

## **ANNEX A -TECHNICAL DESCRIPTION – GENERAL TERMS**

**PROJECT: Supply of medium-voltage power cables for Gantry Cranes and RMGs at the Container Terminal.**

This technical description concerns the supply of power cables for the gantry cranes and RMGs located at Pier I of the Container Terminal (SEMPO) of the Piraeus Port Authority.

## SPECIFICATIONS OF REQUIRED CABLES

The required equipment will be used on the gantry cranes and RMGs of the Piraeus Port Authority and must comply with the following specifications:

### 1) Medium Voltage Cable PRYSMIAN PROTOCOLON (SMK)-LWL (N)TSKCGEWOEU 3x25mm<sup>2</sup>+2x25mm<sup>2</sup>/2+1x(6LWL) 12/20KV\*

This is a flexible medium-voltage cable for applications such as:

- Gantry cranes and lifting systems in ports.
- Equipment with cable reeling drums (reeling systems).
- Mining and heavy industrial installations.
- Environments with high mechanical stress and the need for reliable data transmission.

Cable Specifications	
<b>Cable Type:</b>	PROTOCOLON® (SMK) (N)TSKCGEWOEU with integrated optical fibers (LWL)
<b>Conductor Structure:</b>	3 main power conductors: 3 × 25 mm <sup>2</sup> (stranded copper, FS category).
	2 grounding conductors: 2 × 25 mm <sup>2</sup> / 2 (split for symmetrical arrangement).
	1 optical fiber element: 1 × (6 LWL) for data transmission.
<b>Rated Voltage:</b>	12/20kV
<b>Maximum Permissible Voltage:</b>	24kV
<b>Insulation:</b>	High-quality EPR (Ethylene Propylene Rubber) with inner and outer semiconductive layers for electric field control.
<b>Inner Sheath:</b>	Polychloroprene (PCP).
<b>Outer Sheath:</b>	Double layer PCP rubber (type 5GM5), red color, oil-resistant, UV-resistant, ozone-resistant, flame-retardant.
<b>Anti-twist Protection:</b>	Textile braid between inner and outer sheath.
<b>Resistance:</b>	Operating temperature: -30 °C to +90 °C.
	Short-circuit temperature: +250 °C.
	Resistant to oil, UV, ozone.
<b>Mechanical Properties:</b>	Minimum bending radius: ≤ 5 × Ø (dynamic application)
	Maximum reeling speed: up to 120 m/min
	Maximum tensile load: 15–20 N/mm <sup>2</sup>
<b>Standards Required:</b>	DIN VDE 0250-813, IEC 60228
<b>Tests:</b>	Flame propagation IEC 60332-1-2
	Voltage Test 29 kV for 5 minutes (VDE 0250-813)

## 2) Medium Voltage Cable 20 kV PRYSMIAN – PANZERFLEX ELX 3x35mm<sup>2</sup>+2x25mm<sup>2</sup>/2+6LWL 12/20KV, FIBEROPTICS MONOMODE 9/125

Flexible medium-voltage cable for power supply systems with reeling drums and festoon systems. Designed for high mechanical stress, frequent bending, twisting, and rapid acceleration.

Applications include:

- Ship-to-shore cranes.
- Power supply systems with reeling drums.
- Mining installations and heavy industry.
- Environments requiring reliable data transmission.

Cable Specifications:	
<b>Cable Type:</b>	ELX 3*35+2*25/2+6LWL
<b>Conductor Structure:</b>	3 × 35 mm <sup>2</sup> , stranded copper, class 5 (IEC 60228), tinned for corrosion resistance.
	2 × 25 mm <sup>2</sup> / 2 (split for symmetrical arrangement).
	6 monomode fibers 9/125 μm integrated in central element.
<b>Rated Voltage:</b>	12/20kV
<b>Maximum Permissible Voltage:</b>	24kV
<b>Insulation:</b>	High-quality EPR with semiconductive layers.
<b>Inner Sheath:</b>	Polychloroprene (PCP).
<b>Outer Sheath:</b>	Red PCP, resistant to UV, oil, chemicals, and flame.
<b>Anti-twist Protection:</b>	Textile braid between inner and outer sheath.
<b>Resistance:</b>	Operating temperature: -30 °C to +90 °C.
	Short-circuit temperature: +250 °C.
	Resistant to oil, UV, ozone, flame
<b>Mechanical Properties:</b>	Minimum bending radius: ≤ 8 × Ø
	Maximum reeling speed: up to 180 m/min
	Maximum tensile load: 15–20 N/mm <sup>2</sup>
<b>Standards Required:</b>	VDE 0250-813, IEC 60228, DIN VDE 0298, IEC 60332-1-2, IEC 60811-404
<b>Certifications:</b>	CE, ISO 9001, ISO 14001
<b>Tests:</b>	Flame propagation IEC 60332-1-2,
	EMC performance EN 50081/50082
	Voltage test 29 kV for 5 minutes (VDE 0250-813)

### 3) Medium Voltage Cable 20 kV PANZERFLEX PROTOLO (SMK)-LWL (N)TSKCGEWOEU 3x25mm<sup>2</sup>+2x25mm<sup>2</sup>/2+1X(12E9LWL)

Flexible medium-voltage cable for power supply systems with reeling drums and festoon systems. Designed for high mechanical stress, frequent bending, twisting, and rapid acceleration. Applications include:

- Ship-to-shore cranes.
- Power supply systems with reeling drums.
- Mining installations and heavy industry.

Cable Specifications:	
<b>Cable Type:</b>	PROTOLO (SMK)-LWL (N)TSKCGEWOEU 3*25+2*25/2+1X(12E9LWL)
<b>Conductor Structure:</b>	3 × 25 mm <sup>2</sup> , stranded copper, class 5 (IEC 60228), tinned for corrosion resistance.
	2 × 25 mm <sup>2</sup> / 2 (split for symmetrical arrangement).
	12 monomode fibers 9/125 μm integrated in central element.
<b>Rated Voltage:</b>	12/20kV
<b>Maximum Permissible Voltage:</b>	24kV
<b>Insulation:</b>	High-quality EPR with semiconductive layers.
<b>Inner Sheath:</b>	PCP rubber (type 5GM3).
<b>Outer Sheath:</b>	Double PCP layer, red color, UV, oil, and flame resistant (IEC 60332-1-2).
<b>Anti-twist Protection:</b>	Textile braid between inner and outer sheath.
<b>Resistance:</b>	Operating temperature: -30 °C to +90 °C.
	Short-circuit temperature: +250 °C.
	Resistant to oil, UV, ozone, flame
<b>Mechanical Properties:</b>	Minimum bending radius: ≤ 8 × Ø
	Maximum reeling speed: up to 180 m/min
	Maximum tensile load: 15–20 N/mm <sup>2</sup>
<b>Standards Required:</b>	VDE 0250-813, IEC 60228, DIN VDE 0298, IEC 60332-1-2, IEC 60811-404

#### 4) Medium Voltage Cable 20 kV PANZERFLEX EL12/20KV 3x35mm<sup>2</sup> + 2x25mm<sup>2</sup>/2 + 6FOX2.5/125

This is a flexible medium-voltage cable for power supply systems with reeling drums and festoon systems. It is designed for high mechanical stress, frequent bending, twisting, and rapid acceleration, and is used in applications such as:

- Ship-to-shore cranes
- Power supply systems with reeling drums
- Mining installations and heavy industry

Cable Specifications:	
<b>Cable Type:</b>	EL12/20KV 3*35+2*25/2+6FOX2.5/125
<b>Conductor Structure:</b>	3 × 35 mm <sup>2</sup> , stranded copper, class 5 (IEC 60228), tinned for corrosion resistance.
	2 × 25 mm <sup>2</sup> / 2 (split for symmetrical arrangement).
	6 monomode fibers 2.5/125 μm integrated in central element.
<b>Rated Voltage:</b>	12/20kV
<b>Maximum Permissible Voltage:</b>	24kV
<b>Insulation:</b>	High-quality EPR (Ethylene Propylene Rubber) with inner and outer semiconductive layers for electric field control.
<b>Inner Sheath:</b>	PCP rubber (type 5GM3).
<b>Outer Sheath:</b>	Double PCP layer, red color, UV, oil, and flame resistant (IEC 60332-1-2).
<b>Anti-twist Protection:</b>	Textile braid between inner and outer sheath.
<b>Resistance:</b>	Operating temperature: -30 °C to +90 °C.
	Short-circuit temperature: +250 °C.
	Resistant to oil, UV, ozone, flame
<b>Mechanical Properties:</b>	Minimum bending radius: ≤ 8 × Ø
	Maximum reeling speed: up to 180 m/min
	Maximum tensile load: 15–20 N/mm <sup>2</sup>
<b>Standards Required:</b>	VDE 0250-813, IEC 60228, DIN VDE 0298, IEC 60332-1-2, IEC 60811-404
<b>Certifications:</b>	CE, ISO 9001, ISO 14001
<b>Tests:</b>	Flame propagation IEC 60332-1-2,
	EMC performance EN 50081/50082
	Voltage test 29 kV for 5 minutes (VDE 0250-813)

## Quantities

The above cables are requested in quantities according to the following table:

DESCRIPTION	MANUFACTURER	TYPE	PCS	METERS	QUANTITY
MV CABLE	PRYSMIAN	PROTOLON(SMK)-LWL (N)TSKCGEWOEU 3*25+2*25/2+1*(6LWL) 12/20KV	3	370	1110 m.
M.V. CABLE REEL 20KV	PRYSMIAN – PANZERFLEX	ELX 3*35+2*25/2+6LWL 12/20KV, FIBEROPTICS MONOMODE 9/125	2	260	520 m.
M.V. CABLE REEL 20KV	PANZERFLEX	PROTOLON (SMK)-LWL (N)TSKCGEWOEU 3*25+2*25/2+1X(12E9LWL)	1	440	440 m.
M.V. CABLE REEL 20KV	PANZERFLEX	EL12/20KV 3*35+2*25/2+6FOX2,5/125	4	320	1280 m.
M.V. CABLE REEL 20KV	PANZERFLEX	EL12/20KV 3*35+2*25/2+6FOX2,5/125	4	380	1520 m.

## General Terms

1. **Delivery Time:** Each offer must explicitly state the delivery time. Delivery time is 5–7 working weeks from contract signing.
2. **Place of Delivery:** General Materials Warehouse of PPA, Androutsou & Kanari, Drapetsona, Attica.
3. **DDP (Delivered Duty Paid):** Each offer must explicitly include the DDP term for each item offered. The supplier assumes all responsibilities and costs for delivering the goods to the specified destination, including customs clearance, duties, and import taxes.
4. **Payment Terms:** Within sixty (60) calendar days after the final receipt of cables and acceptance by the designated PPA acceptance committee.
5. The cables upon delivery will be accompanied by relevant certificates as described above.

Piraeus,  
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