DNV·GL

Certificate No:
**TAE000014Z**

# TYPE APPROVAL CERTIFICATE

## This is to certify:

**That the Data transmission cables and systems**

with type designation(s)
**Fire Resistant Profibus Armoured cable 1&2 pairs 0.35mm2 SHF2**

Issued to
**AP Solutions Oy**
**Rovaniemi, Finland**

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

## Application :

**Fire resistant Profibus cable.**

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

This Certificate is valid until **2021-06-21**.

Issued at **Høvik** on **2016-06-22**

for **DNV GL**

DNV GL local station: **Helsinki**

Approval Engineer: **Ivar Bull**

**Marit Laumann**
**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.


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Job Id: **262.1-022097-1**
Certificate No: **TAE000014Z**

## Product description

Fire Resistant Profibus Armoured cable 1&2 pairs 0.35mm2 SHF2

| | |
|---|---|
| Conductors: | Solid or stranded bare copper 0,35mm2 |
| Fire protection: | Fire resistant tape |
| Core insulation: | Polyolefin |
| Screen: | Aluminium/polyester tape (100%) with tinned copper braid (coverage ⩾60%) |
| Inner sheath: | SHF1 |
| Armour: | Braid of galvanized steel, tinned copper or bronze |
| Outer sheath: | SHF2 |

Table 113- Fieldbus cable specifications (IEC 61158-2 ed.6)

| **Cable parameter** | **Type A** | **Type B** | **Fire Resistant Profibus Armoured cable** |
|---|---|---|---|
| Impedance | 135 to 165 Ω (f = 3 to 20MHz) | 100 to 130 Ω (f > 100kHz) | 150 +/- 15 Ω @ f = 1 MHz |
| Capacitance | < 30 pF/m | < 60 pF/m | 30pF/m @ 800 Hz |
| Resistance | < 110 Ω/km | Not specified | ≤ 55 Ω/km @ 20C |
| Conductor cross-sectional area | ≥ 0,34 mm² | ≥ 0,22 mm² | 0,35 mm² |
| Color of sheath non-IS | Violet | Not specified | Violet or Black |
| Color of inner cable conductor A (RxD/TxD-N) | Green | Not specified | Red |
| Color inner cable conductor B (RxD/TxD-P) | Red | Not specified | Green |

## Application/Limitation

By the termination of the cables the total strings of the cable to be kept through into the termination point as for coax cables.

## Type Approval documentation

## Tests carried out

| **Standard** | **Release** | **General description** | **Limitation** |
|---|---|---|---|
| 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 | Charred portion of sample does not exceed 2,5m above bottom edge of burner. |
| IEC 60331-23 | 1999-04 | Tests for electric cables under fire conditions – Circuit integrity – Part 23: Procedures and requirements – Electric data cables | Minimum 90 +15 min<br>Additional requirement:<br>Transmission properties tested during fire:<br>1 Change in Char. imp.: Max ±25% → OK<br>2 Change in Atenuation: @4MHz and 16Mhz: Max ±25%. →OK |

| | | | |
|---|---|---|---|
| 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:<br><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:<br>pH > 4,3<br>Conductivity < 10µS/mm |
| IEC 61034-1/2 | 2005-04 | Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements | Low smoke<br>Light transmittance >60%<br>Result 93% |
| EN50305 | 2002 | Item 9.2 Toxicity index | Measured value: 2,4<br>Outer sheath only |
| UV Test | 2008 | ASTM D 2565 – 99<br>SUNLIGHT RESISTANCE<br>(XENON ARC TEST) | 41,5 W/m$^2$ 300-400nm.<br>Temp. 63 °C. 18min spray/102min dry<br>Duration 720 h. |
| IEC 60092-350 & CSA C22.2 | 2008-02 | Annex E: Procedure<br>8.9.1: Temperature requirements | Cold bend: -40°C<br>Cold impact: -35°C |

## Marking of product

APS Finland – week/year - ARMOURED FIRE RESISTANT PROFIBUS MARINE no of pairs x0.35 mm² LSZH SHF2 – IEC 60331-23 - IEC 60332-3-22 Cat A - Lot - CE - meter

## Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the periodical 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 shall be performed at least every second year.