

TYPE APPROVAL CERTIFICATE

Certificate No:
TAE00000BV
Revision No:
2

This is to certify:

That the Low Voltage Cable

with type designation(s)

MA NV ES HEPR/SHF1 or SHF2 A & B & C, TA NV ES HEPR/SHF1 or SHF2 A & B & C, ITA NV ES HEPR/SHF1 or SHF2 A & B & C, ITM NV ES HEPR/SHF1 or SHF2 A & B & C

Issued to

YOFC Poliron Industria e Comercio de Cabos Especiais Ltda
DIADEMA, SP, Brazil

is found to comply with

DNV rules for classification – Ships, offshore units, and high speed and light craft

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Type	Rated voltage (V)	Temp. class (°C)
MA NV ES HEPR/SHF1 or SHF2 A & B & C	150/250	90
TA NV ES HEPR/SHF1 or SHF2 A & B & C	150/250	90
ITA NV ES HEPR/SHF1 or SHF2 A & B & C	150/250	90
ITM NV ES HEPR/SHF1 or SHF2 A & B & C	150/250	90

Issued at **Hamburg** on **2021-11-19**

This Certificate is valid until **2026-03-21**.

DNV local station: **Rio de Janeiro, CMC**

Approval Engineer: **Carsten Hunsalz**

for **DNV**



Digitally Signed By: Schaarmann, Arne
Location: DNV GL SE Hamburg, Germany
Signing Date: 2021-12-02

Arne Schaarmann
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

Construction:	
Conductors:	Tinned, stranded copper class 2 or class 5
Core insulation:	Mica tape + HF HEPR
Individual screen:	Aluminium + polyester tape with tinned copper drain conductor (only ITA and ITM)
Collective screen:	Aluminium + polyester tape with tinned copper drain conductor (not for ITM)
Inner sheath:	SHF1 or SHF2
Metallic covering:	Bare copper (A) or tinned copper (B) or galvanized steel (C) wire braid
Outer sheath:	SHF1 or SHF2

Type: MA NV ES HEPR/SHF1 or SHF2 A & MA NV ES HEPR/SHF1 or SHF2 B & MA NV ES HEPR/SHF1 or SHF2 C

No of cores:	Cross sectional area [mm ²]
1 Pair	0,5 & 0,75 & 1 & 1,5 & 2,5
1 Triple	0,5 & 0,75 & 1 & 1,5 & 2,5
1 Quad	0,5 & 0,75 & 1 & 1,5 & 2,5

Type: TA NV ES HEPR/SHF1 or SHF2 A & TA NV ES HEPR/ SHF1 or SHF2 B & TA NV ES HEPR/ SHF1 or SHF2 C & ITA NV ES HEPR/ SHF1 or SHF2 A & ITA NV ES HEPR/ SHF1 or SHF2 B & ITA NV ES HEPR/ SHF1 or SHF2 C & ITM NV ES HEPR/ SHF1 or SHF2 A & ITM NV ES HEPR/ SHF1 or SHF2 B & ITM NV ES HEPR/ SHF1 or SHF2 C

No of cores:	Cross sectional area [mm ²]
2-37 Pairs	0,5 & 0,75 & 1 & 1,5 & 2,5
2-37 Triples	0,5 & 0,75 & 1 & 1,5 & 2,5
2-37 Quads	0,5 & 0,75 & 1 & 1,5 & 2,5

Application/Limitation

Control and instrumentation.

This type of cable is fire resistant in accordance with IEC Publication 60331.

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.

Fire resistant. Flame retardant Cat. A. Low smoke.

Type Approval documentation

Datasheets and test reports in documents referred to in approval letters with reference MCANO381/PONT/262.1-015296-J-32 & J-50 and revisions.

Tests carried out

Standard	Issued	General description	Limitation
IEC 60092-350	2020-01	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-360	2021-01	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	Cables for control and instrumentation circuits 150/250 V (300 V)	
IEC 60331-1	2018-03	Fire resistance / Circuit integrity – Test method for fire with shock at temperature of at least 830°C for cables rated up to and including 0,6/1 kV	For cables with an overall diameter exceeding 20 mm
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	For cables with an overall diameter not exceeding 20 mm
IEC 60332-3-22	2018-07	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

Standard	Issued	General description	Limitation
IEC 60332-1-2	2015-07	Tests on electric cables under fire conditions. Test for vertical flame propagation for a single insulated wire or cable.	
IEC 60754-1	2019-11	Test on gases evolved during combustion of materials from cables – Determination of the amount of halogen acid gas	Low Halogen: <0,5% Halogen
IEC 60754-2	2019-11	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 conductivity	Halogen free: pH > 4,3 Conductivity < 10µS
IEC 61034-1/2	2019-11	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke
CSA C22.2 No. 03	2009	4.12 Flexibility at any specified temperature	Cold bend: - 40°C
CSA C22.2 No. 03	2009	4.13 Abnormal low temperature – impact	Cold impact: -35°C

Marking of product

Example:

BELDEN - MA NV ES HEPR/SHF2 A or MA NV ES HEPR/SHF2 B or MA NV ES HEPR/SHF2 C or TA NV ES HEPR/SHF2 A or TA NV ES HEPR/SHF2 B or TA NV ES HEPR/SHF2 C or ITA NV ES HEPR/SHF2 A or ITA NV ES HEPR/SHF2 B or ITA NV ES HEPR/SHF2 C or ITM NV ES HEPR/SHF2 A or ITM NV ES HEPR/SHF2 B or ITM NV ES HEPR/SHF2 C – size – 150/250V – IEC 60331-1/21 - IEC 60332-3-22 – Lot No.

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) checked (if not available tests according to RT to 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