

## CORDAFLEX(SMK) (N)SHTOEU

Low voltage reeling cable for E-RTG's



### Application

Flexible low voltage reeling cable for power supply (also with integrated fiber optics), suitable for application under high and very high mechanical stresses. The main application is reeling operation on ERTG's (Electrified Rubber Tyred Gantry cranes).

### Global data

|                            |                           |
|----------------------------|---------------------------|
| Brand                      | CORDAFLEX(SMK)            |
| Type designation           | (N)SHTOEU-J/-O            |
| Standard                   | Based on DIN VDE 0250-814 |
| Certifications / Approvals | VDE Reg. Nr. 7519; GOST-R |

### Notes on installation

|                       |                                                                                                                                                                                                                                              |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Notes on installation | Preparation of fibre-optics requires special skills and use of elaborate tools. It is therefore recommended that performance of this work is entrusted to our customer service (Factory assembly). Please provide the connection dimensions. |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Design features

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                    |                |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|----------------|
| Conductor           | Electrolytic copper tinned, very finely stranded class FS                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                    |                |
| Insulation          | PROTOLON MS<br>Special compound based on high-quality EPR (min. 3GI3); improved mechanical and electrical characteristics.                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                    |                |
| Core identification | Best identification as a result of light colored insulation with numbers printed in black for power and control cables, earth conductor green-yellow colored.                                                                                                                                                                                                                                                                                                                                                                |                    |                    |                |
| Optical Fiber       | Fibre core diameter: 62.5, 50 or 9µm; diameter across the cladding: 125µm; diameter over the coating: 250µm.<br>Design available with 6,12, 18 or 24 fibres.                                                                                                                                                                                                                                                                                                                                                                 |                    |                    |                |
|                     | Fibre class:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 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 coding        | Specially developed color code for identification of the individual fibres                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                    |                |
| Fiber covering      | Hollow core with filling compound, Basic material: ETFE, Compound: 7YI 1, Natural color                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                    |                |
| Core arrangement    | Laid-up in a maximum of 3 layers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                    |                |
| Sheath system       | - PROTOFIRM Special - Inner sheath:<br>High grade special compound based on PCP, color: yellow;<br>- Anti-torsion braid:<br>Reinforced braid made of polyester threads, in a vulcanized bond between the sheaths, resulting in a high strength of the sheath system;<br>- PROTOFIRM Special - Outer sheath:<br>A sheath system with a unique combination of flexibility and robustness has been achieved through the use of this structure. Abrasion and tear resistant special rubber compound based on PCP, color: yellow. |                    |                    |                |
| Marking             | CORDAFLEX (SMK) (N)SHTOEU -J/-O (number of cores) x (cross section)+VDE Reg.-Nr.                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                    |                |

### Electrical parameters

|                                       |                                                                                         |
|---------------------------------------|-----------------------------------------------------------------------------------------|
| Rated voltage                         | 0.6/1 kV (600/1000V)                                                                    |
| Max. permissible operating voltage AC | 0.7/1.2 kV                                                                              |
| Max. permissible operating voltage DC | 0.9/1.8 kV                                                                              |
| AC Test Voltage                       | 3.5 kV (5 Min.)                                                                         |
| Data transmission                     | Special design with fibre-optics for trouble free data transmission at high data rates. |
| Current Carrying Capacity description | Acc. to DIN VDE 0298-4                                                                  |

#### Chemical parameters

|                    |                                                                             |
|--------------------|-----------------------------------------------------------------------------|
| Resistance to oil  | Acc. to DIN EN 60811-404; DIN VDE 0473-811-404, paragraph 10                |
| Weather resistance | Unrestricted use outdoors and indoors, resistant to ozone, UV and moisture. |
| Water resistance   | Given and verified in long-term tests                                       |

#### Thermal parameters

|                                                 |                         |
|-------------------------------------------------|-------------------------|
| Max. permissible temperature at conductor       | 90 °C                   |
| Max. short circuit temperature of the conductor | 250 °C                  |
| Ambient temperature for fixed installation      | min -50 °C ; max +80 °C |
| Ambient temperature in fully flexible operation | min -35 °C ; max +80 °C |

#### Mechanical parameters

|                                               |                                                                                                                                                                            |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Max. tensile load on the conductor            | 30 N/mm <sup>2</sup>                                                                                                                                                       |
| Torsional stress                              | ± 50 °/m                                                                                                                                                                   |
| Min. bending radius                           | Acc. to DIN VDE 0298 part 3                                                                                                                                                |
| Min. distance with S-type directional changes | 20 X D                                                                                                                                                                     |
| Travel speed                                  | - Gantry (reeling operation): no restriction. It is recommended to consult the manufacturer for speeds beyond 240m/min;<br>- Trolley (festoon operation): up to 240 m/min. |
| Additional tests                              | Reversed bending test, roller bending test, torsional stress test.                                                                                                         |

| Number of cores x cross section                                                 | Part number | MLFB Number | Conductor diameter max. mm | Outer diameter min. mm | Outer diameter max. mm | Bending radius free moving min. mm | Weight (ca.) kg/km | Permissible tensile force max. N | Conductor resistance at 20°C max. Ω/km | Current carrying capacity (1) A | Short Circuit Current (conductor) kA |
|---------------------------------------------------------------------------------|-------------|-------------|----------------------------|------------------------|------------------------|------------------------------------|--------------------|----------------------------------|----------------------------------------|---------------------------------|--------------------------------------|
| (N)SHTOEU-J power cables, 3-core design, earth conductor split in three         |             |             |                            |                        |                        |                                    |                    |                                  |                                        |                                 |                                      |
| 3x35+3x16/3                                                                     | 20004037    | 5DH3121     | 8.4                        | 28.7                   | 31.7                   | 159                                | 1990               | 3150                             | 0.57                                   | 162                             | 5.01                                 |
| 3x50+3x25/3                                                                     | 20004038    | 5DH3122     | 10.3                       | 34.4                   | 37.4                   | 187                                | 2810               | 4500                             | 0.39                                   | 202                             | 7.15                                 |
| 3x70+3x35/3                                                                     | 20004039    | 5DH3123     | 12                         | 39.7                   | 42.7                   | 214                                | 3860               | 6300                             | 0.28                                   | 250                             | 10.01                                |
| 3x95+3x50/3                                                                     | 20004040    | 5DH3124     | 14                         | 44.3                   | 47.3                   | 237                                | 4950               | 8550                             | 0.21                                   | 301                             | 13.59                                |
| 3x120+3x70/3                                                                    | 20004041    | 5DH3125     | 15.8                       | 51                     | 55                     | 275                                | 6440               | 10800                            | 0.16                                   | 352                             | 17.16                                |
| 3x150+3x70/3                                                                    | 20004042    | 5DH3126     | 17.5                       | 53.9                   | 57.9                   | 290                                | 7500               | 13500                            | 0.13                                   | 404                             | 21.45                                |
| 3x185+3x95/3                                                                    | 20004043    | 5DH3127     | 19.4                       | 58.9                   | 62.9                   | 315                                | 8990               | 16650                            | 0.11                                   | 461                             | 26.46                                |
| 3x240+3x120/3                                                                   | 20004044    | 5DH3128     | 22.5                       | 67.4                   | 71.4                   | 357                                | 11940              | 21600                            | 0.08                                   | 540                             | 34.32                                |
| 3x300+3x150/3                                                                   | 20051390    | 5DH3119     | 25.2                       | 75.6                   | 79.6                   | 398                                | 14740              | 27000                            | 0.07                                   | 620                             | 42.9                                 |
| (N)SHTOEU-J 3-core design power cables with FO, earth conductor splitted in two |             |             |                            |                        |                        |                                    |                    |                                  |                                        |                                 |                                      |
| 3x35 + 2x16/2 + 1x(6G62,5)                                                      |             | 5DH3***     | 8.4                        | 35.7                   | 38.7                   | 194                                | 2390               | 3150                             | 0.57                                   | 162                             | 5.01                                 |
| 3x50 + 2x25/2 + 1x(6G62,5)                                                      |             | 5DH3***     | 10.3                       | 39.9                   | 42.9                   | 215                                | 3220               | 4500                             | 0.39                                   | 202                             | 7.15                                 |
| 3x70 + 2x35/2 + 1x(6G62,5)                                                      |             | 5DH3***     | 12                         | 43.7                   | 46.7                   | 234                                | 4200               | 6300                             | 0.28                                   | 250                             | 10.01                                |
| 3x95 + 2x50/2 + 1x(6G62,5)                                                      |             | 5DH3***     | 14                         | 47.6                   | 50.6                   | 253                                | 5220               | 8550                             | 0.21                                   | 301                             | 13.59                                |
| 3x120 + 2x70/2 + 1x(6G62,5)                                                     |             | 5DH3***     | 15.8                       | 54                     | 58                     | 290                                | 6700               | 10800                            | 0.16                                   | 352                             | 17.16                                |
| 3x150 + 2x70/2 + 1x(6G62,5)                                                     |             | 5DH3283     | 17.5                       | 57                     | 61                     | 305                                | 7750               | 13500                            | 0.13                                   | 404                             | 21.45                                |
| 3x185 + 2x95/2 + 1x(6G62,5)                                                     | 20155139    | 5DH3284     | 19.4                       | 59.5                   | 63.5                   | 318                                | 9200               | 16650                            | 0.11                                   | 461                             | 26.46                                |
| 3x240 + 2x120/2 + 1x(6G62,5)                                                    | 20168346    | 5DH3***     | 22.5                       | 69.7                   | 73.7                   | 369                                | 12320              | 21600                            | 0.08                                   | 540                             | 34.32                                |
| 3x300 + 2x150/2 + 1x(6G62,5)                                                    |             | 5DH3***     | 25.2                       | 78                     | 82                     | 410                                | 15000              | 27000                            | 0.07                                   | 620                             | 42.9                                 |

(1) Nominal current carrying capacity for rubber cables laid on a surface, at 30°C ambient temperature (see also VDE 0298-4, Table 15). Design with 12,18 or 24 fibers and/or G50 or E9 types available upon request.

## NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.