Load on electrical/optical armored cable

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Winch system (simplified)
Payload: Target strength- TS-sonde
Target strength TS sonde
CTD with LADCP
Camera-pod
Towed acoustic vehicle
Four conductors and three single mode optical fiber armored cable, designed and specially manufactured for industrial and scientific applications. The armor wires are high tensile, galvanized improved plow steel and preformed.

304 stainless steel tube with 3 Single Mode Fiber Diameter 0.052" 1.32 mm

24/17 AWG 7/ 0.018" 7/ 0.45 mm HDPE insulation diameter 0.134" 3.40 mm
Non conductive filler compound and binder tape HDPE jacket Compressed diameter 0.410" 10.41 mm
Inner armor 23/ 0.058" 23/ 1.47 mm Outer armor 32/ 0.052" 32/ 1.32 mm
Nominal diameter 0.630" 16.00 mm

Nominal Properties

ELECTRICAL
Maximum D.C. resistance at 68°F or 20°C 17 AWG cond. 5.4 Ω/Km 17.6 Ω/Km
Armor 0.8 Ω/Km 2.6 Ω/Km
Minimum insulation resistance at 500 Vdc 17 AWG cond./armor 32810 MΩ/Km 10000 MΩ/Km
17 AWG cond. 1000 Vrms 1000 Vrms

OPTICAL (3 Single mode fibers 9/125/245) Transmission:
at 1550 nm < 0.44 dB/Km
< 0.33 dB/Km
Proof test: 200 kpsi

MECHANICAL
Calculated weight:
in air 597 Lbs/Km 887 Kg/Km
in water (v=1.026) 473 Lbs/Km 704 Kg/Km
Temperature rating:
in 5 °C
max -15 °C
176 °F 80 °C
Minimum Breaking Strength:
Each strand 27500 Lbs 12660 daN
Each core 23580 Lbs 11900 daN
Diameter tolerances:
on reel 18.9 " 480 mm
on sheave 31.5 " 800 mm
Recommended minimum static diameter
Recommended minimum dynamic diameter
Nominal estimated torque

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3 fibres in stainless steel tube

Diameter 16 mm

Breaking strength: 12 000 daN
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- **weight of cable in water**
- **winch pull force**
- **cable + payload**
winch 104

Breaking Strength 12 000 daN

25% of breaking strength

- Weight of cable in water
- Winch pull force
- Cable + payload
- Recommended max work load

Meters paid out

Tonnes

0 1000 2000 3000 4000 5000 6000
Breaking Strength 12 000 daN

- weight of cable in water
- winch pull force
- cable + payload
- recommended max work load
- weight + dynamic forces
Questions?
Suggestions?