



Certificate no.:
TAE00004UW

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Data transmission cables and systems

with type designation(s)

CAN bus cable, Profibus cable, RS485/RS422 cable, Profinet Industrial Cable

issued to

ZHANGJIAGANG TWENTSCHE CABLE CO.,LTD

Zhangjiagang, Jiangsu, China

is found to comply with

DNV rules for classification – Ships, offshore units, and high speed and light craft

Application:

Fieldbus Data communication cables.

Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Issued at **Høvik** on **2024-01-22**

This Certificate is valid until **2029-01-21**.

for **DNV**

DNV local unit: **Jiangyin**

Approval Engineer: **Ivar Bull**

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: 2023-09

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Product description

Industrial fieldbus cables.

Canbus cable
Profibus cable
RS485/RS422 cable
Profinet Industrial Cable

IEC 61158-2	Type A	Type B			
Bus Type	ProfIBUS	CanBUS	RS-485/RS422	PROFINET	Units
Impedance	150±15 f=3-20MHz	100-130 f>100KHz	100 - 130 f>100KHz	100±15	Ohm
Capacitance (f=1000Hz)	<30	<60	<60	56	pF/m
Resistance	<110	≤26	<90	59,4	Ohm/Km
Voltage rating	≤60	≤100	≤100	<100	V
Conductor cross-section	0.34	0.75	0.22-0.75	0,34	mm ²
Conductor size	22	18	24-18	22	AWG
Number of pairs	1	1,2,4,8	1,2,4,8	2	-
Individual screen AL-polyester tape	None	1	1	None	-
Overall shield	2	1	1	2	-
Wire A Color	Green	N/S	N/S	White, Yellow	-
Wire B Color	Red	N/S	N/S	Blue, Orange	-
Optional wire	-	Grounding Wire	Grounding Wire	-	-
Armour and outer sheath:	Optional	Optional	Optional	Optional	

Construction:

Conductor:	Stranded or solid, tinned or bare copper wire
Insulation:	Foamed PE
Fillers and bedding	Halogen-Free, Low-Smoke, Flame retardant
Individual Screen	Al-polyester tape (CanBus and RS485/RS422 types)
Overall Shield	Al-polyester tape + tinned copper wire braid with density ≥55% (Profibus and Profinet types) Tinned copper wire braid with density ≥55% (CanBus and RS485/RS422 types)
Inner sheath	SHF1 or SHF2 or SHF2-MUD per IEC60092-360

Armor:

(Optional) Tinned copper wire braid or galvanized steel wire braid. Braid density ≥80%

Outer sheath:

(Optional) SHF1 or SHF2 or SHF2-MUD per IEC60092-360

Cable parameter	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 Bundles of Cables or Wires) are fulfilled without any additional measures.

Temperature window:

Operation : -40°C to +90°C
Installation : -15°C to +50°C

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
61158-2 Ed. 7	2023-03	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition	
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	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	Halogen free: pH > 4,3 Conductivity < 10µS/mm
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 Ed 6	2022-03	Cables for offshore installations.	Mud resistance test for cable types with SHF2 MUD sheath: IRM 902 + 903 100°C 7d. Calcium Bromide 70°C 56d. EDC 95-11 70°C 56d.

Marking of product

Examples:

ZTC Profibus 1X2X0.34mm² SHF1 or SHF2 or SHF2 MUD IEC 60332-3-22 DNV - DD/MM/YY - Meter
ZTC CANBUS 1×2×0.75mm²+0.75mm² SHF1 or SHF2 or SHF2 MUD IEC 60332-3-22 DNV - DD/MM/YY - Meter
ZTC RS485/422 1×2×0.22mm² SHF1 or SHF2 or SHF2 MUD IEC 60332-3-22 DNV - DD/MM/YY – Meter
ZTC PROFINET 1×2×0.34mm² SHF1 or SHF2 or SHF2 MUD IEC 60332-3-22 DNV - DD/MM/YY – Meter

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