Certificate no.:
TAE000051M

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Fiber optical cable

with type designation(s)
Central Loose Tube – Universal Cable type UT1EF, UT8x1.7F and UX1EF,
Stranded Loose Tube – Universal Cable type UT6x1,7F, UT8x1,7F and UT3x1,7F

issued to
Reichle & De-Massari AG
Wetzikon ZH, ZH, **Switzerland**

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 **2025-04-25**
This Certificate is valid until **2030-04-24**.
DNV local unit: **Augsburg**

for **DNV**

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

Central Loose Tube – Universal Cable type UT1EF and UX1EF

Cable construction:

Number of fibers:	UT1EF 4, 6, 8, 12 and UX1EF 24
Number of loose tubes:	1 (Gel filled)
Loose tube outer diameter [mm]:	UT1EF 2,3 and UX1EF 3.0
Strength member:	Water-blocking e-glass yarn with Rip-cord
Outer cable diameter [mm]:	UT1EF 5,2 and UX1EF 5.8
Outer sheath material type:	SHF1

Type of fibres:

Type	Definition in IEC
E9/125A1	60793-2-50 Typ B6_a1 (G.657.A1)
G62.5/125-OM1	60793-2-10 A1-OM1
G50/125-OM2	60793-2-10 A1b-OM2
G50/125-OM3	60793-2-10 A1b-OM3
G50/125-OM4	60793-2-10 A1b-OM4

Stranded Loose Tube – Universal Cable type UT6x1,7F and UT3x1,7F

Cable construction:

Number of tubes x fibers:	UT6x1,7F	2x12(24), 4x12(48), 6x12(72)
	UT8x1,7F	8x12(96)
	UT3x1,7F	12x12(144)
Number of loose tubes:	UT6x1,7F	2, 4, 6 (Gel filled)
	UT8x1,7F	8 (Gel filled)
	UT3x1,7F	12 (Gel filled)
Loose tube outer diameter [mm]:	1,7	
Strength member:	FRP with Water-blocking yarn and Water-blocking tape or e-glass yarn with Rip-cord	
Outer cable diameter [mm]:	UT6x1,7F 7.8 / UT8x1,7F 9.5 / UT3x1,7F 11.7	
Outer sheath material type:	SHF1	

Type of fibres:

Type	Definition in IEC
E9/125A1	60793-2-50 Typ B6_a1 (G.657.A1)
G50/125-OM3	60793-2-10 A1b-OM3
G50/125-OM4	60793-2-10 A1b-OM4

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 data:	During installation	In service
Min. bend radius:	d=20 x cable diameter	d=20 x cable diameter
Tensile strength:	1000N UT1EF and UX1EF 2000N UT6x1,7F and UT3x1,7F	300N UT1EF and UX1EF 800N UT6x1,7F, UT8x1,7F and UT3x1,7F
Temperature range:	-5 up to +50°C	-30 up to +70°C

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
DNV-CP-0402	2021-09	DNV Type approval program for optical fibre cables	
IEC 60794-1-21 IEC 60794-1-22 IEC 60794-1-23	2020-03 2017-10 2020-01	Optical fibre cables - Part 1-21/22/23: Generic specification - Basic optical cable test procedures	E1 Tensile strength E3 Crush E4 Impact E6 Repeated bending E7 Torsion E10 Kink E11 Cable bend E11 Cold bend F1 Temperature cycling
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	Test was carried out according to comparable EN 50399
IEC 60754-1	2019-11	Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content	SHF1 sheath 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	SHF1 sheath Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 60684-2	2011-08	Clause 45.2 Methods of determination of low levels of fluorine	SHF1 sheath Fluorine content < 0,1%

Marking of product

Example:

R&Mfreenet - UV.FRLSZH - Dca - DoP D9012 - UT1EF - CLT - single sheathed - rodent protected - universal-use - <number of fibers and fiber type> - <article number> - <production number> - *****m

R&Mfreenet - UV.FRLSZH - Eca - DoP D9020 - UT6x1,7F - SLT - single sheathed - rodent protected - universal-use - <number of stranding elements, number of fibers per stranding element and fiber type> - <article number> - <production number> - *****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