



MARINE DIVISION

Certificate number: 21189/A0 BV

File number: ACE 01/781/02

Product code: 25011

*This certificate is not valid when presented without the full attached schedule composed of 7 sections*

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## TYPE APPROVAL CERTIFICATE

*This certificate is issued to*

**PAN ELECTRIC INDUSTRIA ELETROELETRONICA IMP. EXP. LTDA**  
RIO GRANDE DO SUL - BRAZIL

*for the type of product*

### CABLES (LOW VOLTAGE)

0,6/1 kV - PANNAV Series  
Type: PN, PNB and PSBSC

#### Requirements:

BUREAU VERITAS Rules for the Classification of Steel Ships.

IEC 60092-350/351/353/359, IEC 60228, IEC 60332-1, IEC 60332-3-22, IEC 60754-1/2, IEC 61034-1/2.

*This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.*

**This certificate will expire on: 05 Jan 2015**

**For BUREAU VERITAS,**

At BV RIO DE JANEIRO, on 05 Jan 2010,

Francisco Assis



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with BUREAU VERITAS. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of BUREAU VERITAS Marine Division available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

## THE SCHEDULE OF APPROVAL

### 1. PRODUCT DESCRIPTION :

**PANNAV Series:** Flame Retardant, Halogen Free and Low Smoke Marine and Offshore Power and Control cables.

#### **1.1 - Common Specifications:**

Rated Voltage: 0.6/1 kV according to IEC 60092-353  
 Temperature class: 90°C according to IEC 60092-351  
 Flame Retardant: IEC 60332-1 and IEC 60332-3-22 (Cat. A)  
 Halogen Free: IEC 60754-1/2  
 Low Smoke: IEC 61034-1/2

#### **1.2 - Construction: PANNAV PN - 0.6/1 kV**

Conductor: Tinned copper wires (Class 5)  
 Insulation: Halogen Free Thermoset compound (HF 90)  
 Separator: Polyester tape (if required)  
 Oversheath: Halogen Free Thermoplastic compound (SHF1)

#### **1.3 - Construction: PANNAV PNB - 0.6/1 kV**

Conductor: Tinned copper wires (Class 5)  
 Insulation: Halogen Free Thermoset compound (HF 90)  
 Inner covering: Halogen Free Thermoplastic compound (SHF1)  
 Separator: Polyester tape (if required)  
 Armour/Braid: Galvanized steel wire braid  
 Oversheath: Halogen Free Thermoplastic compound (SHF1)

#### **1.4 - Construction: PANNAV PSBSC - 0.6/1 kV**

Conductor: Tinned copper wires (Class 5)  
 Insulation: Halogen Free Thermoset compound (HF 90)  
 Separator: Polyester tape (if required)  
 Inner covering: Halogen Free Thermoplastic compound (SHF1)  
 Armour/Braid: Galvanized steel wire braid

#### **1.5 - Product Range:**

Type	Number of cores	Cross section (mm <sup>2</sup> )	Remarks
<b>PANNAV Series: PN, PNB, PSBSC</b>	1	300	Flame retardant according to IEC 60332-1 & IEC 60332-3-22 (Cat. A) Low Smoke according to IEC 61034-1/2 Halogen Free according to IEC 60754-1/2
	1 to 4	1,5 to 120	
	2 to 60	1,5 and 2,5	

### 2. DOCUMENTS AND DRAWINGS :

#### **PanElectric:**

Databook for BV Type Approval Purpose, dated April 22, 2008  
 Catalogue Marine Cables, Shipboard and Offshore

### 3. TEST REPORTS :

#### **PanElectric:**

Inspection Reports Nos. 1114, 1115 and 1116 all dated 03/31/08  
 Inspection Reports Nos. 1114 Rev. 01, 1115 Rev. 01 and 1116 Rev. 01 all dated 10/13/2009  
 Inspection Report No. 1727 dated 10/13/2009  
 Test Reports witnessed by BV Surveyor.

#### **Instituto Lab System:**

Test Reports Nos. 610408 and 620408 both dated 04/2008  
 Test Report No. 2050408 dated 28/05/2008  
 Test Reports Nos. 111109 dated 11/24/2009, 121109 dated 11/26/2009, 131109 dated 12/04/2009 and 141109 dated 12/05/2009.

**4. APPLICATION / LIMITATION :**

4.1 - BUREAU VERITAS Rules for the Classification of Steel Ships and IEC 60092 series.

4.2 - Approval also valid for units having to comply with IMO Resolution A649 (The "MODU Code").

**5. PRODUCTION SURVEY REQUIREMENTS :**

5.1 - The cables of **PANNAV Series** are to be manufactured, examined and tested by **PAN ELECTRIC INDUSTRIA** in accordance with the type described in this certificate and Bureau Veritas Rules for the Classification of Steel Ships.

5.2 - Arrangements shall be made for a Society's Surveyor to attend the relevant tests and examinations at manufacturer's works or to perform the relevant audits when an alternative survey scheme (BV Mode I) has been agreed. Relevant Bureau Veritas certificate will be issued after satisfactory completion of the procedure.

**6. MARKING OF PRODUCT :**

The cable shall be marked on the surface outer sheath, in a durable legible and visible manner, with the following information through the length of cable:

- 1) - Voltage grade.
- 2) - Cable symbol and temperature class.
- 3) - Number of conductors and conductor size.
- 4) - Applicable standards to flame retardant.
- 5) - Manufacturer's name or trade mark.
- 6) - Year of manufacture.

**7. OTHERS :**

This approval is given on the understanding that the Society reserves the right to require check tests to be carried out on the cables at any time and that:

**PAN ELECTRIC INDUSTRIA ELETROELETRONICA IMP. EXP. LTDA**  
**Rua Nelson Carraro 316, Santo Antao**  
**Bento Gonçalves**  
**95700-000 RIO GRANDE DO SUL**  
**BRAZIL**

will accept full responsibility for informing shipbuilders, ship-owners or their sub-contractors of the proper methods of use and general maintenance of the cables and the conditions of this approval.

\*\*\* END OF CERTIFICATE \*\*\*