



Certificate no.:
TAE000053M

TYPE APPROVAL CERTIFICATE

This is to certify:

that the **Fiber optical cable**

with type designation(s)
FiberConnect® U-DQ(ZN)BH n ...

issued to

WEINERT Fiber Optics GmbH
Roth, Bayern, Germany

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 **2025-07-01**

This Certificate is valid until **2030-06-30**.

for **DNV**

DNV local unit: **Augsburg**

Approval Engineer: **Carsten Hunsalz**

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 USD 300 000.

Product description

Halogen free, flame retardant shipboard cable with sheathing compound type SHF1

Type: FiberConnect® U-DQ(ZN)BH n ...

Design:

Loose tube:

- Jelly filled loose tube, outer diameter 2.9 mm with 4-12 optical fibres and outer diameter 3.5 mm with 16-24 optical fibres. Tube colour: yellow (E9/125), green (G50/125), blue (G62.5/125)
- Colour code fibres (1-12): red, green, blue, yellow, white, grey, brown, violet, turquoise, black, orange, pink
- Colour code fibres (13-24): red, green, blue, yellow, white, grey, brown, violet, turquoise, transparent, orange, pink (always with black ring marking, except transparent)

Strain relief elements:

- E-glass yarns, as strain relief elements

Outer jacket:

- Halogen-free and flame-retardant material (FRNC), sheathing compound type SHF1.
- Wall thickness approx. 1.4 mm
- Colour: grey (OM1), green (OM2), aqua (OM3), magenta (OM4), lime (OM5), yellow (E9/125)

Fibers	Part number	Cable description	Outer diam. (mm)
4	84138023#	U-DQ(ZN)BH 4 ...	7.0
8	84138045#	U-DQ(ZN)BH 8 ...	7.0
12	84138067#	U-DQ(ZN)BH 12 ...	7.0
16	8413808B#	U-DQ(ZN)BH 16 ...	7.5
20	8413810D#	U-DQ(ZN)BH 20 ...	7.5
24	8413812F#	U-DQ(ZN)BH 24 ...	7.5

Application/Limitation

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.

Mechanical characteristics

Min. bending radius fixed (static) acc. IEC 60794-1-111 E11A:	20 x outside diameter 4 turns, 3 cycles
Max. tensile force acc. IEC 60794-1-21 E1, short term:	1000 N
Max. crush resistance acc. IEC 60794-1-21 E3, short term:	2500 N/dm
Max. crush resistance acc. IEC 60794-1-21 E3, long term:	1500 N/dm

Thermal characteristics

Transport, storage and operation:	- 25°C to + 70°C
Installation:	- 5°C to + 50°C

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC 60092-378	2024-11	Electrical installations in ships – Part 378: Optical fiber cables	
IEC 60794-1-21 IEC 60794-1-22 IEC 60794-1-23 IEC 60794-1-24	2020-03 2017-10 2020-01 2014-05	Optical fibre cables - Part 1-21/22/23/24: Generic specification - Basic optical cable test procedures	E1 Tensile strength E3 Crush E4 Impact E10 Kink F1 Temperature cycling G7 Tube kinking E11A Bending
IEC 60793-1-40	2019-03	Optical fibres - Part 1-40: - Attenuation	
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 60332-3-24	2018-07	Tests on electric and optical fibre cables under fire conditions – Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category C	
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 60684-2	2011-08	Clause 45.2 Methods of determination of low levels of fluorine	Fluorine content < 0,1%
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

WEINERT - FiberConnect® U-DQ(ZN)BH n fibre type (alternating current symbol twice) – IEC 60332-3-24 – DNV TAE000053M – (Order No.), (Reel No.), (sequential length in metres)

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