



## Confirmation of Product Type Approval

**Company Name:** TELDOR CABLES & SYSTEMS LTD

**Address:** EIN DOR, 0 19335 Israel

**Product:** Communication Cable

**Model(s):** Teldor MG Fiber Optic cables for Marine / Oil / Gas / Offshore applications, Single or Multi loose tube or Multi tight buffered, Flame retardant, Fire Resistance (optional), Low smoke, Zero Halogens, FR-LSZH/HFFR, Armored/Non-armored, Single mode / Multi mode / Step index fibers jacketed with SHF1 or SHF2 or MUD resistance (NEK 606) jacket types.

Certificate Type	Certificate Number	Issue Date	Expiry Date
Product Design Assessment (PDA)	19-GE1845643-PDA	01-APR-2019	28-MAR-2024
Manufacturing Assessment (MA)	19-PR3653933	08-APR-2019	07-APR-2024
Product Quality Assurance (PQA)	NA	NA	NA

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### Intended Service

Data transmission, Communications and LAN Fiber-Optic cables for Marine, Oil/Gas, Offshore and Industrial applications.

### Description

Fiber Optic cables for Marine, Oil/Gas, Offshore and Industrial applications made from single-mode or multi-mode or step index fibers.

The cables are made by single/multi loose tube or tight buffered constructions with SHF1 / SHF2 / SHF2-Mud-resistant per NEK606 jackets. The cables are flame retardant per IEC60332-3 have fire resistant option per IEC60331-25, halogen free, low smoke emission, armoured and non-armoured.

### Ratings

5000V max.

Operating Temperature Range: - 40°C to + 85°C

### Service Restrictions

1. Unit Certification is not required for this product.
2. If the manufacturer or purchaser requests an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.

3. Termination itself shall be in the outer sheath of the cable and conductors should be locked in place in order to avoid damage from vibration.

4. The scope of Type Approval is to comply with MSC.1/Circ.1221 dated 11 December 2006.

### Comments

1. The Manufacturer has provided a declaration about the lack of Asbestos in this product.

2. The sheath shall be clearly marked with the following data as a minimum:

- Manufacturer's identification (name or trade name)
- Cable designation (Cable type) Number of fibers / cores
- Jacket type
- Armor Type
- Voltage rating
- Year of manufacture
- Batch number, Flame test, Meter mark. The marking shall be repeated at least every 1,0 m.

### Notes, Drawings and Documentation

Technical Specification No.DA-6MT002EDK1W01

Technical Specification No.DA-MLD144DDJ1R01

Technical Specification No.DN-6BO002ED0K01

Technical Specification No.DN- MLD072DD0J01.

Teldor Fiber Optic Cables Specification v03 dated 14 February 2019

BRE Global Test Report No.277021-1 - Teldor Cables DA-6MT002EDK1W01 dated 02 March 2012

BRE Global Test Report No.277021-2 - Teldor Cables DN-6BO002ED0K01 dated 02 March 2012

BRE Global Test Report No.277021-3 - Teldor Cables DB1B04S2401 dated 02 March 2012

BRE Global Test Report No.277021-4 - Teldor Cables DB5G04B2201 dated 02 March 2012

BRE Global Test Report No.277021-5 - Teldor Cables DA-MLD144DDJR01 dated 02 March 2012

BRE Global Test Report No.P100530-1 IEC60754 SHF1 BS6387 dated 01 July 2015

IMQ Test Report No.CN13S0197878-01 - Ozono - Teldor \_TR dated 18 December 2013

Teldor Test\_Report No.DN6BO002ED0K01\_F60020238C dated 20 March 2012

Teldor Test\_Report No.DAMLD144DDJ1R01\_FM1441203B dated 20 March 2012

Teldor Test\_Report No.DNMLD072DD0J01\_FM0720605B dated 20 March 2012

Teldor Test\_Report No.DA6MT002EDK1W01\_F60020239C dated 20 March 2012

F901201Y3B Multi Loose tube Corrugated Steel Armor Fire Resistance SHF1 Signed by DNV on 21-06-2016

F909608T7B Multi Loose Tube Galvanized Steel Wire Armor Fire resistance SHF1 by DNV on

21-06-2016

F901201BJB Single Loose Tube Non Armor Fire Resistance SHF1 Signed by DNV on 21-06-2016

F60040477S Multi Tight Steel Braid Armor Fire resistance SHF2 MUD Signed by DNV on 21-06-2016

### **Term of Validity**

This Product Design Assessment (PDA) Certificate 19-GE1845643-PDA, dated 29/Mar/2019 remains valid until 28/Mar/2024 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product.

Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA.

Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

### **ABS Rules**

2019 Rules for Conditions of Classification, 1-1-4/7.7, 1-1-A3, 1-1-A4, which covers the following:

2019 Steel Vessels Rules 4-8-3/9.1, 4-8-3/9.5, 4-8-3/9.13

2019 Offshore Support Vessels Rules, 4-8-3/9.1, 4-8-3/9.5, 4-8-3/9.13

2019 Steel Vessels Under 90 Meters (295 Feet) in Length Rules, 4-6-4/13.1.1, 4-6-4/13.1.2, 4-6-4/13.1.6

2019 International Naval Ships Guide 4-8-3/9.1, 4-8-3/9.5, 4-8-3/9.13

2019 Marine Rules 4-8-3/9.1, 4-8-3/9.5, 4-8-3/9.13

2019 Rules for Conditions of Classification – Offshore Units and Structures 1-1-4/9.7, 1-1-A2, 1-1-A3, which covers the following:

2019 Mobile Offshore Drilling Unit Rules, 4-3-4/7.1.1, 4-3-4/7.1.2, 4-3-4/7.1.6

2019 Facilities on Offshore Installations Rules 3-6/13

2019 Mobile Offshore Unit Rules, 4-3-4/7.1.1, 4-3-4/7.1.2, 4-3-4/7.1.6

### **International Standards**

IEC 60092-350 Edition 4.0 (2014-08)

IEC 60092-360 Edition 1.0 (2014-04)

IEC 60754-1 Edition 3.0 (2011-11)

IEC 60754-2 Edition 2.0 (2011-11)

IEC 60331-1 Edition 2.0 (2018-03)

IEC 60331-2 Edition 2.0 (2018-03)

IEC 60331-25 First Edition (1999-04)

IEC 60332-3-22 Edition 2.0 (2018-07)

IEC 60332-3-24 Edition 2.0 (2018-07)

IEC 61034-1 Edition 3.1 (2013-06)

IEC 61034-2 Edition 3.1 (2013-06)

IEC 60332-1-1 Edition 1.1 (2015-07)

IEC 60332-1-2 Edition 1.1 (2015-07)

IEC 60332-1-3 Edition 1.1 (2015-07)

IEC 60332-2-1 First edition (2004-07)

IEC 60794-1-2 Edition 4.0 (2017-04)  
ISO/IEC 11801-1 Edition 1.0 (2017-11)

**EU-MED Standards**  
NA

**National Standards**  
NEK TS 606: 2016  
ANSI/TIA-568-3.D (2016-10)  
BS 6387:2013

**Government Standards**  
NA

**Other Standards**  
NA



A handwritten signature in black ink, appearing to read "Joseph W. H.", is positioned above the corporate information.

Corporate ABS Programs  
American Bureau of Shipping  
Print Date and Time: 18-Sep-2019 5:43

ABS has used due diligence in the preparation of this certificate, and it represents the information on the product in the ABS Records as of the date and time the certificate is printed.

If the Rules and/or standards used in the PDA evaluation are revised or if there is a design modification (whichever occurs first), a PDA revalidation may be necessary.

The continued validity of the MA is dependent on completion of satisfactory audits as required by the ABS Rules. The validity of both PDA and MA entitles the product to receive a **Confirmation of Product Type Approval**.

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or prior to the effective date of the ABS Rules and standards applied at the time of PDA issuance. ABS makes no representations regarding Type Approval of the Product for use on vessels, MODUs or facilities built after the date of the ABS Rules used for this evaluation.

Type Approval requires Drawing Assessment, Prototype Testing and assessment of the manufacturer's quality assurance and quality control arrangements. The manufacturer is responsible to maintain compliance with all specifications applicable to the product design assessment. Unless specifically indicated in the description of the product, certification under type approval does not waive requirements for witnessed inspection or additional survey for product use on a vessel, MODU or facility intended to be ABS classed or that is presently in class with ABS.

Due to wide variety of specifications used in the products ABS has evaluated for Type Approval, it is part of our contract that; whether the standard is an ABS Rule or a non-ABS Rule, the Client has full responsibility for continued compliance with the standard.

Questions regarding the validity of ABS Rules or the need for supplemental testing or inspection of such products should, in all cases, be addressed to ABS.

# **Product Type Approval**

<b>Cables Family:</b>	Fiber Optic cables for Marine / Oil / Gas / Offshore applications.
<b>Model/Type designation:</b>	Teldor MG Fiber Optic cables for Marine / Oil / Gas / Offshore applications, Single or Multi loose tube or Multi tight buffered, Flame retardant, Fire Resistance (optional), Low smoke, Zero Halogens, FR-LSZH/HFFR, Armored/Non-armored, Single mode / Multi mode / Step index fibers jacketed with SHF1 or SHF2 or MUD resistance (NEK 606) jacket types.
<b>Intend service/application:</b>	Data transmission, Communications and LAN Fiber-Optic cables for Marine, OIL/GAS, Offshore and Industrial applications.
<b>Description:</b>	Fiber Optic cables for Marine, OIL/GAS, Offshore and Industrial applications made from single-mode or multi-mode or step index fibers. The cables are made by single/multi loose tube or tight buffered constructions with SHF1 / SHF2 / SHF2-Mud-resistant per NEK606 jackets. The cables are flame retardant per IEC60332-3 have fire resistant option per IEC60331-25, halogen free, low smoke emission, armored and Non-armored.
<b>Voltage rating:</b>	5000V
<b>International standards:</b>	ISO/IEC 11801, EIA/TIA 568, IEC 60793, IEC 60794, IEC 60092-350, IEC60092-351, IEC 60052-359, IEC60092-360, IEC 60754-1/2, IEC 61034-1/2, IEC 60332-1-1/2/3, IEC 60332-2, IEC 60332-3-22, IEC 60332-3-24, IEC 60331-25, ANSI/TIA/EIA 568-3.D, NEK 606, SOLAS Amendments chapter II-1, Part D, Reg. 45, 5.2., <b>BS6387</b>

## Quality Assurance Department

### 1. Product description

<b>Fiber types :</b>	Step index Single mode Multi mode Special fiber (per specific data sheet)
<b>Construction:</b>	MTD - Tight buffered (Multi-distribution cables) BO - Tight buffered (BreakOut cables) Gel filled Loose tube (Single or multi loose tube cables) Dry Loose tube (Single or multi loose tube cables) Combination of tight buffered and loose tubes)
<b>Central strength member (opt.) :</b>	Metalic strength member Dielectric strength member
<b>Peripheral strength member (opt.):</b>	Glass Yarns Aramid yarns
<b>Inner Sheath:</b>	SHF1 SHF2 SHF2-MUD Resistance (NEK606)
<b>Aarmor:</b>	Braided galvanized steel wire Corrugated steel tape Served (Galvanized) steel wire Bronze wire braid Copper wire braid Tinned copper wire braid
<b>Outer Sheath:</b>	SHF1 SHF2 SHF2-MUD Resistance (NEK606) (Sheath can be made from single or double layer)
<b>Water Blocking (opt.):</b>	Swellable Yarns Swellable tapes Gel
<b>Fire Resistance (opt.):</b>	Fire resistance tapes

### Typical performance of common fibers

Fiber Code	Units	3	4	5	6	7	8	9	A
Standard Designation		Multimode				Singlemode			
ISO/IEC 11801		OM4	OM3	OM2	OM1	-	-	OS2	-
ANSI/TIA/EIA-492		AAAD	AAAC	AAAB	AAAA	-	-	-	-
IEC 60793-2-10		A1a.3	A1a.2	A1a.1	A1b	-	-	-	-
ITU-T		-	-	-	-	G.657.A2	G.655	G.652.D	G.657.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 @1310nm	µm	-	-	-	-	8.6±0.4	-	9.2±0.4	8.6±0.4
MFD @1550nm	µm	-	-	-	-	9.6±0.5	9.6±0.6	10.4±0.6	9.8±0.5
Cladding diameter	µm	125±1			125±2	125±0.7			
Coating diameter	µm	245±10				245±5			
Max. Attenuation Tight-buffer	dB/Km	3.0 @850nm 1.0 @1300nm			3.5 @850nm 1.0 @1300nm	0.40@1310nm 0.30 @1550nm	-	0.40@1310nm 0.30 @1550nm	
Max. Attenuation Loose-tube	dB/Km	2.8 @850nm 0.9 @1300nm			3.2 @850nm 1.0 @1300nm	0.35 @1310nm 0.22 @1550nm 0.25 @1625nm	0.22 @1550nm 0.26 @1625nm	0.35 @1310nm 0.22 @1550nm 0.25 @1625nm	

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## 2. Special properties:

Halogen free per IEC 60754-1/2  
 Flame retardant per IEC 60332-3-22 (cat.A), 60332-3-24 (cat.C), IEC 60332-1-1/2/3, IEC 60332-2  
 Low Smoke per IEC 61034-1/2  
 Armor/Non-Armor  
 Fire resistant per IEC 60331-25 (Optional)  
 Various fiber types (SM, MM and special)  
 Various construction types (Tight buffers, Breakout, Single loose tube, Multi loose tube)  
 Dry and Gel filled tubes  
 Various Jacket types (SHF1, SHF2, SHF2-MUD resistant per NEK606)  
 Designed for marine and offshore application  
 Oil resistant  
 Designed for harsh conditions

## 3. Application limitation:

Operation temperature: -40°C to +85°C  
 Storage temperature: -40°C to +85°C  
 Installation temperature: -30°C to +50°C

## 4. Standard Marking of Product:

Teldor P/N, Fiber type, No. of tubes/tights, No. of fibers in tube, Armor type, jacket type(s), Water blocking type, Certification No., meter marking, Batch/Lot, Flame rating, Fire rating

**Note:** final Marking is determined per production

## 5. Cable structure:

Fiber type	Buffer	Fiber count	Tube count	Water Blocking	Armor	Jacket Type (Inner/Outer)	Fire resistant
Step index Single mode Multi mode Special fiber	MTD=multi tight BO=Breakout Gel filled tube Dry Tubes	NNN	NNN	G=Gel D-Dry	B =Galvanized Braided Steel Wire R =Corrugated Steel Tape W =Galvanized Served Steel Wire P =Bronze wire braid C =Copper wire braid T =Tin Copper wire braid	SHF1 SHF2 MUD Resistance(NEK606)	F=fire resistant (opt.)

## 6. Tests carried out / Program

Standard	Release	General description	Limitation
IEC 60794-1-2	2017	Optical fibre cables – Part 1-2: Generic specification – Basic optical cable test procedures	
IEC 60092-350	2014-08	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-351	2004-04	Insulating materials for shipboard and offshore units, power, control, instrumentation, telecommunication and data cables	
IEC 60092-359	1999-08	Sheathing materials for shipboard power and telecommunication cables	
IEC 60092-360	2014-04	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	



## Quality Assurance Department

Standard	Release	General description	Limitation
IEC 60331-1/2	2009-05	Fire resistance / Circuit integrity – Test for method for fire with shock at temperature of at least 830°C for cables rated up to and including 0,6/1 kV	Minimum 120 min with mechanical shock
IEC 60331-25	1999-04	Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Fiber Optic cables	Minimum 180 min
IEC 60332-3-22	2018	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 60754-1	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%
NEK 606	2016	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	Mud resistance test: IRM903 100°C 7d. Calcium Bromide 70°C 56d. Oil based mud: Carbo Sea 70°C 56d or EDC 95/11 70°C 56d
BS 6387	2013	Resistance to fire, with water spray, with mechanical shocks	Minimum 180 min