



Electrical Downhole Cable

Weatherford's electrical downhole cable provides a reliable pathway between the in-well pressure and temperature gauges and surface data acquisition unit for both telemetry and power.

The permanent electrical downhole cable consists of four main elements plus optional encapsulation providing additional mechanical and chemical protection. Tubing-encased cable consists of a seven-stranded, tinned copper core with an outer insulating coat. Additional insulation is provided by the filler, which is used to centralize and anchor the conductor within the tubing.

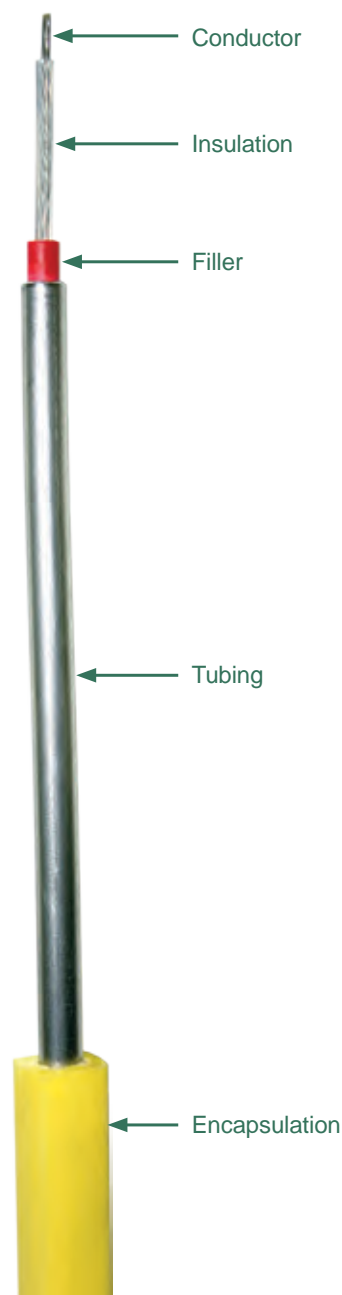
Material specification (metallurgy, wall thickness, polymer encapsulation selection) of each component is important to ensure the cable is matched to well conditions ensuring reliability and maximized performance.

Applications

- Used in conjunction with a range of permanently installed electronic downhole pressure and temperature sensing tools.

Features, Advantages and Benefits

- Splice free lengths >30,000 ft (>9,144 m)
- Tubing material: 316L and INCOLOY® 825
- All cables are pressure tested before leaving the manufacturing plant. Testing verifies cable armor integrity, in addition to the standard 'Eddie Current Testing' process.
- Encapsulation is available in a range of polymeric materials to suit various well conditions.
- Stranded core maximizes power and telemetry transmission characteristics.
- Process enhancements such as improved core concentricity, diameter tolerance, and surface finish improve reliability.
- Installation technique isolates and protects the cable from stress, thus ensuring reliability throughout the life of the well.



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Specifications

TEC Cable Specifications	Tube Wall Thickness (in./mm)		
	0.028 0.71 316L SS or INCOLOY 825	0.035 0.89 316L SS or INCOLOY 825	0.049 1.24 INCOLOY 825
Construction			
Conductor	7-strand tin copper – 18 AWG		
Insulator, TEFZEL (ETFE) wall thickness (in./mm)	0.030 0.76		
Filler layer	Expanded polyolefin		
Tubing OD (in./mm)	0.25 6.35		
Physical Properties			
Continuous maximum operating pressure (psi/bar)	316L SS – 11,500 316L SS – 792.94	316L SS – 17,500 316L SS – 1,206.65	INC 825 – 26,000 INC 825 – 1,792.73
	INC 825 – 13,500 INC 825 – 930.84	INC 825 – 18,000 INC 825 – 1,241.12	
Collapse pressure (psi/bar)	316L SS – 17,500 316L SS – 1,206.65	316L SS – 26,000 316L SS – 1,792.73	INC 825 – 39,000 INC 825 – 2,689.10
	INC 825 – 20,000 INC 825 – 1,379.03	INC 825 – 27,000 INC 825 – 1,861.68	
Weight (lb/1,000 ft, kg/1,000 m)	316L SS – 85.0 316L SS – 126.5	316L SS – 97.0 316L SS – 144.36	INC 825 – 120.00 INC 825 – 180.08
	INC 825 – 148.00 INC 825 – 220.25	INC 825 – 160.00 INC 825 – 238.12	
Electrical Properties			
Armor DC resistance (68°F/20°C) (ohms/1,000 ft, ohms/1,000 m)	316L SS – 17.9 316L SS – 58.8	316L SS – 15.0 316L SS – 49.22	INC 825 – 17.2 INC 825 – 56.43
	INC 825 - 27.3 INC 825 – 89.6	INC 825 – 22.5 INC 825 – 73.82	
Capacitance, conductor to tube (pf/ft , pf/m)	316L SS – 23.3 316L SS – 76.45	316L SS – 25.0 316L SS – 82.03	INC 825 – 36.0 INC 825 – 118.12
	INC 825 – 23.0 INC 825 – 75.46	INC 825 – 30.0 INC 825 – 98.43	
Conductor DC resistance (68°F/20°C) (ohms/1,000 ft, ohms/1,000 m)	6.7 21.98		
Voltage rating (continuous)	1,000 VDC		
Insulation resistance (68°F/20°C), conductor to tube, (mohms/1,000 ft, mohms/1,000 m)	884 2,900		



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Specifications (continued)

Encapsulation Type	Maximum Temperature Rating (°F/°C)	Abrasion Resistance	Resistance to Brines	Resistance to Hydrocarbons
Nylon 11 (Rilsan 11)	275 135	5	3	5
Polypropylene impact copolymer	302 150	3	5	3
Santoprene 203-50		3	5	3
Kynar PVDF or Hylar PVDF		4	4	5
ECTFE 350		5	5	5
ETFE		4	5	5

Recommended guidelines: 5 = Excellent, 1 = Poor