



Certificate No:
TAE00004R1

TYPE APPROVAL CERTIFICATE

This is to certify:

That the **Category cables**

with type designation(s)
S/FTP 4x2x23AWG CAT 5e, CAT 6, CAT 6A, CAT 7, CAT 7A

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 **2023-04-03**

This Certificate is valid until **2028-04-02**.

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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Product description

S/FTP 4x2x23AWG CAT 5e, CAT 6, CAT 6A, CAT 7, CAT 7A

Conductor:	Stranded, annealed and bare copper 4x2x23/7 AWG or 4x2x23/1 AWG
Insulation:	PE-foam
Cabling / Individual screen:	Twisted pairs with aluminum foil-polyester tape
Overall screen:	Solid tinned copper braid
Outer Sheath:	SHF1, SHF2, SHF-MUD

Aarmor + outer sheath optional:	Galvanized steel wire braiding + SHF1, SHF2, SHF-MUD
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Number of cores x conductor cross-section	Overall diameter
	mm
4 x 2 x 23/7 AWG	OD: 9.0 ±0.5mm
4 x 2 x 23/1 AWG	OD: 8.5 ±0.5mm
4 x 2 x 23/7 AWG with Armor + outer sheath	OD: 12.2 ±0.8mm
4 x 2 x 23/1 AWG with Armor + outer sheath	OD: 11.5 ±0.8mm

CAT 5e

Frequency MHz	ATT dB/100m Max.	RL dB Min.	NEXT dB Min.	PSNEXT dB Min.	ELFEXT dB Min.	PSELFEXT dB Min.
4	4.08	23.0	56.3	53.3	52.0	49.0
8	5.78	24.5	51.8	48.8	45.9	42.9
10	6.48	25.0	50.3	47.3	44.0	41.0
16	8.26	25.0	47.2	44.2	39.9	36.9
20	9.28	25.0	45.8	42.8	38.0	35.0
25	10.43	24.3	44.3	41.3	36.0	33.0
31.25	11.73	23.6	42.9	39.9	34.1	31.1
62.5	17.00	21.5	38.4	35.4	28.1	25.1
100	21.98	20.1	35.3	32.3	24.0	21.0

CAT 6

Frequency MHz	ATT dB/100m Max.	RL dB Min.	NEXT dB Min.	PSNEXT dB Min.	ELFEXT dB Min.	PSELFEXT dB Min.
4	3.83	23.0	66.3	63.3	56.0	53.0
8	5.37	24.5	61.8	58.8	49.9	46.9
10	6.00	25.0	60.3	57.3	48.0	45.0
16	7.61	25.0	57.2	54.2	43.9	40.9
20	8.53	25.0	55.8	52.8	42.0	39.0
25	9.57	24.3	54.3	51.3	40.0	37.0
31.25	10.75	23.6	52.9	49.9	38.1	35.1
62.5	15.48	21.5	48.4	45.4	32.1	29.1
100	19.92	20.1	45.3	42.3	28.0	25.0
200	29.14	18.0	40.8	37.8	22.0	19.0
250	33.02	17.3	39.3	36.3	20.0	17.0

CAT 6A

Frequency MHz	ATT dB/100m Max.	RL dB Min.	NEXT dB Min.	PSNEXT dB Min.	ELFEXT dB Min.	PSELFEXT dB Min.
4	3.80	23.0	66.3	63.3	56.0	53.0
8	5.31	24.5	61.8	58.8	49.9	46.9
10	5.93	25.0	60.3	57.3	48.0	45.0
16	7.49	25.0	57.2	54.2	43.9	40.9
20	8.38	25.0	55.8	52.8	42.0	39.0
25	9.38	24.3	54.3	51.3	40.0	37.0
31.25	10.50	23.6	52.9	49.9	38.1	35.1
62.5	14.99	21.5	48.4	45.4	32.1	29.1
100	19.14	20.1	45.3	42.3	28.0	25.0
200	27.58	18.0	40.8	37.8	22.0	19.0
250	31.07	17.3	39.3	36.3	20.0	17.0
300	34.27	17.3	38.1	35.1	18.5	15.5
400	40.05	17.3	36.3	33.3	16.0	13.0
500	45.26	17.3	34.8	31.8	14.0	11.0

CAT 7

Frequency MHz	ATT dB/100m Max.	RL dB Min.	NEXT dB Min.	PSNEXT dB Min.	ELFEXT dB Min.	PSELFEXT dB Min.
4	3.74	23.0	78.0	75.0	78.0	75.0
8	5.24	24.5	78.0	75.0	77.2	74.2
10	5.86	25.0	78.0	75.0	75.3	72.3
16	7.41	25.0	78.0	75.0	71.2	68.2
20	8.29	25.0	78.0	75.0	69.3	66.3
25	9.29	24.3	78.0	75.0	67.3	64.3
31.25	10.41	23.6	78.0	75.0	65.4	62.4
62.5	14.88	21.5	75.5	72.5	59.4	56.4
100	19.02	20.1	72.4	69.4	55.3	52.3
200	27.47	18.0	67.9	64.9	51.5	48.5
250	31.97	17.3	66.4	63.4	49.3	46.3
300	34.19	17.3	65.2	62.2	45.8	42.8
400	40.01	17.3	63.4	60.4	43.3	40.3
500	45.26	17.3	61.9	58.9	41.3	38.3
600	50.10	17.3	60.7	57.7	39.7	36.7

CAT 7A

Frequency MHz	ATT dB/100m Max.	RL dB Min.	NEXT dB Min.	PSNEXT dB Min.	ELFEXT dB Min.	PSELFEXT dB Min.
4	3.75	23.0	78.0	75.0	78.0	75.0
8	5.22	24.5	78.0	75.0	77.2	74.2
10	5.82	25.0	78.0	75.0	75.3	72.3
16	7.34	25.0	78.0	75.0	71.2	68.2
20	8.21	25.0	78.0	75.0	69.3	66.3
25	9.18	24.3	78.0	75.0	67.3	64.3
31.25	10.26	23.6	78.0	75.0	65.4	62.4
62.5	14.57	21.5	78.0	75.0	59.4	56.4
100	18.53	20.1	75.4	72.5	55.3	52.3
200	26.47	18.0	70.9	67.9	49.3	46.3
250	29.73	17.3	69.4	66.4	47.3	44.3

300	32.69	17.3	68.2	65.2	45.8	42.8
500	42.76	17.3	64.9	61.9	41.3	38.3
600	47.10	17.3	63.7	60.7	39.7	36.7
800	54.92	16.1	61.9	58.9	37.2	34.2
1000	61.93	15.1	60.4	57.4	35.3	32.3

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.

Due to the low cross section of these cables, extra precautions shall be made during installation. In order to achieve a transmission link compliant with Category CAT5E, CAT6, CAT6A, CAT7, CAT7A, cables shall be installed with suitable termination equipment according to manufacturer's recommendations.

Horizontal wiring cables S/FTP 4x2x23AWG CAT 5e, CAT 6, CAT 6A, CAT 7, CAT 7A
Flame retardant Cat. A. Halogen free. Low smoke.

Install at: -20°C to +60 °C
Operate at: -40°C to +80 °C

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
DNV-CP-0403	2021-09	DNV Type approval program for Data communication cables – category cables	Ref. IEC 61156-5 standard Category 5e, 6, 6A, 7, 7A
IEC 61156-5	2020-04	Multicore and symmetrical pair/quad cables for digital communications – Part 5: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz – Horizontal wiring – Sectional specification	
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%

Standard	Release	General description	Limitation
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 Cable cat7 S/FTP 4PR 23AWG/7 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