



## Confirmation of Product Type Approval

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

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

**Product:** Cable, Control Cables For Shipboard and Marine Structure Electrical Installation

**Model(s):** Instrumentation / Control / Signal and Low voltage 300V-600V cables, Low Smoke, Zero Halogen, Flame retardant, Fire Resistant for Marine/OIL/GAS applications - MG Designation

<b>Certificate Type</b>	<b>Certificate Number</b>	<b>Issue Date</b>	<b>Expiry Date</b>
Product Design Assessment (PDA)	19-GE1877522-PDA	22-AUG-2019	21-AUG-2024
Manufacturing Assessment (MA)	19-PR3653933	08-APR-2019	07-APR-2024
Product Quality Assurance (PQA)	NA	NA	NA

### **Tier**

3

### **Intended Service**

Instrumentations, Control, Signal and Low Voltage cables for Marine, Offshore and OIL/GAS applications with Low smoke, Zero halogens and flame retardant and fire resistance characteristics.

### **Description**

Instrumentation / Control / Signal and Low voltage 300V-600V/1000V cables for Marine, Oil/Gas and Offshore applications.

The cables are made from solid or stranded conductors, multi-core, multi-pair, multi-triads constructions and their combinations with FR-LSZH SHF1 / SHF2 / SHF2-Mud-resistant jackets.

The cables are flame retardant, fire resistant, Halogen free, Low smoke emission, Armored and Non-Armored.

The cables are oil resistant and designed for harsh conditions.

### **Ratings**

Voltage: 300V-600V/1000V max.

Operating Temperature Range: - 40°C to + 95°C

### **Service Restrictions**

1. Unit Certification is not required for this product.

2. Unit Certification is required where the cables are used for propulsion systems. All propulsion cables, other than internal wiring in control gears and switchboards, are to be subjected to dielectric and insulation tests in the presence of the Surveyor (See 4-8-5/5.17.11 of 2019 Marine Vessels Rules).

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. In order to achieve transmission compliant cables, these cables shall be installed with suitable termination equipment according to manufacturer's recommendations.
5. The scope of Type Approval is to comply with MSC.1/Circ.1221 dated 11 December 2006. Unit Certification is not required for this product.

### 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

Data Sheet Teldor Instrumentation 300V-600V Cables v15

Catalogue Offshore Rev.01/2015

TELDOR Test Report P/N 8MG0629101 dated 18/10/2015

TELDOR Test Report P/N 8MG0631101 dated 15/10/2015

TELDOR Test Report P/N 8MG0638101 dated 15/10/2015

TELDOR Test Report P/N 8MG0639101 dated 15/10/2015

TELDOR Test Report No.36 (P/N 9MGD240129-VER3) Particular Sheathing dated 06/02/2014

TELDOR Test Report No.36 (P/N 9MGD241239-VER3) Particular Sheathing dated 07/02/2014

BRE Global Test Report No. P100530-1 Issue 1 for IEC60754 SHF1 dated 1 July 2015

TELDOR Test Report No. 9DNV026101 for Mud Resistance dated 23 January 2014

TELDOR Test Report No. P/N 7MGF032108 for Nek 606: 2016 dated 15 July 2019

TELDOR Test Report No. P/N 8MG0036101 2Pairs Shielded SHF1 dated 11 January 2018

TELDOR Test Report No. P/N 8MG1186101 12Pairs Armored SHF2-MUD dated 11 January 2018

TELDOR Test Report No. P/N 8MG1296101 2x1.5 Fire Resistance SHF1 dated 11 January 2018

### Term of Validity

This Product Design Assessment (PDA) Certificate 19-GE1877522-PDA, dated 22/Aug/2019 remains valid until 21/Aug/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 Vessels 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 60092-353 Edition 4.0 (2016-09)

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 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 60331-21 Edition 1.0 (1999-04)

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 60092-376 Edition 3.0 (2017-05)

### **EU-MED Standards**

NA

### **National Standards**

NEK TS 606: 2016

### **Government Standards**

NA

**Other Standards**

NA



A handwritten signature in blue ink, appearing to read "James W. White".

Corporate ABS Programs  
American Bureau of Shipping  
Print Date and Time: 18-Sep-2019 5:39

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>	Instrumentation / Control / Signal & Low Voltage 250/300V–600/1000V low smoke, zero halogens, flame retardant, fire resistance (optional) cables for Marine / Oil / Gas / Offshore applications.
<b>Model/Type designation:</b>	Teldor MG Instrumentation / Control / Signal & Low Voltage 250/300V–600/1000V electrical cables for Marine / Oil / Gas / Offshore applications. Flame retardant, Fire Resistance (optional), Low smoke, Zero Halogens, FR-LSZH/HFFR, Armored/Non-armored, jacketed with SHF1 or SHF2 or MUD resistance (NEK 606) jacket types.
<b>Intend service/application:</b>	Instrumentation / Control / Signal & Low Voltage 250/300V–600/1000V cables for Marine, OIL/GAS, Offshore and Industrial applications.
<b>Description:</b>	Instrumentation / Control / Signal & Low Voltage 250/300V–600/1000V cables for Marine, OIL/GAS, Offshore and Industrial applications made from solid or stranded conductors. The cables are made from multi-core, multi-pair and multi-triad constructions and their combinations with SHF1 / SHF2 / SHF2-Mud-resistant per NEK606 jackets. The cables are flame retardant per IEC60332-3 have fire resistant option per IEC60331-21/22, halogen free, low smoke emission (FR-LSZH/HFFR), Armored/Non-armored.
<b>Voltage rating:</b>	600/1000V
<b>International standards:</b>	IEC 60092-353, IEC 60092-350, IEC60092-351, IEC 60052-359, IEC60092-360, IEC 60092-376, 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 60331-21/22, NEK 606, SOLAS Amendments chapter   -1, Part D, Reg. 45, 5.2.

## Quality Assurance Department

### 1. Product description

#### 1.1 250V/300V Cables

Cable Type	Multicore	Multipair	Multitriad
Number of units	1-40	1-50	1-36
Conductor size	0.5 mm <sup>2</sup> 0.75 mm <sup>2</sup> 1.0 mm <sup>2</sup> 1.5 mm <sup>2</sup> 2.5 mm <sup>2</sup>		
Conductor material	Bare annealed copper or Tin-coated annealed copper		
Conductor construction	Stranded - IEC 60228 Class 2 or Class 5		
Flame barrier	Inorganic tapes / Fire resistance tape		
Insulation material	Cross-Linked, Halogen-Free, Low-Smoke, Flame retardant per IEC 60092-360, IEC 60092-376		
Individual Shield	Optional metal foil + drain or metal braid or metal foil + metal braid		
Individual jacket	Optional jacket (taped or extruded)		
Overall Shield	Optional metal foil + drain or metal braid or metal foil + metal braid		
Braid construction	Separator tape + bare or tin-coated copper wires per IEC 60092-376		
Inner jacket material	SHF1 or SHF2 or SHF2-MUD per NEK606 single or double layer		
Armor	Braid wire materials: Braided tinned copper wire. Braided bare copper wire. Braided galvanized steel wire. Braided aluminum alloy wire. Braided copper alloy wire. Braided bronze wire.		
Outer jacket material	SHF1 or SHF2 or SHF2-MUD per NEK606 single or double layer		
Overall diameter	2.0 mm min. - 60 mm max.		
Special Construction	Combinations of various cross sections and combinations of single/pair & triads are allowed		
Max. pulling force	Specified in the detailed specification.		
Special properties	Flame retardant, Halogen Free, Circuit Integrity with water spray and mechanical shock per EN50200, Fire Resistant, Low Smoke, Mud Resistant		

## Quality Assurance Department

### 1.2 600V/100V Cables

Construction:

Conductor:	Plain or tinned annealed copper Class 2 or Class 5
Flame barrier:	Inorganic tapes / Fire resistance tape
Insulation:	HF90, HF XLPE (Halogen-Free, Low-Smoke, Flame retardant)
Individual screen:	Aluminium/polyester tape with tinned copper drain wire
Collective screen:	Aluminium/polyester tape with tinned copper drain wire
Inner sheath:	SHF1 or SHF2 or SHF2 MUD single or double layer
Metal covering / Armor:	Plain/tinned copper wire braid or copper alloy wire braid or galvanized steel wire braid (multi core cables only) or Braided aluminum alloy wire or Braided bronze wire
Outer sheath:	SHF1 or SHF2 or SHF2 MUD single or double layer

No of cores:	Cross sectional area [mm <sup>2</sup> ]
1-37	1 1,5 2,5 4
1-33	6
1-23	10

No of Pairs:	Cross sectional area [mm <sup>2</sup> ]
2-27	1
2-23	1,5
2-19	2,5

No of Triads:	Cross sectional area [mm <sup>2</sup> ]
1-27	1
1-21	1,5
1-16	2,5

Cables may also include combinations of the above

## Quality Assurance Department

### 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 60331-21/22 (Optional)

Various Jacket types (SHF1, SHF2, SHF2-MUD resistant per NEK606)

Designed for marine and offshore application

Oil resistant

Designed for harsh conditions

Combinations of cross sections and single/pair/core structures are permitted

Optional: Cold bend per CSA 22.2 @ -40°C and Cold Impact per CSA 22.2 @ -35°C (IEC 60092-350 Annex E.)

### 3. Application limitation:

Operation temperature: -40°C to +95°C

Storage temperature: -40°C to +95°C

Installation temperature: -30°C to +50°C

### 4. Standard Marking of Product:

Teldor P/N, Number & Type of units, Shield type, Armor type, jacket type(s), Certification No., meter marking, Batch/Lot, Flame rating, Fire rating, **voltage rating**

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

### 5. Cable structure:

Unit Count	Basic Unit type	Conductor Cross-section	Conductors Material	Individual Shield	Overall Shield	Armor	Fire resistant	Jacket Type (Inner/Outer)
mm	S: Singles P: Pairs T: Triads	05: 0.5 mm <sup>2</sup> 07: 0.75 mm <sup>2</sup> 10: 1.0 mm <sup>2</sup> 15: 1.5 mm <sup>2</sup> 25: 2.5 mm <sup>2</sup> 04: 4.0 mm <sup>2</sup> 06: 6.0 mm <sup>2</sup> 100: 10.0 mm <sup>2</sup>	T: Tin-coated copper B: Bare copper	1: Unshielded 2: Al. foil 3: Copper foil 4: BC braid 5: TC braid 6. Al. foil + TC braid 7. CU foil + BC braid	1: Unshielded 2: Al. foil 3: Copper foil 4: BC braid 5: TC braid 6. Al. foil + TC braid 7. CU foil + BC braid	T: Braided tinned copper wire B: Braided bare copper wire G: Braided galvanized steel wire A: Braided aluminum alloy wire C: Braided copper alloy wire Z: Braided bronze wire	F=fire resistant (opt.)	SHF1 SHF2 MUD Resistance(NEK606)

### 6. Tests carried out / Program

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 60092-350	2014-08	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	

TELDOR... The Best Connection™

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## Quality Assurance Department

Standard	Release	General description	Limitation
IEC 60092-376	2017-05	Cables for control and instrumentation circuits 150/250 V (300 V)	Increased insulation thickness and voltage level 0,6/1kV
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.	
IEC 60092-353	2011-08	Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV	0,6/1 kV
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 60331-21	1999-04	Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to and including 0,6/1,0 kV	Minimum 120 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 Ed. 4	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
IEC 60092-350	2014-08	Annex E: Cold bend test and impact test for low temperature behaviour	Cold bend: -40°C Cold impact: -35°C