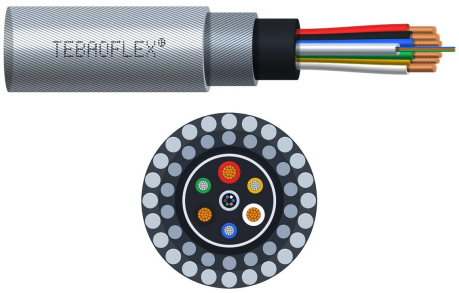
6,000 m Double-Armored Subsea Trencher & Observatory EO Umbilical



TEBAOFLEX® engineers 6,000 m-rated double and triple counter-helical galvanized extra-improved plow steel (GEIPS) armored subsea electro-optical (EO) umbilicals for tracked seabed trenchers, deep side-scan sonar tow bodies, and cabled benthic observatories. Covering slim 6.53–13.34 mm sonar/CTD EO lines (24.5–89.0 kN break) up to heavy 22.35–38.10 mm power-and-telemetry trunks (204.6–445 kN / 100,000 lbf break, 1–7 kV XLPE/PP/HDPE power, 1–60 fibers inside laser-welded 316L stainless optical tubes) and 73.0 mm hydraulic/aramid trencher hybrids.

1. Key Electrical, Thermal & Mechanical Ratings

Diameter Portfolio	6.53 mm (0.257") to 38.10 mm (1.500") EO | 73 mm Hyd.	**Breaking Loads (kN/lb)**	24.5 kN (5,500 lb) up to 445 kN (100,000 lbf) GEIPS
Depth & LARS Rating	Qualified to 6,000 m open-face & cyclic traction sheaves	**Optical Fiber Core**	1–60 SM (G.652D/G.657) & MM (62.5/125) in 316L tube
Power & Telemetry	Up to 7 kV XLPE/PP/PE power + shielded triples/quads/coax	**Armor Package**	Torque-balanced 2- or 3-layer GEIPS (lubricant-injected)
Temp Operating Range	-55 °C to +100 °C (extended high-temp fluoropolymer opt.)	**MOQ & Lead Time**	50 m test cut | 7–45 working days custom LARS reel

2. Layer-by-Layer Cable Construction

Torque-balanced 2- or 3-layer counter-helical plow-steel armor extruded/laid around a hermetic HDPE core housing 1–7 kV conductors and 316L steel-tube optics.

Central Stainless Optical Fiber Tube	1–60 SM (G.652D/G.657A1) or MM (62.5/125/245) fibers suspended in thixotropic gel inside TIG-welded 316L stainless tube
1–7 kV Power & Controlled-Z Elements	Bare or tinned flexible copper (1–7 kV XLPE/PP/HDPE) plus Al/PET-foil & tinned-braid screened triples, quads, and sonar coaxes
Extruded Water-Blocking Core Jacket	High-density HDPE, TPE, or PE void-free pressure sheath isolating electrical elements beneath outer steel wires
2- or 3-Layer Counter-Helical GEIPS Armor	Preformed galvanized extra-improved plow steel wires wound at opposed lay angles (24.5–445 kN break) w/ injected grease
Optional Abrasion TPE/HDPE Over-Jacket	Heavy extrusion over double steel armor (Trencher / Burial Plough) or bare greased steel for low hydro-drag sonar tow

3. Applicable Engineering & Testing Standards

• API RP 9B / ASTM A1007 Wireline & Armor: Preformed counter-helical galvanized plow-steel tensile balancing, torque neutrality (zero twist), and fatiguing

• ITU-T G.652D / G.657 / Telcordia GR-20: Optical fiber strain-relief excess fiber length (EFL) matching steel elongation up to working tension

• IEC 60502 & MIL-STD-167-1A Basis: Continuous 1–7 kV core dielectric stability (4–15 kV spark/tank) and deep submergence vibration immunity

4.1 6,000 m Heavy Armored Trencher, MUX / BOP & Benthic Observatory EO Umbilicals

Part Code	Outer Dia. (mm / in)	Breaking Load (kN / lbf)	Conductors	Optical Fibers	Over-Jacket / Tier
TBX-EO-4862	27.94 mm (1.100")	205 kN (45,000 lbf)	8 Cond Power/Ctrl	8 × MM/SM Tube	TPE Armored EO
TBX-EO-4485	30.99 mm (1.220")	231 kN (52,000 lbf)	15 Cond Power/Ctrl	Custom SM/MM	HDPE Outer Trencher
TBX-EO-5532	29.97 mm (1.180")	400 kN (90,000 lbf)	22 Cond Heavy	Custom SM/MM	HDPE Heavy MUX/Plough
TBX-EO-4818	38.10 mm (1.500")	276 kN (62,000 lbf)	28 Cond Power/Ctrl	Custom SM/MM	PE Armored Trencher
TBX-EO-4287	38.10 mm (1.500")	445 kN (100,000 lbf)	13 Cond MV/HV	62.5/125/245 Fiber	TPE Extreme Duty EO
TBX-EO-35HYD	73.00 mm (2.874")	88.3 kN (9,000 kg)	8×4×2.5 mm² (0.6/1 kV)	3 × 1/2" 350 bar Hose	Double Aramid PUR Hyd.

4.2 Counter-Helical Double-Armored Side-Scan Sonar & Deep Tow Instrumentation Cables

Part Code	Dia. (mm / in)	Break Load (kN / lbf)	Water Weight	Conductors / Coax	Optical / Zo Spec
TBX-TOW-5900	6.53 mm (0.257")	24.9 kN (5,600 lbf)	137 kg/km	2 Conductors	1 × Single-Mode (SMF)
TBX-TOW-5382	9.98 mm (0.393")	71.0 kN (16,000 lbf)	322 kg/km	2 Conductors (82 Ω/km)	2 × Single-Mode (SMF)
TBX-TOW-2799	11.43 mm (0.450")	71.2 kN (16,000 lbf)	379 kg/km	1 × 40-Ohm Coax	Armored Tow Sonar
TBX-TOW-3613	11.00 mm (0.433")	85.0 kN (19,100 lbf)	388 kg/km	1 × 45-Ohm Coax	Low-Drag Bare Steel
TBX-TOW-0480	12.17 mm (0.479")	84.5 kN (19,000 lbf)	469 kg/km	4 Cond + 4 Coax (35 Ω)	Multi-Channel Sonar
TBX-TOW-1301	12.65 mm (0.498")	89.0 kN (20,000 lbf)	448 kg/km	3 Cond + 3 Coax (30 Ω)	Deep Route Survey
TBX-TOW-0880	22.35 mm (0.880")	204.6 kN (46,000 lbf)	1,254 kg/km	18 Cond + 1 Coax (74 Ω)	TPE Observatory Trunk

Selection Note: Match LARS winch drum 40×OD sheave specs cleanly: specify TBX-EO-5532 (400 kN) or TBX-EO-4287 (445 kN) for tracked seabed trenchers and TBX-TOW-2799/5382 for streamlined deep sonar tows.

5. Quotation & Custom Manufacturing Checklist

Specify target depth (up to 6,000 m), breaking tension (24.5–445 kN), power voltage (1–7 kV), fiber count (SM/MM), bare grease-injected armor vs HDPE/TPE over-jacket, and length (MOQ 50 m).