TYPE APPROVAL CERTIFICATE

Certificate No:
TAE00000UH
Revision No:
1

This is to certify:

That the Fiber optical cable

with type designation(s)
QFCI-FV, QFCI-MICA, QFCB-FV, QFCB-MICA

Issued to
OPTRAL, S.A.
Sant Iscle de Vallalta, BARCELONA, Spain

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft
DNV GL class programme DNVGL-CP-0402 – Type approval – Optical fibre cables

Application :

Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Issued at **Høvik** on **2021-07-03**
This Certificate is valid until **2026-02-15**.
DNV local station: **Barcelona FIS**

Approval Engineer: **Georgy Abramenko**

for **DNV**

Marta Alonso Pontes
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.

Product description

Construction :	PTB loose-tubes (up to 12 fibres per tube)
Loose Tube	Gel Filled
Fire resistant layer	mica tape (-MICA) or fibre glass wire braid (-FV)
Central strength element	Glass fibre reinforced plastic rod (FRP)
Peripheral strength element	Reinforced fibreglass yams WB (Water Blocking)
Inner Sheath	SHF1
Armour	Galvanized steel wire braiding
Outer Sheath	SHF1, LSZH-MUD (QFCB cables)

Type	Definition IEC	Definition ISO 11801	Definition ITU-T	TIA/EIA
E9/125	60793-2-50 B1.3	OS2	G.652D	
E9/125	60793-2-50 B1.2	----	G.654	
E9/125	60793-2-50 B4/B5	----	G.655/G.656	
E9/125	60793-2-50 B6.A&B	----	G.657A1/A2/B2/B3	
G50/125	60793-2-10 A1a.1	OM2	G.651.1	
G50/125	60793-2-10 A1a.2	OM3	G.651.1	492AAAC
G50/125	60793-2-10 A1a.3	OM4	G.651.1	492AAAD
G50/125	60793-2-10 A1a.4	OM5	G.651.1	492AAAE
G62.5/125	60793-2-10 A1b	OM1	----	492AAAA

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.

For Safe Return to Port of passenger vessels: when DNV Rules Part 6.2.11 items 3.3.4.2 and 5.3.2.1 require fire resistant cables, these have to be tested according to IEC 60331-1/2.

Type Approval documentation

Tests carried out

Standard/ req. reference	Year of release	Description	Limitation
DNV-GL CP-0402	2019-07	Type approval of fibre optical cables	
IEC 60092-360	2014-04	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	
IEC 60331-25	1999-04	Tests for electric cables under fire conditions – Circuit integrity – Part 25: Procedures and requirements – Optical fibre cables	Minimum 90 min. During the course of the test, the maximum increase in attenuation shall not exceed the value stated in the relevant specification (1,5 dB per fibre).
IEC 60332-3-22	2009-02	Tests on electric and optical fibre cables under fire conditions – Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category A	Charred portion of sample does not exceed 2,5m above bottom edge of burner.

IEC 60754-1	2011-11	Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content	Low Halogen: <0,5% Halogen
IEC 60754-2	2011-11	Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity	Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 61034-1/2	2005-04	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance ≥60%
NEK TS 606	2009-05	Cables for offshore installations (cable type F1 QFCI)	
EN 50200:2016	2016-01	Method of test for resistance to fire of unprotected small cables for use in emergency circuits	QFCB cables

Marking of product

OPTRAL [manufacturing year] QFCI-FV or QFCI-MICA or QFCB-FV or QFCB-MICA – FIBER OPTIC CABLE [numCores]FO[ModeFieldDiameter] [Fibre type] / IEC 60331-25 / IEC 60332-3-22 – [Lot. No] / [meterMarking]m

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.

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE