



MARINE DIVISION

Certificate number: 21188/A0 BV

File number: ACE 01/781/01

Product code: 2505H

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

INSTRUMENTATION AND COMMUNICATION CABLES

150/250 V - PANNAV Series

Type: IN, IBI, IBIC, IBC, IBICA, IBCA, IBIA, IA and IASC

Requirements:

BUREAU VERITAS Rules for the Classification of Steel Ships.

IEC 60092-350/351/376/359, 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 Instrumentation cables.

1.1 - Common Specifications:

Rated Voltage: 150/250 V according to IEC 60092-376
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 IN -150/250 V

Conductor: Tinned copper wires (Class 2)
Insulation: Halogen Free Thermoset compound (HF 90)
Separator: Polyester tape (if required)
Oversheath: Halogen Free Thermoplastic compound (SHF1).

1.3 - Construction: PANNAV IBI - 150/250 V

Conductor: Tinned copper wires (Class 2)
Insulation: Halogen Free Thermoset compound (HF 90)
Separator: Polyester tape (if required)
Individual electrostatic screening tape: Aluminium polyester tape with drain wire.
Separator: Polyester tape
Oversheath: Halogen Free Thermoplastic compound (SHF1).

1.4 - Construction: PANNAV IBIC - 150/250 V

Conductor: Tinned copper wires (Class 2)
Insulation: Halogen Free Thermoset compound (HF 90)
Separator: Polyester tape
Individual electrostatic screening tape: Aluminium polyester tape with drain wire
Separator: Polyester tape.
Collective electrostatic screening tape: Aluminium polyester tape with drain wire
Separator: Polyester tape (if required)
Oversheath: Halogen Free Thermoplastic compound (SHF1).

1.5 - Construction: PANNAV IBC - 150/250 V

Conductor: Tinned copper wires (Class 2)
Insulation: Halogen Free Thermoset compound (HF 90)
Separator: Polyester tape
Collective electrostatic screening tape: Aluminium polyester tape with drain wire
Separator: Polyester tape (if required)
Oversheath: Halogen Free Thermoplastic compound (SHF1).

1.6 - Construction: PANNAV IBICA - 150/250 V

Conductor: Tinned copper wires (Class 2)
Insulation: Halogen Free Thermoset compound (HF 90)
Separator: Polyester tape
Individual electrostatic screening tape: Aluminium polyester tape with drain wire
Separator: Polyester tape.
Collective electrostatic screening tape: Aluminium polyester tape with drain wire
Separator: Polyester tape
Inner covering: Halogen Free Thermoplastic compound (SHF1)
Armour/Braid: Galvanized steel wire braid
Oversheath: Halogen Free Thermoplastic compound (SHF1) if required.

1.7 - Construction: PANNAV IBCA - 150/250 V

Conductor: Tinned copper wires (Class 2)
 Insulation: Halogen Free Thermoset compound (HF 90)
 Separator: Polyester tape
 Collective electrostatic screening tape: Aluminium polyester tape with drain wire
 Separator: Polyester tape (if required)
 Inner covering: Halogen Free Thermoplastic compound (SHF1)
 Armour/Braid: Galvanized steel wire braid
 Oversheath: Halogen Free Thermoplastic compound (SHF1) if required.

1.8 - Construction: PANNAV IBIA - 150/250 V

Conductor: Tinned copper wires (Class 2)
 Insulation: Halogen Free Thermoset compound (HF 90)
 Separator: Polyester tape
 Individual electrostatic screening tape: Aluminium polyester tape with drain wire
 Separator: Polyester tape. (if required)
 Inner covering: Halogen Free Thermoplastic compound (SHF1)
 Armour/Braid: Galvanized steel wire braid
 Oversheath: Halogen Free Thermoplastic compound (SHF1) if required.

1.9 - Construction: PANNAV IA - 150/250 V

Conductor: Tinned copper wires (Class 2)
 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
 Separator: Polyester tape (if required)
 Oversheath: Halogen Free Thermoplastic compound (SHF1) if required.

1.10 - Construction: PANNAV IASC - 150/250 V

Conductor: Tinned copper wires (Class 2)
 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.

1.11 - Product Range:

Type	Number of Core/Pair/Triple/Quad	Cross section (mm ²)	Remarks
PANNAV Series: IN, IBI, IBC, IBIC, IBICA IBCA, IBIA, IA, IASC	1P to 60 P	5 to 2.5	Flame retardant according to IEC 60332-1 & IEC 60332-3-22 Low Smoke according to IEC 61034-1/2 Halogen Free according to IEC 60754-1/2
	1T to 50 T		
	1Q to 25 Q		
	2C to 60 C		

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. 111, 1112 and 1113 all dated 03/31/08
 Inspection Reports Nos. 1111 Rev. 01, 1112 Rev. 01 and 1113 Rev. 01 all dated 10/13/2009
 Inspection Reports Nos. 1728 and 1729 both dated 10/13/2009
 Test Reports witnessed by BV Surveyor.

Instituto Lab System:

Test Reports Nos. 640408, 650408 and 660408 all dated 04/2008
 Test Report No. 2050408 dated 28/05/2008
 Test Reports Nos. 151109 dated 11/25/2009, 161109 dated 12/05/2009, 171109 dated 12/05/2009, 181109 dated 12/04/2009 and 191109 dated 11/27/2009.

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 - Production sites are to be recognized by Bureau Veritas as per NR320 for HBV products. To this end **PAN ELECTRIC INDUSTRIA** has to make the necessary arrangements for a Society's Surveyor to perform visits and product audits at the production sites.

5.3 - **PAN ELECTRIC INDUSTRIA** has declared to Bureau Veritas that the type of product described in this certificate may be manufactured at the following production site:

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

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:

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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 ***