Certificate No:
TAE00004D5

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Fiber optical cable

with type designation(s)
QFCI-FI

Issued to
Wuhan Hysin Ship Technology Co., Ltd.
Wuhan, **China**

is found to comply with
DNV rules for classification – Ships, offshore units, and high speed and light craft

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Issued at **Hamburg** on **2021-09-30**
This Certificate is valid until **2026-09-29**.
DNV local station: **Nanjing NB & CMC**

Approval Engineer: **Carsten Hunsalz**

for **DNV**

Arne Schaarmann
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

Product description

Fire resistant, flame retardant and halogen free universal fibre optic cable

Type: QFCI-FI

Loose tube: Jelly filled loose tubes with optical fibres of type E9/125 or G50/125 or G62.5/125 (2 to 24 fibres) or (26 to 48 fibres). The loose tubes are arranged in a circle around a strain relief element. The bundle is wrapped with an aluminum polyethylene laminate (APL), filled with filling compound
Inner sheath: Flame-retardant PE inner sheath with steel tape, jelly filled
Outer jacket: Fire resistant, flame retardant, halogen free, on SHF1 basis thermoplastic material
Outer diameter 13.4 mm

Type of fibres:

Type	Definition in IEC	Definition in ISO 11801	Definition ITU-T
E9/125	60793-2-50 B1.3	OS2	G.652D
G50/125	60793-2-10 A1a.1	OM2	G.651.1
G50/125	60793-2-10 A1a.2	OM3	G.651.1
G50/125	60793-2-10 A1a.3	OM4	G.651.1
G50/125	60793-2-10 A1a.4	OM5	G.651.1
G62.5/125	60793-2-10 A1b	OM1	without

Application/Limitation

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.

Fiber optical cable
Fire Resistant. Flame retardant in bunch Cat. A. Halogen free. Low smoke.

Temperature range: -40°C to 70°C
Tensile strength long-/short- time: 1000N/3000N

Bending radius static: 12,5D
Bending radius at -40°C: 20D

Type Approval documentation

Test Report: CT21-01530-2

Data Sheet: Wuhan Hysin Ship Technology
Marine Optical Fiber Cables 2021

Tests carried out

Standard	Release	General description	Limitation
DNVGL-CP-0402	2019-06	DNV GL Type approval program for optical fiber cables	
IEC 60794-1-21	2015-03	Optical fibre cables - Part 1-21: Generic specification - Basic optical cable test procedures - Mechanical tests methods	E1 Tensile strength E3 Crush E4 Impact E7 Torsion E10 Kink E11 Cable bend E11 Cold bend
IEC 60793-1-40	2019-03	Optical fibres - Part 1-40: - Attenuation	
IEC 60092-360	2021-01	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	
IEC 60332-1-2	2015-07	Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable –Procedure for 1 kW pre-mixed flame	
IEC 60332-3-22	2018-07	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 60331-25	1999-04	Tests for electric cables under fire conditions - Circuit integrity - Part 25: Procedures and requirements - Optical fibre cables	Changes in attenuation <1,5 dB (during 90 min. Fire Test)
IEC 60754-1	2019-11	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	2019-11	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	2019-11	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance >60%

Marking of product

Hysin - QFCI-FI - (No of fibers) - (model of optical fiber) – D (outer diameter) - meter mark - IEC 60331-25 – IEC 60332-3-22 - Lot No.

Place of Production

DNV GL id: 10591692

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