Certificate No:
TAE00004RN

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Data transmission cables and systems

with type designation(s)
Coaxial cable Type RG 58 Marine, RG 58 Marine ARM, RG 213 Marine, RG 213 Marine ARM, RG 214 Marine, RG 214 Marine ARM

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**.
DNV local unit: **Shanghai**

Approval Engineer: **Carsten Hunsalz**

for **DNV**

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

Halogen free, SHF1 or SHF 2 or SHF2 MUD sheathed radio frequency coaxial cable.

Type: RG 58 Marine, RG 58 Marine ARM, RG 213 Marine, RG 213 Marine ARM, RG 214 Marine, RG 214 Marine ARM

Inner conductor:	Stranded bare copper
Insulation:	Polyethylene (PE)
Braid:	Al-polyester tape + tinned copper wire braid + 2nd tinned copper wire braid (RG 214 only)
Sheath:	SHF1 or SHF 2 or SHF2 MUD
Optional amour for ARM types:	Galvanized steel wire braid or bronze wire braid or tinned copper wire braid
Optional outer sheath for ARM types:	SHF1 or SHF 2 or SHF2 MUD

Electrical Characteristics	Impedance Ω
RG 58	50 +- 2
RG 213	50 +- 2
RG 214	50 +- 2

Attenuation dB/100m

Frequency (MHz)	5	10	100	200	500	1000	1500	2150	2500	3000	5500
RG 58	3,5	4,9	14,4	21,0	36,4	52,2	63,9	76,9	83,5	91,8	-
RG 213	1,4	2,0	5,8	8,4	13,2	20,0	25,3	31,5	34,7	38,6	
RG 214	1,3	1,9	5,7	8,2	12,9	19,6	24,8	30,9	34,0	37,6	55,0

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.

Radio frequency coaxial cable
Flame retardant Cat. A. Halogen free. Low smoke. Mud resistant (SHF2 MUD types)

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC 60096-0-1	2012-10	Radio frequency cables – Part 0-1: Guidelines to the design of detail specifications – Coaxial cables	Partly used
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 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

Standard	Release	General description	Limitation
IEC 60684-2	2011-08	Item 45.2 Determination of low levels of fluorine	Fluorine content, maximum 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%
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:

Forller Cable - RG 58 Marine SHF1 or SHF2 or SHF MUD – DNV - IEC 60332-3-22 - <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) 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