

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Category cables**

with type designation(s)

InduData Cat 5e S/FTP 4 x 2 x 0,22mm² AWG 24/7 stranded,**InduData Cat 7 S/FTP 4 x 2 x 0,27mm² AWG 22/7 stranded,****InduData Cat 7 S/FTP 4 x 2 x 0,259mm² AWG 23/1 solid**

Issued to

B.V. Twentsche Kabelfabriek
Haaksbergen, Netherlands

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft**Application :****Data communication cable, installation/horizontal cable****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Høvik** on **2018-01-19**This Certificate is valid until **2022-12-31**.for **DNV GL**DNV GL local station: **Jiangyin**Approval Engineer: **Ivar Bull**

Andreas Kristoffersen
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

Cat5e S/FTP 4 pair cable

Construction	
Conductor	0,22mm ² , 7 x 0,20 mm, plain or tinned copper
Insulation	Foam PE
Twisting/ screens	Individual laminated aluminium tape + overall tinned copper braid
Outer sheath	SHF1

Transmission Frequency(MHz)	4	10	16	20	25	31.25	62.5	100
Attenuation dB/100m	4,1	6,5	8,2	9,3	10,4	11,7	17,0	22
Return Loss dB/100m	23,0	25,0	25,0	25,0	24,3	23,6	21,5	20,1
NEXT dB/100M	56,3	50,3	47,2	45,8	44,3	42,9	38,4	35,3

Cat 7 S/FTP 4 pair cable

Construction	
Conductor	0,27mm ² , 7 x 0,223 mm, plain or tinned copper
Insulation	Foam PE
Twisting/ screens	Individual laminated aluminium tape + overall tinned copper braid
Outer sheath	SHF1

Transmission Frequency(MHz)	4	10	16	20	25	31.25	62.5	100	155	200	250	300	600
Attenuation dB/100m	3,7	5,9	7,4	8,3	9,3	10,4	14,9	19	24	27,5	31,0	34,2	50,1
Return Loss dB/100m	23	25	25	25	24,3	23,6	21,5	20,1	18,8	18,0	17,3	17,3	17,3
NEXT dB/100M	78	78	78	78	78	78	75,5	72,4	69,5	67,9	66,4	65,2	60,7

Cat 7 S/FTP 4 pair cable

Construction	
Conductor	0,259mm ² , 1 x 0,574 mm, plain or tinned copper
Insulation	Foam PE
Twisting/ screens	Individual laminated aluminium tape + overall tinned copper braid
Outer sheath	SHF1

Transmission Frequency(MHz)	4	10	16	20	25	31.25	62.5	100	155	200	250	300	600
Attenuation dB/100m	3,7	5,9	7,4	8,3	9,3	10,4	14,9	19,0	24,0	27,5	31,0	34,2	50,1
Return Loss dB/100m	23	25	25	25	24,3	23,6	21,5	20,1	18,8	18,0	17,3	17,3	17,3
NEXT dB/100M	78	78	78	78	78	78	75,5	72,4	69,5	67,9	66,4	65,2	60,7

Manufactured by

Zhangjiagang Twentsche Cable Co., Ltd.,
Jiangsu, China

Application/Limitation

In order to achieve a transmission link compliant with Category 7, cables shall be installed with suitable termination equipment according to manufacturer's recommendations.

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.

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC 61156-5	2009-05	Multicore and symmetrical pair/quad cables for digital communications – Part 5: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz – Horizontal floor wiring – Sectional specification	Reference to requirement for category cable: 5e (100MHz), 7 (600MHz),
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 60332-3-24	2009-02	Tests on electric and optical fibre cables under fire conditions – Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category C	Bunch test Category C
IEC 60332-1-2	2004-07	Tests on electric and optical fibre cables under fire conditions – Part 1-1: Test for vertical flame propagation for a single insulated wire or cable – Apparatus	Flame retardant small scale
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	2013-07 2013-09	Measurement of smoke density of cables	IEC 61034-1/2

Job Id: **262.1-015223-2**
Certificate No: **TAE00002J5**

Marking of product

TKF - InduData - Category 5E S/FTP - 4 x 2 x 0,22mm² AWG 24/7 stranded - HFFR-LS- MARINE
APPROVED <BATCH NR.> <Meter MARKING> or

TKF - InduData - Category 7 S/FTP - 4 x 2 x 0,27mm² AWG 22/7 stranded - HFFR-LS - MARINE
APPROVED <BATCH NR.> <Meter MARKING> or

TKF - InduData - Category 7 S/FTP - 4 x 2 x 0,259mm² AWG 23/1 solid - HFFR-LS - MARINE
APPROVED <BATCH NR.> <Meter MARKING>

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) 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 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