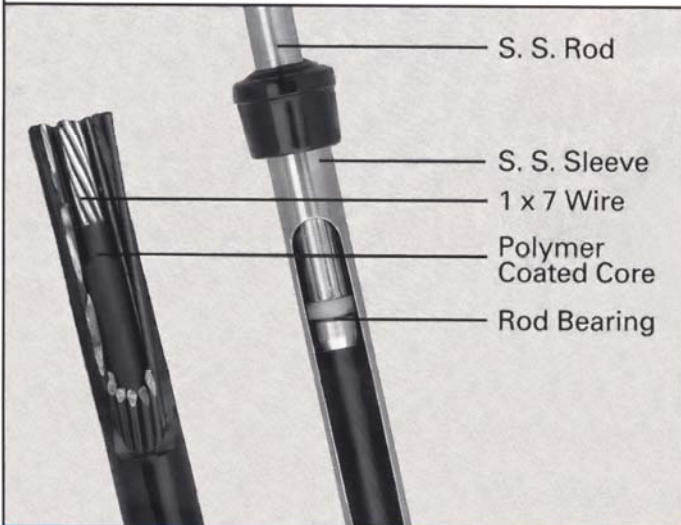
*HP Cables*





### CABLES, CONTROLS & CONTROL SYSTEMS

#### CONSTRUCTION FEATURES



#### OPTIMUM LIFE BEND RADIUS

Series	Operating Life Minimum
3	3"
4	5"
6	7"

#### OPERATING LOAD (lbs.)

Series	Travel (in.)	Operating Load (lbs.)	
		Push	Pull
3 Series	2	60	60
	3	50	60
	4	40	60
4 Series	2	120	120
	3	100	120
	4	80	120
6 Series	2	225	225
	3	200	225
	4	175	225

#### HP CABLES®

Furon Felsted, a leading designer and manufacturer of Cable and Control Systems has designed a new line of Hi-Performance HP Control Cables to improve its current standard construction.

These new Hi-Performance Cables represent a breakthrough in cable construction resulting in superior performance characteristics:

- Easier routing
- Smaller bend radii
- Lower backlash
- Higher efficiency
- Increased push capability

We are replacing the conventional 1 x 19 armor wrap core that has been the industry standard for many years. Instead, a stranded wire rope with a 1 x 7 construction is used, then bonded and coated with proprietary polymer materials. The 1 x 7 configuration is well known as a superior push/pull element. Combining this improvement with new core and conduit manufacturing processes results in assemblies with closer tolerances, reduced backlash and less lost motion under load.

The new cable design is the direct result of advances in polymer technology, available to us as a division of Furon Company. Other divisions of Furon Company are recognized worldwide for high-performance polymer based parts and components for a wide range of industrial applications – from miniature seals used in the space shuttles to 3000' long tube bundles which reach from offshore oil platforms to the ocean floor. For HP cables, these polymer advances are represented in a new conduit liner, core coating, and a boundary silicone lubricant containing a micro-fine PTFE dispersion, providing low friction and superior wear resistance even under severe operating and routing conditions.

Because this cable construction and performance are new to the marketplace, we have changed our cable color so customers can easily identify the new style. Our standard black cable, regarded as an industry standard, is now dark maroon. Our HP HEFT II (High Temperature) cable has been changed from silver to gloss black. Both cable constructions are Hi-Performance: The new HP HEFT II is for use in *high temperature* applications (-65°F to +300°F).

To aid our customers in cable installation, we have concurrently decreased the outer diameter of the cable jacket by a minimal amount. This smaller diameter, combined with the reduced bend radius, simplifies customer installations with difficult cable routings. The net result is a cable which installs easier and operates efficiently under complicated routing situations.

Our Cable Catalog part numbering system is being modified to make it easy to order. The familiar four (4) digit cable part number will not change, but will be preceded by a three (3) digit prefix. The first digit will indicate cable type, while the second and third will show any control head options. We are retaining solid core 3 series cables, and utility, positive lock, and Verniers with exposed core will also retain the solid stainless steel core.

For further information, please contact your Field Sales Representative.

# HP CABLES®

## FEATURES & CONSTRUCTION

### Core Constructions

Hi-Performance (HP) 1 × 7 coated core is available in 3, 4, and 6 series cables. HP Core utilizes a Furon proprietary coating over 1 × 7 wire rope. This construction offers improved flexibility, higher efficiency, lower backlash, and higher push loads than armor core construction.

Solid stainless steel cores are available in 3 series push pull, universal, positive lock, and P.T.O. cables. Tension cables utilize a 1 × 19 HP coated core, while 8 series push-pull remains armor core.

### Liners

All Felsted cables utilize polymer liners, available in standard HP CABLE construction at -65 to +225 (°F)/ -54 to +107 (°C) and HEFT 2 high temperature version at -65 to +300 (°F)/ -54 to +149 (°C). Factory lubrication provides optimum core performance without requiring further service.

### Stranded Conduit

Multiple, oil tempered spring wires are placed in a long lay pattern to protect the liner and inner core, maintain flexibility, and withstand extreme compressive and tensile loads. This long lay construction results in minimal deflections during cable operation, assuring precise controlling action to the operator.

### Conduit Jacket

Heavy duty, thick walled polymer jackets are extruded onto the stranded conduit for maximum cable strength. Standard HP CABLE material is a HDPE molded to a dark maroon color. HEFT 2 jacket, used in high temperature applications, uses a NYLON 11 based material and is molded into a gloss black color. Prior to HP CABLES, standard jacket colors were black, and HEFT was silver in color.

### End Fittings

Corrosion resistant materials are used throughout to assure maximum wear. Standard rods and sleeves are 300 series stainless steel, while hubs are either stainless or aluminum.

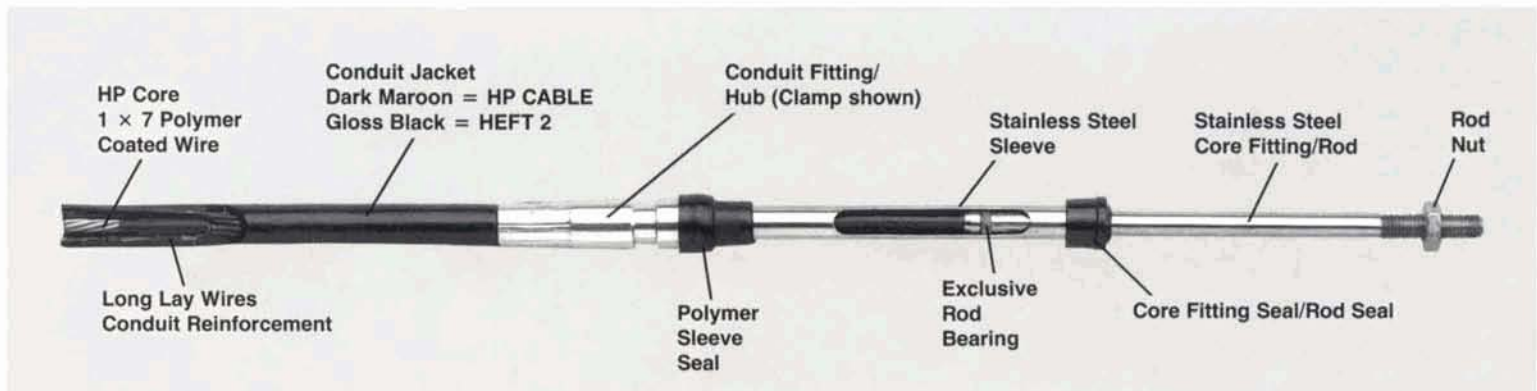


### Seals & Boots

Durable polymer seals are used to prevent moisture and contaminants from entering the cable. Optional SUPER SEALS are available for especially rugged applications—such as in military or arctic conditions. Tension cables use a durable tear resistant silicone boot, designed for high cycle use and high temperature.

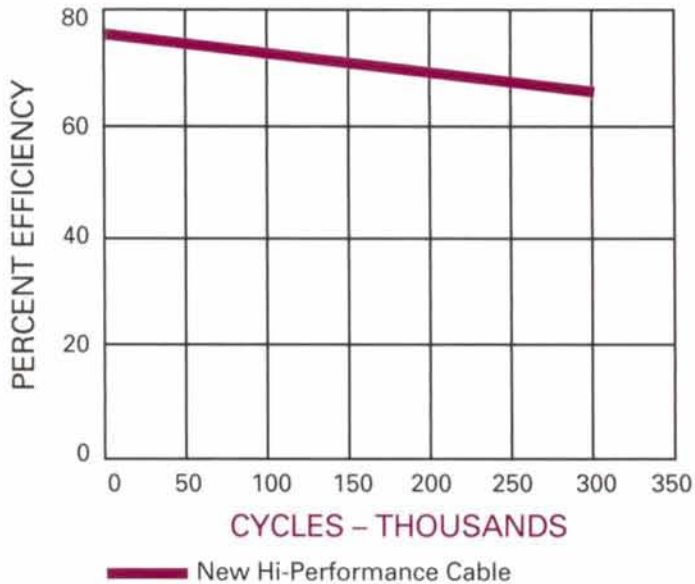
### Rod Bearing

An exclusive polymer rod bearing is incorporated to prevent metal-to-metal sliding contact between the rod and sleeve. This also assures accurate rod to seal alignment, and provides long, smooth and quiet cable operation.



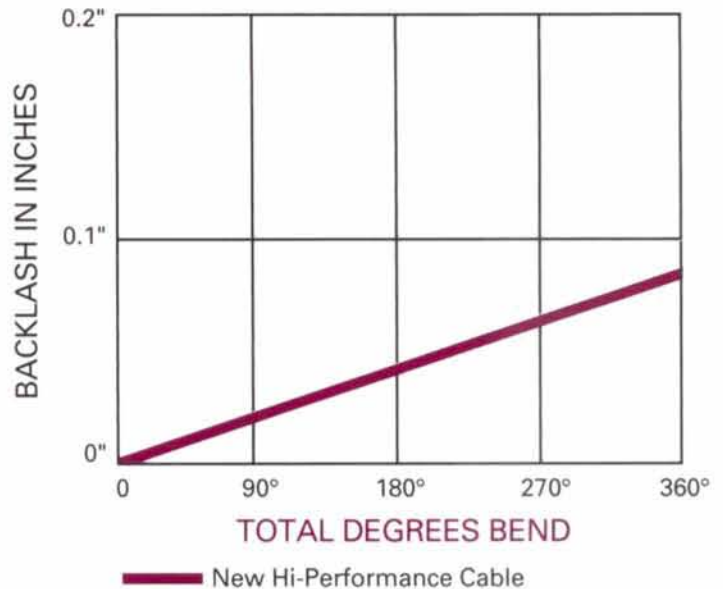
# SPECIFICATIONS

## FELSTED PULL HP CABLES TYPICAL EFFICIENCIES



Severe Routing: 3" Travel Assemblies, 144" Overall Length, 510 Degrees Total Bend

## FELSTED PULL HP CABLES TYPICAL BACKLASH vs DEGREES BEND



## EFFICIENCY

The efficiency factor of a cable system helps determine what series of cable to use in a given situation. Affected by the total degrees of bend in the cable, efficiency shows how much input force is needed to produce a desired output load. Use the following formula and tables to calculate.

$$\text{Input Force} = \frac{\text{Output Load} \times \text{Efficiency Factor}}{\text{Efficiency Factor}}$$

$$\text{Output Load} = \frac{\text{Input Force}}{\text{Efficiency Factor}} \quad \text{OL} = \frac{\text{IF}}{\text{EF}}$$

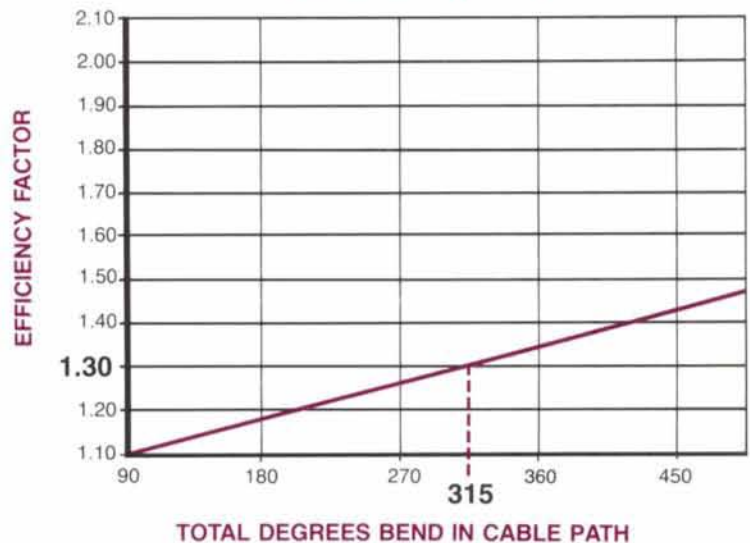
Let's take for example the following application: you know the system requires an output load of 40 lbs. and the cable follows a path totaling 315° bend. Select the correct efficiency factor from **Efficiency Graph** above right (315° bend = 1.30 efficiency factor).

**Formula:** Output × Efficiency Factor = Input Required

40 lbs. × 1.30 = 52.0 lbs. Input Required

In the above example, the cable configuration with 315° total bend, 52.0 lbs. input force is needed to produce the required 40 lbs. output. Based on this data alone, an HP Cable® 4 series would be recommended.

## Efficiency Graph



TOTAL DEGREES BEND IN CABLE PATH	90°	180°	270°	360°	450°
<b>EFFICIENCY FACTORS</b>	1.10	1.18	1.27	1.35	1.43