DNV·GL

Certificate No:
**TAE000042T**

# TYPE APPROVAL CERTIFICATE

## This is to certify:

**That the Fiber optical cable**

with type designation(s)
**QFCI & QFOI, QFAI**

Issued to
**ZHANGJIAGANG TWENTSCHE CABLE CO.,LTD**
**Zhangjiagang, Jiangsu, China**

is found to comply with
**DNV GL 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 GL.**

Issued at **Hamburg** on **2020-10-13**
This Certificate is valid until **2025-10-12**.
DNV GL local station: **Jiangyin NB & CMC**

Approval Engineer: **Carsten Hunsalz**

for **DNV GL**

**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 GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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.



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## Product description

QFCI & QFOI

| | |
|---|---|
| Construction: | PTB loose-tubes (up to 12 or 24 fibres per tube) |
| Loose Tube | Gel Filled |
| Fire resistant layer | Mica tape around each tube |
| Central strength element | Galvanized steel wire (with polymer over-coat if necessary) |
| Water Blocking Yarn | Water Blocking Yarn around the CSM |
| Inner Sheath | SHF1 |
| Armour | Galvanized steel wire braid or tinned copper wire braid |
| Outer Sheath | SHF1 |

QFAI

| | |
|---|---|
| Construction: | PTB loose-tube (up to 24 fibres) |
| Loose Tube | Gel filled |
| Fire resistant layer | Mica tape around the tube |
| Strength element | Tear rope (option) |
| Armour/Screen | Strength member of yarn |
| Outer Sheath | SHF1 |

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 |
| 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 90°C

## Type Approval documentation

## Tests carried out

| Standard | Release | General description | Limitation |
|---|---|---|---|
| DNVGL-CP-0402 | 2019-07 | DNV GL Type approval program for optical fiber cables | |
| IEC 60794-1-21 | 2015-04 | Optical fibre cables - Part 1-21: Generic specification - Basic optical cable test procedures - Mechanical tests methods | E1 Tensile strength<br>E3 Crush<br>E4 Impact<br>E7 Torsion<br>E10 Kink<br>E11 Cable bend<br>E11 Cold bend |
| IEC 60793-1-40 | 2019-03 | Optical fibres - Part 1-40: Measurement methods and test procedures - Attenuation | |
| 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 | 950°C – 1000°C<br>Minimum 180 min.<br>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 60332-1-2 | 2016-09 | Tests on electric cables under fire conditions.<br>Test for vertical flame propagation for a single insulated wire or cable. | |
| IEC 60332-3-22 | 2018-03 | 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 | |
| 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:<br><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:<br>pH > 4,3<br>Conductivity < 10µS/mm |
| IEC 61034-1/2 | 2013-06 | Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements | Low smoke<br>Light transmittance >60% |
| NEK TS 606 | 2016 | Cables for offshore installations (cable type F101 QFCI) | |

## Marking of product

Example:

ZTC TEXEL – QFCI - FIBER OPTIC CABLE - No of fibers - Fibre type - IEC 60331-25 - IEC 60332-3-22 - (Lot. No) - (manufacturing year) - (meter marking)

## 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