



Certificate No:
TAE00004S3

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Field bus cables

with type designation(s)
Marine Bus Cable Profibus-DP and Canbus

Issued to
Wuhan Hysin Ship Technology Co., Ltd.
Wuhan, China

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.

Issued at **Høvik** on **2023-05-22**

This Certificate is valid until **2028-05-21**.

for **DNV**

DNV local unit: **Nanjing NB & CMC**

Approval Engineer: **Carsten Hunsalz**

Frederik Tore Elter
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.



Form code: TA 251

Revision: 2022-12

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Page 1 of 4

Product description

IEC 61158-2	Type A	Type B
Bus Type	Profibus-DP	Canbus
Impedance	150 ohm f=3-20MHz	120 ohm f=1MHz
Capacitance	<30 pF/m	<40 pF/m
Resistance	≤55 ohm/km	≤26 ohm/km
Conductor cross-sectional area	0.35, 0.5, 0.75 mm ²	0.35, 0.5, 0.75 mm ²
Number of pairs	1, 2	1, 2
Number of single conductors		4
Overall shield	2	2
Wire A Colour	Green	Blue
Wire B Colour	Red	White
Option	Aarmor + Outer Sheath	Aarmor + Outer Sheath

Construction:

Conductor material	Solid bare copper wire for Profibus-DP, stranded tinned copper wire for Canbus
Insulation material	Foamed PE
Filler	PP
Overall screen	AL/Mylar+ Tinned copper wire braid coverage ≥60% for Profibus-DP, ≥80% for Canbus
Inner jacket material	SHF1 or SHF2 or SHF2-MUD
Aarmor (Optional)	Galvanized steel wire braiding coverage ≥60%
Outer jacket material (Optional)	SHF1 or SHF2 or SHF2-MUD

Cable parameter acc. IEC 61158-2	Type A	Type B
Impedance	135 to 165 ohm (f=3 to 20MHz)	100 to 130 ohm (f>100KHz)
Capacity	<30pF/m	<60pF/m
Resistance	<110ohm/km	Not specified
Conductor cross-sectional area	>=0.34mm ²	>=0.22mm ²

Application/Limitation

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.

Fieldbus Data communication cables.

Flame retardant in bunch; cat A. Low smoke

Outer sheath SHF1 or SHF2 or SHF2 MUD according to NEK TS 606

Temperature range:

Operation: -40°C to +80 °C

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC 61158-2	2023-03	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition	Cable specifications as per item 22.1.2.2 and table 144.
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 60332-1-2	2015-07	Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame	
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	Charred portion of sample does not exceed 2,5m above bottom edge of burner.
IEC 60754-1	2019-11	Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content	Sheath only Low Halogen: <0,5% Halogen
IEC 60754-2	2019-11	Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity	Sheath only Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 60684-2	2011-08	Clause 45.2 Methods of determination of low levels of fluorine	Sheath only Fluorine content < 0,1%
IEC 61034-1/2	2019-11	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance >60%
NEK TS 606	2022	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	SHF2-MUD resistance test: IRM902+IRM903 100°C 7d. Calcium Bromide 70°C 56d. Oil based mud: EDC 95/11 70°C 56d
UL 1581	2020-02	UL Standard for Safety Reference Standard for Electrical Wires, Cables, and Flexible Cords	SHF1, SHF2, SHF-MUD UV resistant acc. UL 1581 Cl.1200 min. 85% after 300h in the tensile strength and elongation
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.	SHF1 aging in IRM 902 70°C 4h SHF2 aging in IRM 902 100°C 24h tensile strength and elongation max +/- 40%

Marking of product

Example:

Hysin MARINE Bus Cable Profibus-DP size SHF1 IEC 60332-3-22 <meter marking> <batch no.>

Place of Production

DNV id: 10630537

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