DNV·GL

Certificate No:
TAE000016E

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 **2016-10-07**

for **DNV GL**

DNV GL local station: **Station Oslo Maritime and CAP**

Approval Engineer: **Ivar Bull**

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.

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Job Id: **262.1-002558-9**
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Product description

Type QFCI-I/O/RM-JM/-

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

Fibre type	**9/125**	**HiCap 50/125**	**HiCap 62.5/125**	**MaxCap 50/125**
Reference(DNK)	**SMF652B**	**MMF50HiCap**	**MMF62HiCap**	**MMF50MaxCap**
IEC60793-2 category	B1.3	A1a	A1b	A1a.2
IEC11801 classification	OS1	OM2	OM1	OM3
ITU-T type	G652	-	-	-
Gigabit Ethernet maximum distances SX(850 nm) LX(1300 nm) LX(1310 nm)	 5000 m	 750 m 2000 m	 500 m 1000 m	
Core diameter	8.3 m (nominal)	50 ± 2.5 m	62.5 ± 2.5 m	50 ± 2.0 m
Mode field diameter	1310 nm 9.2 ± 0.4 m 1550 nm 10.4 ± 0.8 m			
Cladding diameter	125 ± 1.0 m	125 ± 2.0 m	125 ± 2.0 m	125 ± 1.0 m
Primary coating diameter (nominal)	250 m	250 m	250 m	250 m
Attenuation (Typical values) 850 nm 1300 nm 1310 nm 1550 nm	 0.37 dB/km 0.22 dB/km	 2.5 dB/km 0.7 dB/km	 3.0 dB/km 0.7 dB/km	 2.5 dB/km 0.8 dB/km
Attenuation-loose tube (Maximum values) 850 nm 1300 nm 1310 nm 1550 nm	 0.40 dB/km 0.25 dB/km	 2.7 dB/km 0.9 dB/km	 3.2 dB/km 0.9 dB/km	 3.0 dB/km 1.0 dB/km
Attenuation-tight buffer (Maximum values) 850 nm 1300 nm 1310 nm 1550 nm	 0.5 dB/km 0.35 dB/km	 2.8 dB/km 1.0 dB/km	 3.4 dB/km 1.0 dB/km	

Bandwidth(OFL*) 850 nm 1300 nm		>600 MHzkm >1200 MHzkm	>350 MHzkm >600 MHzkm	>200 MHzkm >600 MHzkm
Chromatic Dispersion 1285-1330 nm 1550 nm	3 ps/nmkm 18 ps/nmkm			
Polarization Mode Disp. 1550 nm	0.5 ps/(√km)			
Numerical aperture	0.13 (nominal)	0.200 ± 0.015	0.275 ± 0.015	0.200 ± 0.015
Minimum permanent bending diameter	50 mm	50 mm	50 mm	50 mm

Rev: LK02/03

* -Over Filled Launch methode(OFL). Modal Bandwidth in accordance with IEC60793-1-41.
OM3, other fibre types and qualities are available on request.

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 Publication 60331-25.

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 and BP-GS 112-2 Clause 7.1 Fire impact and water resistance test.

Marking of product

DRAKA NORSK KABEL or DRAKA 01 or Prysmian 01 - part no. - QFCI - fibre type – IEC 60331- IEC 60332-3-22.

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