



TYPE APPROVAL CERTIFICATE

Certificate No:
TAE0000156
Revision No:
4

This is to certify:

That the Fiber optical cable

with type designation(s)
U-D(ZN)BH n ... FS ZB

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 **Høvik** on **2023-10-02**

This Certificate is valid until **2026-09-05**.

for **DNV**

DNV local unit: **Augsburg**

Approval Engineer: **Carsten Hunsalz**

Frederik Tore Elter
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 with circuit integrity and FRNC outer jacket
 Design:

Cable core:

- jelly-filled loose tube outer diameter 3.5 mm with 2-12 optical fibres and outer diameter 4.0 mm with 14-24 optical fibres
 Tube colour: yellow (E9/125), green (G50/125), blue (G62.5/125)
- Fibre colours (1-12): red, green, blue, yellow, white, grey, brown, violet, turquoise, black, orange, pink
 (13-24): red, green, blue, yellow, white, grey, brown, violet, turquoise, transparent, orange, pink (with black ring-marking)

Fire protection:

- Inner fire barrier: Fire protection tape made of woven glass
- Outer fire barrier: E-glass yarns, two layers (S and Z), as strain relief element and non-metallic rodent protection

Outer jacket:

- Halogen-free and flame-retardant material (SHF1, IEC 60092 Part 360), with approx. 1.2 mm wall
- Outer diameter 2 to 12 fibres 10.3 mm and 14 – 24 fibres 10.8 mm

Type of fibres

Part – No.	Type	Optical quality	Definition in IEC	Definition in ISO 11801	Definition ITU-T
84#####A	E9/125	0.38F3.5 / 0.22H18	60793-2-50 B-652.D / B-657.A1	OS2	G.652D/ G.657A1
84#####B	E9/125	0.36F3.5 / 0.22H18	60793-2-50 B-652.D	OS2	G.652D
84#####C	E9/125	0.38F3.5 / 0.22H18	60793-2-50 B-652.D / B-657.A1	OS2	G.652D/ G.657A1
84#####E	E9/125	0.38F3.5 / 0.22H18	60793-2-50 B-652.D / B-657.A1	OS2	G.652D/ G.657A1
84#####U	E9/125	0.38F3.5 / 0.22H18	60793-2-50 B-657.A2	OS2	G.657A2
84#####K	E9/125	0.38F3.5 / 0.22H18	60793-2-50 B-657.B3	OS2	G.657B3
84#####X	G50/125 BIMF	3.0B500 / 1.0F500	60793-2-10 A1-OM2	OM2	G.651.1
84#####H	G50/125	2.7B600 / 0.7F1200	60793-2-10 A1-OM2	OM2	G.651.1
84#####V	G50/125 BIMF	2.5B1500 / 0.7F500	60793-2-10 A1-OM3	OM3	G.651.1
84#####S	G50/125 BIMF	2.5B1500 / 0.7F500	60793-2-10 A1-OM3	OM3	G.651.1
84#####W	G50/125 BIMF	2.5B3500 / 0.7F500	60793-2-10 A1-OM4	OM4	G.651.1
84#####R	G50/125 BIMF	2.5B3500 / 0.7F500	60793-2-10 A1-OM4	OM4	G.651.1
84#####L	G62.5/125	3.2B200 / 0.9F500	60793-2-10 A1-OM1	OM1	without
84#####M	G62.5/125	3.0B300 / 0.8F800	60793-2-10 A1-OM1	OM1	without

Application/Limitation

This type of cable is fire resistant in accordance with IEC Publication 60331.

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.

Temperature Window

Installation:	-5°C to +50°C
Operation:	-40°C to +60°C
Storage:	-40°C to +70°C

Maximum Tensile Load

2500N

Minimum Bend Radius

Installation:	20 x outside diameter
Operation:	15 x outside diameter

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 60794-1-2	2021-01	Optical fibre cables – Part 1-2: Generic specification – Basic optical cable test procedures	E1 Tensile Strength F1 Temperature Cycling E3 Crush E6 Repeated bending F5B Water penetration
IEC 60794-1-21	2020-03	Optical fibre cables - Part 1-21: Generic specification - Basic optical cable test procedures - Mechanical tests methods	E4 Impact E7 Torsion E10 Kink E11 Cable bend E11 Cold bend E6 Repeated bending
IEC 60793-2-10	2019-05	Optical fibres - Part 2-10: Product specifications - Sectional specification for category A1 multimode fibres	
IEC 60793-2-50	2018-12	Optical fibres - Part 2-50: Product specifications - Sectional specification for class B single-mode fibres	
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 60811-201/202/203	2017-07	Electric and optical fibre cables Test methods for non-metallic materials Part 201/202/203: General tests Measurement of insulation thickness of thickness of non-metallic sheath of overall dimensions	Dimensions
EN 50200	2016-01	Method of test for resistance to fire of unprotected small cables for use in emergency circuits	180 minutes
IEC 60331-25	1999-04	Tests for electric cables under fire conditions – Circuit integrity – Part 25: Procedures and requirements – Optical fibre cables	90 minutes
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	Bunch test Category A
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
IEC 61034-1/2	2019-11	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke

Marking of product



Job Id: **262.1-011642-10**
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WEINERT - FiberConnect® fire resistant U-D(ZN)BH (No. of fibre) (fibre type) (alternating current symbol twice) - IEC 60332-3-22 - IEC 60331-25 - DNV TAE0000156 - batch no. - 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