DNV·GL

Certificate No:
TAE00002UX

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)
MG 250V Armoured, Flame retardant, Fire resistant, Halogen free Low smoke Control, Signal and Instrumentation Cables

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

is found to comply with
DNV GL rules for classification – Ships and offshore units

Application :

Fire resistant Control and Instrumentation cable. Armoured.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.
Rated voltage (V) **150/250V**
Temp. class (°C) **90**

Issued at **Høvik** on **2018-05-22**
This Certificate is valid until **2022-12-31**.
DNV GL local station: **Haifa**

Approval Engineer: **Ivar Bull**

for **DNV GL**

Andreas Kristoffersen
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

© DNV GL 2014. DNV GL and the Horizon Graphic are trademarks of DNV GL AS.

Job Id: **262.1-028257-1**
Certificate No: **TAE00002UX**

Product description

Type: MG 250V Armoured, Flame retardant, Fire resistant, Halogen free Low smoke Control, Signal and Instrumentation Cables

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 / Fire resistance tape (optional)		
Insulation material	HF XLPE per IEC 60092-360, IEC 60092-376		
Individual screen	Optional metal foil + drain or metal braid or metal foil + metal braid		
Overall screen	Optional metal foil + drain or metal braid or metal foil + metal braid		
Braid screen construction	Separator tape + bare or tin-coated copper wires per IEC 60092-376		
Inner sheath material	SHF1 or SHF2 or SHF2-MUD per NEK606 single or double layer		
Braid armor	Bare copper wire braid Tinned copper wire braid Copper alloy wire braid Galvanized steel wire braid		
Outer sheath material	SHF1 or SHF2 or SHF2-MUD per NEK606 single or double layer		
Overall diameter	2.0 mm min. - 60 mm max.		
Special Construction	Cables may include combinations of various cross sections and combinations of single/pair & triads. In such cases fictitious calculations for braid wires and sheaths shall be performed as if all elements were of the larger size.		
Max. pulling force	Specified in the detailed specification.		
Special properties	Flame retardant, Halogen Free, Low Smoke, Mud Resistant		

Application/Limitation

This type of cable is fire resistant according to IEC 60331-1/2.

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
IEC 60092-350	2014-08	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
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 60092-376	2017-05	Electrical installations in ships - Part 376: Cables for control and instrumentation circuits 150/250 V (300 V)	

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 830ºC for cables rated up to and including 0,6/1 kV	Minimum 120 min+15 min cooling down time
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	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 TS606 Ed5	2016	Cables for offshore installations - halogen-free low smoke flame-retardant / fire-resistant (HFFR-LS). 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
CSA C22.2 No. 38.05	2007-03	Thermoset Insulated Wires and cables. Cold bending & impact tests	Cold bend: -40°C Cold impact: -35°C

Marking of product

TELDOR EC-[…] MG Armoured - Fire resistant - Number & Type of units 150/250V, P/N, B/N, METER MARK - IEC 60092-376- IEC 60331-1/2 - 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) and selected type tests (ref. to applicable class programs) checked (if not available these tests shall 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