

**TYPE APPROVAL CERTIFICATE****This is to certify:****That the Data transmission cables and systems**with type designation(s)  
**QFCI F1/F101**

Issued to

**Draka Norsk Kabel - part of the Prysmian Group  
DRAMMEN, Norway**

is found to comply with

**DNV GL rules for classification – Ships and offshore units  
DNV GL class programme DNVGL-CP-0402 – Type approval – Optical fibre cables****Application :****Fire resistant fibre optic cable.****Product(s) approved by this certificate is/are accepted for installation on all vessels classed  
by DNV GL.**This Certificate is valid until **2021-06-29**.Issued at **Høvik** on **2016-10-12**DNV GL local station: **Station Oslo Maritime and CAP**for **DNV GL**Approval Engineer: **Ivar Bull**

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**Andreas Kristoffersen  
Head of Section**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Job Id: **262.1-002558-9**  
 Certificate No: **TAE000016E**  
 Revision No: **1**

## Product description

Optical fibre cables designed according to NEK TS 606 Ed5: 2016  
 Type QFCI-I/O/RM-JM/-F1 or F101 \*

Number of fibres	Number of fibres in each tube	Number of tubes + fillers	Loose tube diameter[mm]	Outer diameter [mm]
4	4	1+5	2,2	13,5
8	8	1+5	2,2	13,5
12	12	1+5	2,2	13,5
24	12	2+4	2,2	13,5
36	12	3+3	2,2	13,5
48	12	4+2	2,2	13,5
60	12	5+1	2,2	13,5
72	12	6+0	2,2	13,5

Fibre type	9/125	50/125-OM2	50/125-OM3	50/125-OM4	62.5/125-OM1
Fiber data sheet	C03	C34	C31	C32	C02
IEC60793-2-10, 20, 50 cat.	B.1.3	A1a.1	A1a.2	A1a.3	A1b
IEC11801 classification	OS2	OM2	OM3	OM4	OM1
ANSI/TIA/EIA classification	CAAB	AAAB	AAAC	AAAD	AAAA
ITU-T type	G652.D	G651.1	G651.1	G651.1	-
Core diameter	See mode field diameter	50 ± 2 m	50 ± 2 m	50 ± 2 m	62.5 ± 2.5 m
Mode field diameter	1310 nm 9.0 ± 0.4 m 1550 nm 10.1 ± 0.5 m				
Cladding diameter	125 ± 0.7 m	125 ± 1.0 m	125 ± 1.0 m	125 ± 1.0 m	125 ± 1.0 m
Primary coating diameter (nominal)	242 ± 7 m	242 ± 5 m	242 ± 5 m	242 ± 5 m	242 ± 7 m
Attenuation (Maximum values) 850 nm 1300 nm 1310 nm 1550 nm	0.39 dB/km 0.25 dB/km	2.7 dB/km 0.8 dB/km	3.0 dB/km 1.0 dB/km	3.0 dB/km 1.0 dB/km	3.2 dB/km 1.0 dB/km
Bandwidth(OFL) 850 nm 1300 nm		>500 MHzkm >500 MHzkm	>1500 MHzkm >500 MHzkm	>3500 MHzkm >500 MHzkm	>200 MHzkm >600 MHzkm
Chromatic Dispersion 1285-1330 nm 1550 nm 1625 nm	3 ps/nmkm 18 ps/nmkm 22 ps/nmkm				
Polarization Mode Disp. Max. Individual Fibre PMD <sub>o</sub> Link Design Value	0.5 ps/√km 0.2 ps/√km				
Group index of refraction 850 nm 1300/1310 nm(MMF/SMF) 1550 nm 1625 nm	1.467 1.468 1.468	1.482 1.477	1.482 1.477	1.482 1.477	1.496 1.491

\* F1 is designed according to NEK TS 606 Ed4: 2009

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## Application/Limitation

Temperature window

Operation: -40°C to +70°C  
Installation: -10°C to +70°C  
Storage: -40°C to +70°C

This type of cable is fire resistant in accordance with IEC 60331-25 (1000°C, 3 hours)

This type of cable is fire resistant in accordance with IEC 60331-2 (830°C, 2 hours) including water spray according to EN 50200, Annex E, Water jet according to BS 8491.

The requirements of SOLAS Amendments Chapter II-1, Part D, Reg. 45, 5.2 (provision to be taken to limit Fire Propagation along Bunches of Cables or Wires) are fulfilled without any additional measures.

## Type Approval documentation

### Tests carried out

Tested according to IEC 60794-1/-2, IEC 60331-25 (3 hours@1000C), IEC 60332-3-22, IEC 60332-3-24, IEC 60754-1/2, IEC 61034-1/2. Fire impact and water resistance test. IEC 60331-2, with additional water spray according to EN 50200 Annex E, additional water Jet according to BS 8491.

### Marking of product

Eg. "meter" DRAKA 01 "part no" QFCI – LSHF-FR - OPTICAL CABLE- "fibre type" – IEC 60331- 2- IEC 60331-25 IEC 60332-3-22 BATCH NO. "Batch no."

### Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval are complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Routine Tests (RT) checked (if not available tests according to RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Assessment to be performed at least every second year.

END OF CERTIFICATE