



Confirmation of Product Type Approval

Please refer to the "Service Restrictions" shown below to determine if Unit Certification is required for this product. This certificate reflects the information on the product in the ABS Records as of the date and time the certificate is printed.

Pursuant to the Rules of the American Bureau of Shipping (ABS), the manufacturer of the below listed product held a valid Manufacturing Assessment (MA) with expiration date of 22/MAR/2019. The continued validity of the Manufacturing Assessment is dependent on completion of satisfactory audits as required by the ABS Rules.

And; a Product Design Assessment (PDA) valid until 17/APR/2019 subject to continued compliance with the Rules or standards used in the evaluation of the product.

The above entitle the product to be called Product Type Approved.

The Product Design Assessment is valid for products intended for use on ABS classed vessels, MODUs or facilities which are in existence or under contract for construction on the date of the ABS Rules used to evaluate the Product.

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.

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.

Product Name: Cable, Communication

Model Name(s): Instrumentation, Control & Signal Electrical Cables for ships and Offshore Units: SHF2/SHF2-MUD Resistant, Flame retardant, Low smoke, Zero Halogen. Type DF Armored; DG Armored Fire resistant; DP Non-armored; DQ Non-armored Fire resistant

Presented to:

TELDOR CABLES & SYSTEMS LTD
EIN DOR, 0
KIBBUTZ EIN-DOR
Israel

Intended Service:	Instrumentations, Control and Signal cables for Marine, Offshore and Industrial applications.
Description:	Mud-resistant, SHF2, multi-core, multi-pair or multi-triad Instrumentations, Control and Signal Copper cables, flame retardant and/or fire -resistant, halogen free, low smoke emission, SHF2 sheathed, armored or non-armored cables made with solid or stranded conductors.
Tier:	2
Ratings:	300V max.
Service Restrictions:	Unit Certification is not required for this product. 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.
Comments:	The Manufacturer has provided a declaration about the lack of Asbestos in this product. 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 cores / pairs / triples Cross-section of conductors Shield type Armor

Type. Voltage rating Year of manufacture Bus type, Batch number, Flame test, Meter mark. The marking shall be repeated at least every 1,0 m.

Notes / Documentation: Technical Specifications for Type DF, DP, DG-01P05T12T01, DQ-01P05T1201. Type Test Reports issued by TELDOR, IMQ and BRE Global.

Term of Validity: This Product Design Assessment (PDA) Certificate 14-GE1177437-PDA, dated 18/Apr/2014 remains valid until 17/Apr/2019 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.

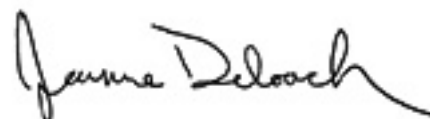
ABS Rules: 2014 Steel Vessel Rules 1-1-4/7.7, 1-1 Appendix 3 and 4, 4-8-3/9 2014 MODU Rules 1-1-4/9.7, 1-1 Appendix 2 and 3, 4-3-4/7 2014 Steel Vessels Under 90 Meters (295 Feet) in Length 1-1-4/7.7, 1-1-Appendix 3 and 4, 4-6-4/13 2014 Facilities on Offshore Installations 1-1-4/9.7, 1-1-Appendix 2 and 3, 3-6/13 2014 Offshore Support Vessels 1-1-4/7.7, 1-1-Appendix 3 and 4, 4-8-3/9

National Standards: NEK TS 606: 2009

International Standards: IEC 60092-376 (2003), IEC 60092-350 (2008), IEC 60092-359(1999), IEC 60754-1/2 (2011-11), IEC 61034-1/2 (2013), IEC 60332-3-22 (2009), IEC 60331-21 (1999).

Government Authority:
EUMED:
Others:

Model Certificate	Model Certificate No	Issue Date	Expiry Date
PDA	14-GE1177437-PDA	18/APR/2014	17/APR/2019



ABS Programs

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 was printed. Type Approval requires Drawing Assessment, Prototype Testing and assessment of the manufacturer's quality assurance and quality control arrangements. Limited circumstances may allow only Prototype Testing to satisfy Type Approval. The approvals of Drawings and Products remain valid as long as the ABS Rule, to which they were assessed, remains valid. ABS cautions manufacturers to review and maintain compliance with all other specifications to which the product may have been assessed. Further, unless it is specifically indicated in the description of the product; Type Approval does not necessarily waive witnessed inspection or survey procedures (where otherwise required) for products to be used in a vessel, MODU or facility intended to be ABS classed or that is presently in class with ABS. 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.

Type DF - Armored Flame retardant Instrumentation and Control Electrical Mud Resistant Cables for Ships and Offshore Units

Standard: IEC 60092-376

Mud resistance test: NEK TS 606 (Optional)

Flame test: IEC 60332-3-22 (CAT A)

1. List of approved cable types

Cable Type	Multicore	Multipair	Multitriad
Number of units	1-40	1-50	1-36
Conductor size	0.5 mm ² 0.75 mm ² 1.0 mm ² 1.5 mm ² 2.5 mm ²		
Conductor material	Bare annealed copper or Tin-coated annealed copper		
Conductor construction	Stranded - IEC 60228 Class 2 or Class 5		
Insulation material	IEC 60092-351 HF XLPE (Cross-Linked, Halogen-Free, Low-Smoke, Flame retardant)		
Insulation thickness	Nom. conductor cross section mm ²	Min. average insulation thickness mm	
	0.5 mm ²	0.4	
	0.75 mm ²	0.5	
	1.0 mm ²	0.5	
	1.5 mm ²	0.6	
	2.5 mm ²	0.6	
Fillers and bedding	Halogen-Free, Low-Smoke, Flame retardant		
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	0.15mm or 0.20mm tin-coated or bare copper wires, 84% coverage min.		
Inner jacket material	IEC 60092-359 SHF2		
Inner jacket thickness	Core OD x 0.04 + 0.8 mm min. Lower limit: 1.0 mm min.		
Armor	Braid wire diameter range: 0.2 to 0.4mm 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	IEC 60092-359 SHF2 with optional MUD resistance		
Outer jacket thickness	Core OD x 0.025 + 0.6 mm min. Lower limit: 0.8 mm min.		
Overall diameter	2.0 mm min. - 60 mm max.		
Max. pulling force	Armored cables: Specified in the detailed specification.		
Special properties	Flame retardant, Halogen Free, Low Smoke, Mud Resistant		

2. Application/Limitation

Temperature window: Operation: -40 to +95C Storage: -40 to +95C Installation: -15 to +50C

Voltage operating range: Up to 300V rms.

3. Test program

IEC 60092-376

IEC 60332-3-22

IEC 60754-1/2

IEC 61034-1/2

NEK TS 606

4. Marking of product

TELDOR DF-[...] Number & Type of units, Shield type, Armor type, 300V, P/N, B/N, METER MARK - IEC 60332-3-22

DF	Unit Count	Basic Unit type	Conductor Cross-section	Conductors Material	Individual Shield	Overall Shield	Armor	Options
DF	nn	S: Singles P: Pairs T: Triads	05: 0.5 mm ² 07: 0.75 mm ² 10: 1.0 mm ² 15: 1.5 mm ² 25: 2.5 mm ²	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	XX

Type DG - Armored Fire resistant Instrumentation and Control Electrical Mud Resistant Cables for Ships and Offshore Units
Standard: IEC 60092-376
Mud resistance test: NEK TS 606 (Optional)
Flame test: IEC 60332-3-22 (CAT A) & IEC 60331-21

1. List of approved cable types

Cable Type	Multicore	Multipair	Multitriad
Number of units	1-40	1-50	1-36
Conductor size	0.5 mm ² 0.75 mm ² 1.0 mm ² 1.5 mm ² 2.5 mm ²		
Conductor material	Bare annealed copper or Tin-coated annealed copper		
Conductor construction	Stranded - IEC 60228 Class 2 or Class 5		
Flame barrier	Inorganic tapes		
Insulation material	IEC 60092-351 HF XLPE (Cross-Linked, Halogen-Free, Low-Smoke, Flame retardant)		
Insulation thickness Excluding the Inorganic tapes thickness	Nom. conductor cross section mm ²		Min. average insulation thickness mm
	0.5 mm ²		0.4
	0.75 mm ²		0.5
	1.0 mm ²		0.5
	1.5 mm ²		0.6
	2.5 mm ²		0.6
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	0.15mm or 0.20mm tin-coated or bare copper wires, 84% coverage min.		
Inner jacket material	IEC 60092-359 SHF2		
Inner jacket thickness	Core OD x 0.04 + 0.8 mm min. Lower limit: 1.0 mm min.		
Armor	Braid wire diameter range: 0.2 to 0.4mm 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	IEC 60092-359 SHF2 with optional MUD resistance		
Outer jacket thickness	Core OD x 0.025 + 0.6 mm min. Lower limit: 0.8 mm min.		
Overall diameter	2.0 mm min. - 60 mm max.		
Max. pulling force	Specified in the detailed specification.		
Special properties	Flame retardant, Halogen Free, Circuit Integrity with water spray, Fire Resistant, Low Smoke, Mud Resistant		

2. Application/Limitation

Temperature window: Operation: -40 to +95C Storage: -40 to +95C Installation: -15 to +50C
Voltage operating range: Up to 250V rms.

3. Test program

IEC 60092-376
IEC 60332-3-22
IEC 60331-21
IEC 60754-1/2
IEC 61034-1/2
NEK TS 606

4. Marking of product

TELDOR DG-[...] Number & Type of units, Shield type, Armor type, 300V, P/N, B/N, METER MARK - IEC 60331-21, IEC 60332-3-22

DG	Unit Count	Basic Unit type	Conductor Cross-section	Conductors Material	Individual Shield	Overall Shield	Armor	Options
DG	nn	S: Singles P: Pairs T: Triads	05: 0.5 mm ² 07: 0.75 mm ² 10: 1.0 mm ² 15: 1.5 mm ² 25: 2.5 mm ²	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	XX

Type DP - Non-armored Flame retardant Instrumentation and Control Electrical Mud Resistant Cables for Ships and Offshore Units

Standard: IEC 60092-376

Mud resistance test: NEK TS 606 (Optional)

Flame test: IEC 60332-3-22 (CAT A)

1. List of approved cable types

Cable Type	Multicore	Multipair	Multitriad
Number of units	1-40	1-50	1-36
Conductor size	0.5 mm ² 0.75 mm ² 1.0 mm ² 1.5 mm ² 2.5 mm ²		
Conductor material	Bare annealed copper or Tin-coated annealed copper		
Conductor construction	Stranded - IEC 60228 Class 2 or Class 5		
Insulation material	IEC 60092-351 HF XLPE (Cross-Linked, Halogen-Free, Low-Smoke, Flame retardant)		
Insulation thickness	Nom. conductor cross section mm ²		Min. average insulation thickness mm
	0.5 mm ²		0.4
	0.75 mm ²		0.5
	1.0 mm ²		0.5
	1.5 mm ²		0.6
	2.5 mm ²		0.6
Fillers and bedding	Halogen-Free, Low-Smoke, Flame retardant		
Individual Shield	Optional metal foil + drain or metal braid or metal foil + metal braid		
Individual jacket	Optional jacket (taped or extruded)		
Inner Jacket material	IEC 60092-359 SHF2 (Optional)		
Inner Jacket thickness	Optional jacket. Core OD x 0.025 + 0.6 mm min. Lower limit: 0.8 mm min.		
Overall Shield	Optional metal foil + drain or metal braid or metal foil + metal braid		
Braid construction	0.15mm or 0.20mm tin-coated or bare copper wires, 84% coverage min.		
Outer Jacket material	IEC 60092-359 SHF2 with optional MUD resistance		
Outer Jacket thickness	Core OD x 0.025 + 0.9 mm min. Lower limit: 1.0 mm min.		
Overall diameter	2.0 mm min. - 55 mm max.		
Max. pulling force	50N/mm ²		
Special properties	Flame retardant, Halogen Free, Low Smoke, Mud Resistant		

2. Application/Limitation

Temperature window: Operation: -40 to +85C Storage: -40 to +85C Installation: -15 to +50C

Voltage operating range: Up to 300V rms.

3. Test program

IEC 60092-376

IEC 60332-3-22

IEC 60754-1/2

IEC 61034-1/2

NEK TS 606

4. Marking of product

TELDOR DP-[...] Number & Type of units, Shield type, 300V, P/N, B/N, METER MARK - IEC 60332-3-22

DP	Unit Count	Basic Unit type	Conductor Cross-section	Conductors Material	Individual Shield	Overall Shield	Options
DPnn		S: Singles P: Pairs T: Triads	05: 0.5 mm ² 07: 0.75 mm ² 10: 1.0 mm ² 15: 1.5 mm ² 25: 2.5 mm ²	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	XX 01-Single jacket, Black 02-Double jacket, Black

Type DQ - Non-armored Fire resistant Instrumentation and Control Electrical Mud Resistant Cables for Ships and Offshore Units

Standard: IEC 60092-376

Mud resistance test: NEK TS 606 (Optional)

Flame tests: IEC 60332-3-22 (CAT A) & IEC 60331-21

1. List of approved cable types

Cable Type	Multicore	Multipair	Multitriad
Number of units	1-40	1-50	1-36
Conductor size	0.5 mm ² 0.75 mm ² 1.0 mm ² 1.5 mm ² 2.5 mm ²		
Conductor material	Bare annealed copper or Tin-coated annealed copper		
Conductor construction	Stranded - IEC 60228 Class 2 or Class 5		
Flame barrier	Inorganic tapes		
Insulation material	IEC 60092-351 HF XLPE (Cross-Linked, Halogen-Free, Low-Smoke, Flame retardant)		
Insulation thickness Excluding the Inorganic tapes thickness	Nom. conductor cross section mm ²	Min. average insulation thickness mm	
	0.5 mm ²	0.4	
	0.75 mm ²	0.5	
	1.0 mm ²	0.5	
	1.5 mm ²	0.6	
	2.5 mm ²	0.6	
Individual Shield	Optional metal foil + drain or metal braid or metal foil + metal braid		
Individual jacket	Optional taped jacket		
Inner Jacket material	IEC 60092-359 SHF2 (Optional)		
Inner Jacket thickness	Optional jacket. Core OD x 0.025 + 0.6 mm min. Lower limit: 0.8 mm min.		
Overall Shield	Optional metal foil + drain or metal braid or metal foil + metal braid		
Braid construction	0.15mm or 0.20mm tin-coated or bare copper wires, 84% coverage min.		
Jacket material	IEC 60092-359 SHF2 with optional MUD resistance		
Jacket thickness	Core OD x 0.025 + 0.9 mm min. Lower limit: 1.0 mm min.		
Overall diameter	2.0 mm min. - 55 mm max.		
Max. pulling force	50N/mm ²		
Special properties	Flame retardant, Halogen Free, Circuit Integrity with water spray, Fire Resistant, Low Smoke, Mud Resistant		

2. Application/Limitation

Temperature window: Operation: -40 to +85C Storage: -40 to +85C Installation: -15 to +50C

Voltage operating range: Up to 300V rms.

3. Test program

IEC 60092-376

IEC 60332-3-22

IEC 60331-21

IEC 60754-1/2

IEC 61034-1/2

NEK TS 606

4. Marking of product

TELDOR DQ[...] Number & Type of units, Shield type, 300V, P/N, B/N, METER MARK - IEC 60331-21, IEC 60332-3-22

DQ	Unit Count	Basic Unit type	Conductor Cross-section	Conductors Material	Individual Shield	Overall Shield	Options
DQ	nn	S: Singles P: Pairs T: Triads	05: 0.5 mm ² 07: 0.75 mm ² 10: 1.0 mm ² 15: 1.5 mm ² 25: 2.5 mm ²	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	XX 01-Single jacket, Black 02-Double jacket, Black