DNV·GL

Certificate No:
TAE00003F5

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Fiber optical cable

with type designation(s)
OC031016-XX

Issued to
Optical Cable Corporation
Roanoke, VA, USA

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 **2019-05-13**
This Certificate is valid until **2024-05-12**.
DNV GL local station: **New York**

for **DNV GL**

Approval Engineer: **Carsten Hunsalz**

Arne Schaarmann
Head of Section

Job Id: **262.1-010535-3**
Certificate No: **TAE00003F5**

Product description

2-6 CHANNELS FIBER OPTIC CABLE P/N OC031016-XX

Suffix (XX)	Channels	Fiber type	Core Dia.for MM/ mode dia.for SM [µm]	Fiber coating [µm]
-01	4	MM – OM1	62,5	245
-02	4	MM – OM1	62,5	500
-03	4	MM – OM2	50	245
-04	4	MM – OM2	50	500
-05	4	SM	9-10	245
-06	4	SM	9-10	500
-07	6	MM – OM1	62,5	245
-08	6	MM – OM1	62,5	500
-09	6	MM – OM2	50	245
-10	6	MM – OM2	50	500
-11	6	SM	9-10	245
-12	6	SM	9-10	500
-13	2	MM – OM1	62,5	245
-14	2	MM – OM1	62,5	500
-15	2	MM – OM2	50	245
-16	2	MM – OM2	50	500
-17	2	SM	9-10	245
-18	2	SM	9-10	500
-19	2	MM – OM3	50	245
-20	2	MM – OM3	50	500
-21	2	SM - BIF	9-10	245
-22	2	SM - BIF	9-10	500
-23	4	MM – OM3	50	245
-24	4	MM – OM3	50	500
-25	4	SM - BIF	9-10	245
-26	4	SM - BIF	9-10	500
-27	6	MM – OM3	50	245
-28	6	MM – OM3	50	500
-29	6	SM - BIF	9-10	245
-30	6	SM - BIF	9-10	500

BIF = Bend Insensitive Fiber

Part Number Configurations

Fiber type	Spec.	1) Core diameter [µm] 2) Cladding diameter [µm] 3) Fiber coating [µm] 4) Secondary buffer diameter [µm]				850 nm		1300 /1310 nm		1550 nm	
		1	2	3	4	Attenuation dB/km Bandwidth MHz-km		Attenuation dB/km Bandwidth MHz-km		Attenuation dB/km Bandwidth MHz-km	
MM	IEC 11801 OM1	62,5	125	245	900	3,5	200	1,5	500	N/A	N/A
MM	IEC 11801 OM1	62.5	125	500	900	3,5	200	1,5	500	N/A	N/A
MM	IEC 11801 OM2	50	125	245	900	3,5	500	1,5	500	N/A	N/A

MM	IEC 11801 OM2	50	125	500	900	3,5	500	1,5	500	N/A	N/A
MM	IEC 11801 OM3	50	125	245	900	3,5	500	1,5	500	N/A	N/A
MM	IEC 11801 OM3	50	125	500	900	3,5	500	1,5	500	N/A	N/A
SM	ITU-T-G.652.D	9-10	125	245	900	N/A	N/A	0,5	N/A	0,5	N/A
SM	ITU-T-G.652.D	9-10	125	500	900	N/A	N/A	0,5	N/A	0,5	N/A
SM	ITU-T-G.657.A1	9-10	125	245	900	N/A	N/A	0,5	N/A	0,5	N/A
SM	ITU-T-G.657.A1	9-10	125	500	900	N/A	N/A	0,5	N/A	0,5	N/A

Optical Fibers
Singlemode dispersion slope - 1310nm (≤0,092 ps/nm^2-km)

Application/Limitation

Temperature Window		Maximum Tensile Load		Minimum Bend Radius	
Installation: Operation: Storage:	-10°C to +60°C -40°C to +85°C -55°C to +85°C	Installation: Operation:	1200N 400N	Installation: Operation:	14,25 cm 9,5 cm

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.

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
DNVGL-CP-0402	2016-02	DNV GL Type approval program for optical fiber cables	
IEC 60794-1-1	2011-09	Optical fibre cables - Part 1-1: Generic specification - General	
IEC 60794-1-2	2003-05	E1 Tensile strength E3 crush E4 Impact E6 Repeated bending E7 Torsion E10Kink E11 cable bend and cold cable bend F1 Temperature cycling F5 water penetration	At temperature; -10°C
IEC 60811-1-1	2001-07	cl.9 Mechanical characteristics of outer jacket	
IEC 60811-1-2	2000-07	cl. 8.1 Mechanical characteristics after aging in air oven	
IEC 60811-3-1	2001-05	cl. 8.2Maximum permissible deformation	
		Heat shock test	
IEC 60811-1-4	1985-07	Elongation test	
		Cold impact test	

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	Flame retardant small scale
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 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: <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: pH > 4,3 Conductivity < 10µS/mm
IEC 61034-1/2	2013-07 2013-09	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance ≥60%

Marking of product

OPTICAL CABLE COPORATION - OC031016-XX - fibre type - IEC 60332-3-22

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