Anhui Feichun Special Cable Co., Ltd.

安徽飞纯特种电缆有限公司

TECHNICAL SPECIFICATION

Type (N)TSKCGEWOEU Reeling Cable 3,6/6KV

Featured Specification

3,6/6KV Power Cable: 3x50+2x25/2+6G 9/125µm

Flexible medium voltage reeling cable with integrated fibre optics for combined transmission of energy and data.

Product Overview

Cable Brand: Protolon (SMK)-LWL
Cable Designation: (N)TSKCGEWOEU
Category: MV Medium Voltage Cables
Type: Flexible & Trailing Cables For Reeling Applications
Standard: DIN VDE 0250-813
Certification: GOST-R
Primary Industry: Crane Cables – Port Authorities

Application

The (N)TSKCGEWOEU cable is specified and installed for the combined transmission of energy and data in medium voltage flexible cable applications under high to extreme mechanical stresses, including:

- High travel speeds
- Dynamic tensile loads
- Multiple changes of direction into different planes
- Churning on running over rollers
- Torsional stresses
- Fast-moving container cranes
- Large mobile equipment

Available Voltage Ratings

Rating 1	Rating 2	Rating 3
3.6/6kV	6/10kV	8.7/15kV

> **Rating 4**
>
> 12/20kV

Design Features

Conductor

Conductor and earth conductor made of electrolytic copper tinned, very finely stranded, class FS (refer also to DIN VDE 0295).

Insulation

Protolon HS high grade special compound based on high-quality EPR (at least 3GI3); improved mechanical and electrical characteristics (refer also to DIN VDE 0207, Part 20).

Electrical Field Control

Inner semiconductive layer of EPR, outer semiconductive layer of modified NBR, capable of being stripped when cold and thus extremely easy to prepare (Easy Strip design).

Core Identification

Natural coloured insulation with black semi-conductive layer.

Core Arrangement

Three core design with cradle separator in the centre, earth conductor split into 2 parts positioned in two interstices. Optical element: six tubes, laid up around a central support element, with one, two or three optical fibers in each, positioned in the third interstice.

Cable Sheath System

1. **Protofirm Sandwich - Double Layer Inner Sheath:** Compound based on EPR, quality at least 5GM3, served as water barrier, colour: red
2. **Anti-torsion Braid:** Reinforced braid made of polyester threads, in a vulcanized bond between the sheaths, resulting in high strength of the sheath
3. **Protofirm Sandwich - Double Layer Outer Sheath:** A sheath system with a unique combination of flexibility and robustness achieved through new sandwich structure. Abrasion and tear-proof high grade rubber compounds based on PCP, quality at least 5GM5, colour: bright red/red

Electrical Parameters

Parameter	3.6/6kV	6/10kV	8.7/15kV	12/20kV
Rated Voltage	3.6/6kV	6/10kV	8.7/15kV	12/20kV
Max. Permissible Operating Voltage AC	4.2/7.2kV	6.9/12kV	10.4/18kV	13.9/24kV
Max. Permissible Operating Voltage DC	5.4/10.8kV	9/18kV	13.5/27kV	18/36kV
AC Test Voltage	11kV	17kV	24kV	29kV

EMC: This design exhibits an extremely low interference level as a result of use of a symmetrical three-core design with very narrow manufacturing tolerances.

Data Transmission: Special design with fibre-optics for trouble free data transmission at high data rates.

Current Carrying Capacity: According to DIN VDE 0298, Part 4. Higher values are permissible in specific cases (please consult the manufacturer).

Optical Fiber Specifications

Parameter	G50/125µm	G62.5/125µm	E9/125µm
Type	Graded-index fibre	Graded-index fibre	Monomode fibre
Attenuation at 850 nm	<2.8 dB/km	<3.3 dB/km	-
Attenuation at 1310 nm	<0.8 dB/km	<0.9 dB/km	<0.4 dB/km
Attenuation at 1550 nm	-	-	<0.3 dB/km
Bandwidth at 850 nm	>400 MHz	>400 MHz	-
Bandwidth at 1300 nm	>1200 MHz	>600 MHz	-
Numerical aperture	0.2 ± 0.02	0.275 ± 0.02	0.14 ± 0.02
Chromatic dispersion at 1300 nm	-	-	<3.5 ps/nm km
Chromatic dispersion at 1550 nm	-	-	<3.5 ps/nm km

Fiber Core Specifications:

- Fibre core diameter: 62.5, 50 or 9µm
- Diameter across the cladding: 125µm
- Diameter over the coating: 250µm
- Available with 6, 12, 18 or 24 fibres
- Specially developed color code for identification of individual fibres
- Fiber covering: Hollow core with filling compound, Basic material: ETFE, Compound: 7YI 1, Natural color

Chemical Parameters

Oil Resistance

According to DIN EN 60811-404 and DIN VDE 0473-811-404, paragraph 10

Weather Resistance

Unrestricted use outdoors and indoors, resistant to ozone, UV and moisture

Water Resistance

According to HD 2216

Thermal Parameters

Max. Permissible Temperature at Conductor

90 °C

Max. Short Circuit Temperature

250 °C

Ambient Temperature (Fixed Installation)

min -50 °C ; max +80 °C

Ambient Temperature (Fully Flexible Operation)

min -35 °C ; max +80 °C

Mechanical Parameters

Max. Tensile Load on Conductor

20 N/mm²

Max. Tensile Load During Acceleration

Up to 30 N/mm² (acc. to DIN VDE 0298 part 3: 15 N/mm²)

Torsional Stress

± 25 °/m

Min. Bending Radius

Acc. to DIN VDE 0298 part 3

Min. Distance (S-type Changes)

20 x D (D = cable diameter)

Travel Speed - Gantry

No restriction. For speeds beyond 240 m/min consult manufacturer

Additional Tests

Reversed bending test, torsional stress test

Technical Data Table - 3.6/6 kV Rating

Design with 12, 18 or 24 fibers and/or G50 or E9 types available upon request.

Cores x Cross Section	Part Number	MLFB Number	Conductor Ø max. (mm)	Earth Conductor Ø max. (mm)	Outer Ø min. (mm)	Outer Ø max. (mm)	Bending Radius min. (mm)	Weight (kg/km)	Tensile Force max. (N)	Dynamic Tensile Force max. (N)	Resistance at 20°C max. (Ω/km)	Current Capacity[1] (A)	Short Circuit Current (kA)
3x25 + 2x25/2 + 1x(6G62.5)	5DK3081	-	7.1	5	39.9	42.9	429	2570	1500	2250	0.8	131	3.58
3x35 + 2x25/2 + 1x(6G62.5)	20004468	5DK3082	8.3	5	42	45	450	2990	2100	3150	0.57	162	5.01
3x50 + 2x25/2 + 1x(6G62.5)	**20004469**	**5DK3083**	**9.9**	**5**	**44.8**	**47.8**	**478**	**3660**	**3000**	**4500**	**0.39**	**202**	**7.15**
3x70 + 2x35/2 + 1x(6G62.5)	20004470	5DK3084	11.8	5.9	49.9	53.9	539	4740	4200	6300	0.28	250	10.01
3x95 + 2x50/2 + 1x(6G62.5)	20004471	5DK3085	13.8	7.2	54.8	58.8	588	5920	5700	8550	0.21	301	13.59
3x120 + 2x70/2 + 1x(6G62.5)	20008293	5DK3086	15.4	8.3	58.2	62.2	622	7130	7200	10800	0.16	352	17.16

Cores x Cross Section	Part Number	MLFB Number	Conductor Ø max. (mm)	Earth Conductor Ø max. (mm)	Outer Ø min. (mm)	Outer Ø max. (mm)	Bending Radius min. (mm)	Weight (kg/km)	Tensile Force max. (N)	Dynamic Tensile Force max. (N)	Resistance at 20°C max. (Ω/km)	Current Capacity[1] (A)	Short Circuit Current (kA)
3x150 + 2x70/2 + 1x(6G62.5)	20007743	5DK3100	17.2	8.3	63.5	67.5	675	8500	9000	13500	0.13	404	21.45

Note: [1] Nominal current carrying capacity for rubber cables laid on a surface, at 30°C ambient temperature (see also VDE 0298-4, Table 15).

> **Important Installation Note:** Preparation of fibre-optics requires special skills and use of elaborate tools. It is recommended that performance of this work is entrusted to factory customer service (Factory assembly). Please provide the connection dimensions.

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This specification is subject to change without notice. For the most current information and specific application requirements, please contact our technical support team.

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