DNV·GL

Certificate No:
TAE00003HA

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Data transmission cables and systems

with type designation(s)
Profibus, Canbus, RS485/RS422

Issued to
ZHANGJIAGANG TWENTSCHE CABLE CO.,LTD
Zhangjiagang, Jiangsu, China

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

Fieldbus Data communication cables.

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

Issued at **Hamburg** on **2019-05-28**
This Certificate is valid until **2024-05-27**.
DNV GL local station: **Jiangyin**

Approval Engineer: **Carsten Hunsalz**

for **DNV GL**

Arne Schaarmann
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.

Product description

IEC 61158-2	Type A	Type B		
Bus Type	**ProfiBUS**	**CanBUS**	**RS-485/RS422**	**Units**
Impedance	150 f=3-20MHz	100-130 f>100KHz	100 - 130 f>100KHz	Ohm
Capacitance (f=1000Hz)	<30	<60	<60	pF/m
Resistance	<110	≤26	<90	Ohm/Km
Voltage rating	≤60	≤100	≤100	V
Conductor cross-sectional area	0.34	0.75	0.22	mm^2
Conductor size	22	20/19	24	AWG
Number of pairs	1	1,2,4,8	1,2,4,8	-
Individual shield	None	1	1	-
Overall shield	2	1	-	-
Wire A Color	Green	N/S	N/S	-
Wire B Color	Red	N/S	N/S	-
Option	Armor + Outer Sheath	Grounding Wire, Armor + Outer Sheath	Grounding Wire, Armor + Outer Sheath	-

Construction:

Conductor material	Stranded bare copper wire, stranded tinned copper wire for RS485/RS422 type
Insulation material	Foamed PE, cellular polyolefin for CanBus type
Fillers and bedding	Halogen-Free, Low-Smoke, Flame retardant
Individual Shield	Al-polyester tape for CanBus and RS485/RS422 type
Overall Shield	Al-polyester tape + tinned copper wire braid braiding density ≥80% for ProfiBus type Tinned copper wire braid braiding density ≥80% for CanBus type
Inner jacket material	SHF1 or SHF2 or SHF2-MUD per IEC60092-360
Armor (Optional)	Tinned copper wire braid or galvanized steel wire braiding density ≥90%
Outer jacket material (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 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 window:
Operation : -40°C to +90°C
Installation : -15°C to +50°C

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC 61158-2 ed. 6	2014-07	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition	Cable specifications as per item 22.1.2.2 and table 113.
IEC 60092-360	2014-04	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	2011-11	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	2011-11	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	2013-06	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance >60%

Standard	Release	General description	Limitation
NEK TS 606	2016	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

Example:

ZTC Profibus 1X2X0.34mm^2 SHF1 or SHF2 or SHF2 MUD IEC 60332-3-22 DNV GL+DD/MM/YY+Meter

ZTC CANBUS 1×2×0.75mm2+0.75mm2 SHF1 or SHF2 or SHF2 MUD IEC 60332-3-22
DNV GL+DD/MM/YY+Meter

ZTC RS485/422 1×2×0.22mm2 SHF1 or SHF2 or SHF2 MUD IEC 60332-3-22 DNV GL+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