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QFCI

4, 8 , 12, 24 or 48 fibers Armoured

Loose tube, jelly filled

Fire resistant, SHF1, UV

NEK TS 606 F101(F1)

DNV-GL, ABS

Application

Fiberoptical cable for the oil- and offshore industry and other harsh environments. The cable has excellent communication properties and is tested to be operative in at least 180 min. at 1,000°C which means that it can maintain vital communication in case of a fire situation. The fibers are protected in jelly filled loose tubes stranded around a central strength member to ensure optimum performance and long life. Each fiber and loose tube is color coded for easy identification during splicing and termination.



Construction

| | |
|--------------------------|--|
| Fibers | Loose tube jelly filled MM 62.5 and 50, SM 9 |
| Loose tube diam. | 2.2 [mm] |
| Inner jacket | SHF1 10.1 [mm] |
| Tensile strength support | Centre steel wire |
| Armour alt.1 | Galvanised steel wire braid |
| Armour alt.2 | Tinned Cu-braid |
| Armour alt.3 | Bronze wire braid |
| Jacket | Black SHF1 |
| O.D. | 13.5 [mm] |
| Weight | 260 [kg/km] |
| Jacket marking | NEK Kabel QFCI FIBER OPTIC CABLE IEC 60331-25 SHF1 |



Specifications

| | |
|------------------------------|-------------------|
| Operating temperature | -40 – +70 [°C] |
| Temperature @ installation | -10 to +60 [°C] |
| Tensile strength installed | 500 [N] |
| Crush test | 3000 [N/10cm] |
| Impact | 30 [J] |
| Torsion | ±1 [turn/m] |
| Min. bending radius | 15 [x outer diam] |
| Min. bending radius flexible | 20 [x outer diam] |



Norms

| | |
|--|--|
| Halogenfree, max content corrosive and toxic gases | IEC 60754-1, -2 |
| Sheathing material | IEC 60092-360 (359) NEK TS 606 F101 (F1) |
| Fire retardant | IEC 60332-3-22 Cat.A |
| Fire resistant | IEC 60331-25 180 min. 1,000°C |
| Weather resistant | IEC 60794-1-22-F1 |
| Ozone resistant | IEC 60811-2-1 |
| Oil and fuel, hydrocarbons resistant | IEC 60811-404 IRM 903 |
| Smoke emission | IEC 61034-1, -2 EN 50268-2 |
| UV-resistant | ASTM G 154 |
| Certification | DNV-GL, ABS |



Also available with SHF2 jacket or SHF2 MUD.
 Alternatively with copper or bronze armour.



Table Fiber

| Number of fibers | Number of fibers per tube | Number of fibers and tubes | Weight [kg/km] | Part no. |
|------------------|---------------------------|----------------------------|----------------|----------|
| 4 - 9/125 | 2 | 2 + 4 | 260 | 1042410 |
| 8 - 9/125 | 4 | 2 + 4 | 260 | 1042411 |
| 12 - 9/125 | 4 | 3 + 3 | 260 | 1042412 |
| 24 - 9/125 | 6 | 4 + 2 | 260 | 1042413 |
| 48 - 9/125 | 12 | 4 + 2 | 260 | 1042414 |
| 4 - 62.5/125 | 2 | 2 + 4 | 260 | 1042415 |
| 8 - 62.5/125 | 4 | 2 + 4 | 260 | 1042416 |
| 12 - 62.5/125 | 4 | 3 + 3 | 260 | 1042417 |
| 24 - 62.5/125 | 6 | 4 + 2 | 260 | 1042418 |
| 48 - 62.5/125 | 12 | 4 + 2 | 260 | 1042419 |
| 4 - 50/125 OM3 | 2 | 2 + 4 | 260 | 1042420 |
| 8 - 50/125 OM3 | 4 | 2 + 4 | 260 | 1042421 |
| 12 - 50/125 OM3 | 4 | 3 + 3 | 260 | 1042422 |
| 24 - 50/125 OM3 | 6 | 4 + 2 | 260 | 1042423 |
| 48 - 50/125 OM3 | 12 | 4 + 2 | 260 | 1042424 |
| 4 - 50/125 OM2 | 2 | 2 + 4 | 260 | 1091195 |
| 8 - 50/125 OM2 | 4 | 2 + 4 | 260 | 1091196 |
| 12 - 50/125 OM2 | 4 | 3 + 3 | 260 | 1091197 |
| 24 - 50/125 OM2 | 6 | 4 + 2 | 260 | 1091198 |
| 12 - 9/125 | 6 | 3 + 3 | 260 | 1091091 |
| 24 - 9/125 | 6 | 4 + 2 | 260 | 1091092 |
| 48 - 9/125 | 12 | 4 + 2 | 260 | 1091093 |

Fiber data

| Properties | MM 62.5 OM1 | MM 50 OM2 | MM 50 OM3 | MM 50 OM4 |
|---|------------------|------------------|------------------|------------------|
| Core Diameter | 62.5 ± 2.5 µm | 50 ± 2.5 µm | 50 ± 2.5 µm | 50 ± 2.5 µm |
| Core non-circularity | < 5% | < 5% | < 5% | < 5% |
| Cladding diameter | 125 ± 1.0 µm | 125 ± 1.0 µm | 125 ± 1.0 µm | 125 ± 1.0 µm |
| Coating diameter | 242 ± 5 µm | 242 ± 5 µm | 242 ± 5 µm | 242 ± 5 µm |
| Cladding non-circularity | <0.7% | <0.7% | <0.7% | <0.7% |
| Core/Cladding concentricity error | <1 µm | <1 µm | <1 µm | <1 µm |
| Coating/cladding concentricity error | <10 µm | <6 µm | <6 µm | <6 µm |
| Numerical Aperture | 0.275 ± 0.015 µm | 0.200 ± 0.015 µm | 0.200 ± 0.015 µm | 0.200 ± 0.015 µm |
| Attenuation @ 850 nm | <3.50 dB/km | <2.89 dB/km | <2.89 dB/km | <2.89 dB/km |
| Attenuation @1300 nm | <1.00 dB/km | <0.80 dB/km | <0.80 dB/km | <0.80 dB/km |
| Bandwidth @ 850 nm | >200 MHz*km | >500 MHz*km | >1500 MHz*km | >3500 MHz*km |
| Bandwidth @ 1300 nm | >500 MHz*km | >500 MHz*km | >500 MHz*km | >500 MHz*km |
| Effective Modal Bandwidth (EMB)@ 850 nm | | | >2000 MHz*km | >4700 MHz*km |
| Fibre capacity 10GBase-SR | 33 m | 83 m | 300 m | 550 m |
| Fibre cap. 40GBase-SR4/100Base-RS10 | 274 m | 600 m | 1000 m | 1100 m |
| Fibre cap. 40GBase-SR4/100Base-RS10 | | | 140 m | 170 m |
| Proof test | >100kpsi | >100kpsi | >100kpsi | >100kpsi |



| Properties | SMR ITU-T G652D | SMR ITU-T G657A | SMR ITU-T G657B | SMR NZD ITU-T G655.E |
|--|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|
| Mode field Diameter @ 1310 nm | 9,0±0,4 µm | 9,2±0,4µm | 8,9±0,4 µm | - |
| Mode field Diameter @ 1550 nm | 10,1±0,5µm | 10,1±0,5µm | 9,9±0,5µm | 9,2±0,5µm |
| Cladding diameter | 125±0,7µm | 125±0,7µm | 125±0,7µm | 125±1,0µm |
| Coating diameter | 242±7 µm | 242±7 µm | 242±7 µm | 242±7 µm |
| Cladding non-circularity | ≤ 0,7 % | ≤ 0,7 % | ≤ 0,7 % | ≤ 0,7 % |
| Core/Cladding concentricity error | ≤ 0,5 µm | ≤ 0,5 µm | ≤ 0,5 µm | ≤ 0,5 µm |
| Coating/cladding concentricity error | ≤ 12 µm | ≤ 12 µm | ≤ 12 µm | ≤ 12 µm |
| Cable Cut off wavelength | ≤ 1260 nm | ≤ 1260 nm | ≤ 1260 nm | ≤ 1300 nm |
| Zero dispersion wavelength (λ ₀) | 1300-1322 µm | 1300-1322 µm | 1300-1324 µm- | ≤ 1440 nm |
| Dispersion slope (S ₀) @ (λ ₀) | ≤ 0,090 ps/(nm ² * km) | ≤ 0,090 ps/(nm ² * km) | ≤ 0,092 ps/(nm ² * km) | - |
| Chromatic dispersion @ 1285 – 1330 nm | ≤ 3,5 ps/(nm * km) | ≤ 3,5 ps/(nm * km) | - | - |
| Chromatic dispersion @ 1550 nm | ≤ 18 ps/(nm * km) | ≤ 18 ps/(nm * km) | - | - |
| Chromatic dispersion @ 1625 nm | ≤ 22 ps/(nm * km) | ≤ 22 ps/(nm * km) | - | - |
| Chromatic dispersion @ 1530 – 1565 nm | - | - | - | 5,5 ÷ 10 ps/(nm * km) |
| Chromatic dispersion @ 1565 – 1625 nm | - | - | - | 7,5 ÷ 13,8 ps/(nm * km) |
| PMD @ 1550 nm | ≤ 0,1 ps/√ km | ≤ 0,1 ps/√ km | ≤ 0,1 ps/√ km | ≤ 0,2 ps/√ km |
| Attenuation @ 1310 nm | ≤ 0,35 dB/km | ≤ 0,35 dB/km | ≤ 0,35 dB/km | ≤ 0,40 dB/km |
| Attenuation @ 1383nm | ≤ 0,35 dB/km | ≤ 0,35 dB/km | ≤ 0,35 dB/km | ≤ 1,00 dB/km |
| Attenuation @ 1550 nm | ≤ 0,25 dB/km | ≤ 0,25 dB/km | ≤ 0,25 dB/km | ≤ 0,25 dB/km |
| Attenuation @ 1625 nm | ≤ 0,28 dB/km | ≤ 0,28 dB/km | ≤ 0,28 dB/km | ≤ 0,28 dB/km |
| Attenuation with bending: | | | | |
| Mandreal Radius 15mm @1550 10 turns | - | ≤ 0,25 dB | ≤ 0,03 dB | - |
| Mandreal Radius 15mm @1625 10 turns | - | ≤ 1,0 dB | ≤ 1,0 dB | - |
| Mandreal Radius 10mm @1550 1 turn | - | ≤ 0,75 dB | ≤ 0,1 dB | - |
| Mandreal Radius 10mm @1625 1 turn | - | ≤ 1,5 dB | ≤ 0,2 dB | - |
| Mandreal Radius 7,5mm @1550 1 turn | - | - | ≤ 0,5dB | - |
| Mandreal Radius 7,5mm @1625 1 turn | - | - | ≤ 01,0dB | - |
| Proof test | ≥ 100 kpsi | ≥ 100 kpsi | ≥ 100 kpsi | ≥ 100 kpsi |



Updated

| Date | Rev. | Description |
|------------|------|--------------------|
| 16.03.2015 | 1 | Armour |
| 14.12.2015 | 2 | Norms and Part no. |
| 23.01.2017 | 3 | Fiber data |
| 11.01.2018 | 4 | Updated Norms |