



## QFCU (QFCI MUD)

**Armoured SHF2, UV  
NEK 606, F5, QFCB  
Loose tube, jelly filled  
DNV-GL, ABS**



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### Application

Fiberoptical cable for use in vital communication and emergency systems, which needs to be operational during a fire situation (180 min. 1000°C). The fibers are protected in jelly filled loose tubes stranded around a central strength member to ensure high performance and long endurance. Individual colours for each fiber. 62.5, 50 and 9 µm fibers. MUD resistant jacket.



### Construction

Fibers	Loose tube jelly filled MM 62.5 and 50, SM 9
Loose tube diam.	2.2 [mm] Mica tape on each loose tube
Inner jacket	SHF1
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 SHF2
O.D.	16,5 [mm]
Weight	350 [kg/km]



- Outer jacket + MUD
- Loose tube
- Optical fiber
- Mica tape
- Strength element
- Filler, dummies
- Inner jacket
- Armour

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### 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)
Flame retardant	IEC 60332-3-22 cat.A
Fire resistant	IEC 60331-25 min. 1000°C
Ozone resistant	IEC 60811-2-1
Smoke emission	IEC 61034-1, -2
Chemical resistance	EC 60811-2-1 (Mineral oils)
MUD resistant	NEK TS 606 F5
UV-resistant	ASTM G 154
Certification	DNV-GL, ABS



## Table Fiber

Number of fibers	Number of fibers per tube	Number of fibers and tubes	Weight [kg/km]	Part no.
4 - 62,5/125	2	2 + 4	325	1091114
8 - 62,5/125	4	2 + 4	325	1091115
12 - 62,5/125	4	3 + 3	325	1091116
24 - 62,5/125	6	4 + 2	325	1091117
48 - 62,5/125	12	4 + 2	325	1091126
4 - 50/125 OM3	2	2 + 4	325	1091125
8 - 50/125 OM3	4	2 + 4	325	1091118
12 - 50/125 OM3	4	3 + 3	325	1091119
24 - 50/125 OM3	6	4 + 2	325	1091124
48 - 50/125 OM3	12	4 + 2	325	1091146
4 - 50/125 OM2	2	2 + 4	325	1042464
8 - 50/125 OM2	4	2 + 4	325	1042465
12 - 50/125 OM2	4	3 + 3	325	1042466
24 - 50/125	6	4 + 2	325	1042467
48 - 50/125	12	4 + 2	325	1091150
4 - 9/125	2	2 + 4	325	1091147
8 - 9/125	4	2 + 4	325	1091191
12 - 9/125	4	3 + 3	325	1091192
24 - 9/125	6	4 + 2	325	1091193
48 - 9/125	12	4 + 2	325	1091194

## 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 capacity 1GBase-SR	274 m	600 m	1000 m	1100 m
Fibre cap. 40GBase-SR4/100Base-RS10	274 m	600 m	1000 m	1100 m
Fibre cap. 40GBase-SR4/100Base-RS10			140 m	1740 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	9,0±0,4 µm	8,9±0,5 µm	-
Mode field Diameter @ 1550 nm	10,1±0,5µm	10,1±0,5µm	9,9 ± 0,5 µm	9,2 ± 0,5 µm
Cladding diameter	125±0,7 µm	125±0,7 µm	125±0,7 µm	125±01,0 µm
Coating diameter	242±7 µm	242±7 µm	242±7 µm	242±7 µm
Cladding non-circularity	≤ 0,7 %	≤ 0,7 %	≤ 0,7 %	≤ 1,0 %
Core/Cladding concentricity error	≤ 0,5 µm	≤ 0,5 µm	≤ 0,5 µm	≤ 0,6 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 <sub>0</sub> )	1300-1322 µm	1300-1322 µm	1300-1322 µm	1440 µm
Dispersion slope (S <sub>0</sub> ) @ (λ <sub>0</sub> )	≤ 0,090 ps/(nm <sup>2</sup> * km)	≤ 0,090 ps/(nm <sup>2</sup> * km)	≤ 0,092 ps/(nm <sup>2</sup> * 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	≤ 1,0 dB/km
Attenuation @ 1550 nm	≤ 0,25 dB/km	≤ 0,25 dB/km	≤ 0,25 dB/km	≤ 0,25 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	≤ 0,1 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	-	-	≤ 0,5 dB	-
Mandreal Radius 7,5mm @1625 1 turn	-	-	≤ 1,0 dB	-
Proof test	≥ 100 kpsi	≥ 100 kpsi	≥ 100 kpsi	≥ 100 kpsi



## Updated

Date	Rev.	Description
16.03.2015	1	Armour
28.12.2015	2	Revision of part. no.
23.01.2017	3	Fiber data