

# TYPE APPROVAL CERTIFICATE

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## This is to certify:

That the **Category cables**

with type designation(s)

**Cat. 5e S/FTP 4x2x0,205mm<sup>2</sup> stranded, Cat. 6A S/FTP 4x2x0,246mm<sup>2</sup> stranded, Cat. 6A S/FTP 4x2x0,246mm<sup>2</sup> solid, Cat. 7 S/FTP 4x2x0,246mm<sup>2</sup> stranded, Cat. 7 S/FTP 4x2x0,246mm<sup>2</sup> solid, Cat. 7A S/FTP 4x2x0,264mm<sup>2</sup> solid**

Issued to

**Hyman Marine & Offshore Co., Ltd.**  
**Shanghai, 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 **2023-04-25**

This Certificate is valid until **2028-04-24**.

for **DNV**

DNV local unit: **Shanghai**

Approval Engineer: **Carsten Hunsalz**

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**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.



## Product description

Cat. 5e S/FTP 4x2x0,205mm<sup>2</sup> (7x0,193mm) stranded  
 Cat. 6A S/FTP 4x2x0,246mm<sup>2</sup> (7x0,212mm) stranded  
 Cat. 6A S/FTP 4x2x0,246mm<sup>2</sup> (1x0,56mm) solid  
 Cat. 7 S/FTP 4x2x0,246mm<sup>2</sup> (7x0,212mm) stranded  
 Cat. 7 S/FTP 4x2x0,246mm<sup>2</sup> (1x0,56mm) solid  
 Cat. 7A S/FTP 4x2x0,264mm<sup>2</sup> (1x0,58mm) solid

### Construction:

Conductor: Stranded or solid plain cooper  
 Insulation: Foam Polyethylene  
 Shield: Individually laminated Aluminium shielded pairs  
 Overall tinned copper wire braid  
 Outer Sheath: SHF1

### Transmission properties:

#### Cat. 5e S/FTP 4 pair cable – 56J193-008:

| Transmission Frequency(MHz) | 1    | 4    | 8    | 10   | 16   | 20   | 25   | 31,25 | 62,5 | 100  |
|-----------------------------|------|------|------|------|------|------|------|-------|------|------|
| Attenuation dB/100m         | 2,1  | 4,1  | 5,8  | 6,5  | 8,3  | 9,3  | 10,4 | 11,7  | 17,0 | 22,0 |
| Return Loss dB/100m         | 20,0 | 23,0 | 24,5 | 25,0 | 25,0 | 25,0 | 24,3 | 23,6  | 21,5 | 20,1 |
| PSNEXT dB/100m              | 62,3 | 53,3 | 48,8 | 47,3 | 44,2 | 42,8 | 41,3 | 39,9  | 35,4 | 32,3 |

#### Cat. 6A S/FTP 4 pair cable – 66J212-008 and Cat. 6A S/FTP 4 pair cable – 66J56-008:

| Transmission Frequency(MHz) | 1    | 4    | 10   | 16   | 20   | 31,25 | 62,5 | 100  | 200  | 250  | 400  | 500  |
|-----------------------------|------|------|------|------|------|-------|------|------|------|------|------|------|
| Attenuation dB/100m         | 2,1  | 3,8  | 5,9  | 7,5  | 8,4  | 10,5  | 15,0 | 19,1 | 27,6 | 31,1 | 40,1 | 45,3 |
| Return Loss dB/100m         | 20   | 23   | 25   | 25   | 25   | 23,6  | 21,5 | 20,1 | 18,0 | 17,3 | 17,3 | 17,3 |
| PSNEXT dB/100m              | 72,3 | 63,3 | 57,3 | 54,2 | 52,8 | 49,9  | 45,4 | 42,3 | 37,8 | 36,3 | 33,3 | 31,8 |

#### Cat. 7 S/FTP 4 pair cable – 70J212-008 and Cat. 7 S/FTP 4 pair cable – 70J56-008::

| Transmission Frequency (MHz) | 1   | 4   | 10  | 16  | 20  | 30   | 31,25 | 62,5 |
|------------------------------|-----|-----|-----|-----|-----|------|-------|------|
| Attenuation dB/100m          | 2,0 | 3,7 | 5,9 | 7,4 | 8,3 | 10,2 | 10,4  | 14,9 |
| Return Loss dB/100m          | 20  | 23  | 25  | 25  | 25  | 23,8 | 23,6  | 21,5 |
| PSNEXT dB/100m               | 75  | 75  | 75  | 75  | 75  | 75   | 75    | 72,5 |

### continued

| Transmission Frequency (MHz) | 100  | 155  | 200   | 250  | 300  | 600  |
|------------------------------|------|------|-------|------|------|------|
| Attenuation dB/100m          | 19,0 | 24,0 | 27,47 | 31,0 | 34,2 | 50,1 |
| Return Loss dB/100m          | 20,1 | 18,8 | 18,0  | 17,3 | 17,3 | 17,3 |
| PSNEXT dB/100m               | 69,4 | 66,5 | 64,9  | 63,4 | 62,2 | 57,7 |

#### Cat. 7A S/FTP 4 pair cable – 72J58-008:

| Transmission Frequency (MHz) | 1   | 4   | 10  | 16  | 20  | 25  | 31,25 | 62,5 |
|------------------------------|-----|-----|-----|-----|-----|-----|-------|------|
| Attenuation dB/100m          | 2,1 | 3,7 | 5,8 | 7,3 | 8,2 | 9,2 | 10,3  | 14,6 |

|                        |    |    |    |    |    |      |      |      |
|------------------------|----|----|----|----|----|------|------|------|
| Return Loss<br>dB/100m | 20 | 23 | 25 | 25 | 25 | 24,3 | 23,6 | 21,5 |
| PSNEXT<br>dB/100m      | 75 | 75 | 75 | 75 | 75 | 75   | 75   | 75   |

continued

|                                 |      |      |      |      |      |      |      |      |
|---------------------------------|------|------|------|------|------|------|------|------|
| Transmission<br>Frequency (MHz) | 100  | 200  | 250  | 300  | 500  | 600  | 800  | 1000 |
| Attenuation<br>dB/100m          | 18,5 | 26,5 | 29,7 | 32,7 | 42,8 | 47,1 | 54,9 | 61,9 |
| Return Loss<br>dB/100m          | 20,1 | 18,0 | 17,3 | 17,3 | 17,3 | 17,3 | 16,1 | 15,1 |
| PSNEXT<br>dB/100m               | 72,4 | 67,9 | 66,4 | 65,2 | 61,9 | 60,7 | 58,9 | 57,4 |

## 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:<br>5e (100MHz)<br>6 and 6A (500 MHz)<br>7 (600MHz)<br>7A (1000MHz) |
| 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 60332-3-22 | 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 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 60754-1    | 2019-11 | Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content                                                                                           | Low Halogen:<br><0,5% Halogen                                                                                   |
| IEC 60754-2    | 2019-11 | Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content                                                                                           | Halogen free:<br>pH > 4,3<br>Conductivity < 10µS/mm                                                             |
| IEC 61034-1/2  | 2019-11 | Measurement of smoke density of cables burning under defined conditions –<br>Part 1: Test apparatus<br>Part 2: Test procedure and requirements                                                                     | Low smoke<br>Light transmittance >60%                                                                           |
| IEC 60811-2-1  | 2001-11 | Methods specific to elastomeric compounds-<br>Ozone resistance ,hot set and<br>Mineral oil immersion tests                                                                                                         | Immersion oil:<br>Variation $\leq \pm 40\%$                                                                     |

## Marking of product

Forller Cable CAT5E S/FTP 4 x 2 x 0,205mm<sup>2</sup> AWG 24 stranded or  
Forller Cable CAT6A S/FTP 4 x 2 x 0,246mm<sup>2</sup> AWG 23 stranded or  
Forller Cable CAT6A S/FTP 4 x 2 x 0,246mm<sup>2</sup> AWG 23 solid or  
Forller Cable CAT7 S/FTP 4 x 2 x 0,246mm<sup>2</sup> AWG 23 stranded or  
Forller Cable CAT7 S/FTP 4 x 2 x 0,246mm<sup>2</sup> AWG 23 solid or  
Forller Cable CAT7A S/FTP 4 x 2 x 0,264mm<sup>2</sup> AWG 23 solid  
LSZH IEC60332-3-22 <DNV NO.> <BATCH NO.> <meter marking>

## Place of Production

DNV id: 10129143

## 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