

# TYPE APPROVAL CERTIFICATE

Certificate No:  
**TAE000009U**  
Revision No:  
**2**

## This is to certify:

That the **Low Voltage Cable**

with type designation(s)

**CM NV ES HEPR/SHF1 or SHF2 A.1 & B.1, CA NV ES HEPR/SHF1 or SHF2 A.1 & B.1**

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) |
|--------------------------------------|-------------------|------------------|
| CM NV ES HEPR/SHF1 or SHF2 A.1 & B.1 | 150/250           | 90               |
| CA NV ES HEPR/SHF1 or SHF2 A.1 & B.1 | 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

Type:

CM NV ES HEPR/SHF1 A.1 & CM NV ES HEPR/SHF1 B.1 & CA NV ES HEPR/SHF1 A.1 & CA NV ES HEPR/SHF1 B.1

CM NV ES HEPR/SHF2 A.1 & CM NV ES HEPR/SHF2 B.1 & CA NV ES HEPR/SHF2 A.1 & CA NV ES HEPR/SHF2 B.1

Construction:  
 Conductors: Tinned, stranded copper class 2 or class 5  
 Core insulation: Mica tape + HF HEPR  
 Overall shielding: None (CM) or Aluminium + polyester tape with tinned copper drain conductor (CA)  
 Inner covering: Extruded or lapped non-hygroscopic material  
 Metallic covering: Bare copper (A) or tinned copper (B) wire braid  
 Outer sheath: SHF1 or SHF2

| No of cores: | Cross sectional area [mm <sup>2</sup> ] |
|--------------|-----------------------------------------|
| 2-60         | 0,5 & 0,75                              |

## 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 Bundles 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                                   |
| 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                              |

| Standard         | Issued  | General description                                                                                                                                                                                                       | Limitation                                       |
|------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| 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:<br>pH > 4,3<br>Conductivity < 10µS |
| IEC 61034-1/2    | 2019-11 | Measurement of smoke density of cables burning under defined conditions –<br>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 - CM NV ES HEPR/SHF2 A.1 or CM NV ES HEPR/SHF2 B.1 or CA NV ES HEPR/SHF2 A.1 or CA NV ES HEPR/SHF2 B.1 – 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