DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **E-11729**

This is to certify that the
Data transmission cables and systems

with type designation(s)
DA fiber cable

Issued to
TELDOR Cables & Systems Ltd.
Israel, **Israel**

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards
Type Approval Programme No. 6-827.50-1
IEC 60793-2-10 (2011)
IEC 60793-2-50 (2008)
IEC 60331-25 (1999-04)
IEC 60332-3-22 (2009-02)
IEC 60332-3-24 (2009-02)
IEC 60754-1/2 (2011-11)
IEC61034-1/2 (2005-04/2005-04)

Application
Fiber cable
Fire resistant. Flame retardant in bunch; cat A and cat C
Halogen free. Low smoke
Mud resistant (optional)

Voltage (kV)
Temp. class (°C)

This Certificate is valid until **2016-06-30**.

Issued at **Høvik** on **2014-03-28**

DNV local station: **Limassol**

Approval Engineer: **Ivar Bull**

for **Det Norske Veritas AS**
Digitally Signed By: Laumann, Marit
Location: DNV Høvik, Norway
Signing Date: 2014-03-28

Marit Laumann
Head of Section

Product description

Type : DA type fiber cable

multi loose tube or single loose tube or multi tight buffered
Corrugated-steel armored or steel wire braide fire resistant marine fiber optic cable

Construction	Tight buffered dry core or PBT loose-tubes [max 24 fibers per tube]
Central strength member	Dielectric or steel
Peripheral strength member	Aramid or glass yarn
Inner sheath	SHF2
Metallic covering	Galvanized or stainless steel wire, bronze wire or palstic-coated corrugated steel
Outer sheath	SHF2 or SHF MUD, single or double layer

Fiber code	Units	3	4	5	6	7	8	9	10
Standard designation		Multimode				Singlemode			
ISO/IEC 11801		OM4	OM3	OM2	OM1	-	-	OS2	-
ANSI TIA/EIA		AAAD	AAAC	AAAB	AAAA	-	-	-	-
IEC 60793-2-10		A1a.3	A1a.2	A1a.1	A1b	-	-	-	-
ITU-T		-	-	-	-	G657.A2	G655	G652.D	G657.A1
IEC 60793-2-50		-	-	-	-	B6_a2	B4	B1.3	B6_a1
Operating wavelength	nm	850 1300				1310 1550 1625	1550 1625	1310 1550 1625	
Core diameter	µm	50±2,5	50±2,5	50±2,5	62,5±3				
MFD @1310 nm	µm	-	-	-	-	8,6±0,4	-	9,2±0,4	8,6±0,4
MFD @1550 nm	µm	-	-	-	-	9,6±0,6	9,6±0,6	10,4±0,6	9,8±0,5
Cladding	µm	125±1			125±2	125±0,7			
Coating	µm	245±10				245±5			
Max attenuation Tight buffer	dB/km	3,5 @ 850 nm 1,2@1300 nm			3,5 @ 850 nm 1,5@1300 nm	0,4 @ 1310 nm 0,3 @ 1550 nm	-	0,4 @ 1310 nm 0,3 @ 1550 nm	
Max attenuation Loose tube	µm	2,8 @ 850 nm 0,9 @1300 nm			3,2 @ 850 nm 1,0@1300 nm	0,37 @ 1310 nm 0,22 @ 1550 nm 0,25 @ 1625 nm	0,22 @ 1550 nm 0,26 @ 1625 nm	0,37 @ 1310 nm 0,22 @ 1550 nm 0,25 @ 1625 nm	

For more details please see datasheet.

Application/Limitation

Temperature window :
Min. Installation temperature : -30°C
Operation temperature : -40°C to + 80°C
Storage temperature : -40°C to + 80°C

This cable is fire resistance in accorance with IEC 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.

Type Approval documentation

Datasheet Armoured fire-resistant low-halogen low smoke fiber optic communication cable type DA , revision 11/12 dated 2012-06-10

Type tests Bre global test report ; DA-6MT002EDK1W01 report no 277021-1
Bre global test report ; DA-MLD144DDJ1R01 report no 277021-5
DA6MT002EDK1W01; dated 2012-01-02
DA-MLD144DDJ1R01 ; dated 2012-01-02

Tests carried out

Standard	Release	General description	Limitation
IEC 60793-2-10	2011-03	Optical fibres - Part 2-10: Product specifications - Sectional specification for category A1 multimode fibres	
IEC 60793-2-50	2008-05	Optical fibres - Part 2-50: Product specifications - Sectional specification for class B single-mode fibres	
IEC 60092-359	1999-08	Sheathing materials for shipboard power 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	Minimum 90 min
IEC 60332-3-22	2009-02	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 60332-3-24	2009-02	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	Bunch test Category C
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:
IEC 60754-2	1999-07	Test on gases evolved during combustion of materials from cables – Determination of the degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and condctivity	Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 61034-1/2	2005-04	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke

Marking of product

DA	Fiber Type	Buffer	Fiber Count	CSM	Water Blocking	PSM	Inner Jacket	Armor	Options
DA	Para. 2	LD=Multi Loose Tube SL=Single Loose Tube MT=Multi Tight BO=Breakout	NNN	D=Dielectric E=None F=Aramid M=Steel	G=Gel D=Dry	N=None K=Aramid J=Glass Z=Glass	0=None 1=SHF2	R: corrugated steel tape W: helically would steel wire B: galv. steel wire braid P: Bronze wire braid	XX

Certificate Retention Survey

The scope of the retention/renewal survey is to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the survey are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routine Tests (RT) checked
- (if RT- and PST-test reports are not available, tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensure traceability between manufacturer's product type marking and Type Approval Certificate.

Survey shall be performed at least every second year.

END OF CERTIFICATE