DNV·GL

Certificate No:
TAE00002KU

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)
MarineCom YZafc X-FR & Marine2Com YZ2afc X-FR 250 V,
MarineSignal YZs X-FR 250 V

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 :

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

Type	Rated voltage (V)	Temp. class (°C)
MarineCom YZafc X-FR & Marine2Com YZ2afc X-FR 250 V	**250**	**90**
MarineSignal YZs X-FR 250 V	**250**	**90**

Issued at **Høvik** on **2018-02-07**
This Certificate is valid until **2023-02-06**.
DNV GL local station: **Rotterdam**

Approval Engineer: **Ivar Bull**

for **DNV GL**

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.

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Job Id: **262.1-026398-1**
Certificate No: **TAE00002KU**

Product description

MarineCom -YZafc X-FR 250 V HALOGEN
Marine2Com –YZ2afc X-FR 250 V HALOGEN FREE
MarineSignal YZs X-FR 250 V HALOGEN FREE

c = common screen
2 = individual screen

Construction:

Conductors:	Plain or tinned stranded copper class 2
Core insulation:	Mica + HF90
Common Screen:	Aluminium foil with tinned copper drain wire
Individual screen (if any)	Aluminium foil with tinned copper drain wire
Inner covering:	Non hygroscopic tape
Screen:	Aluminum or copper polyester tape with tinned or plain copper drainwire.
Outer sheath:	SHF1

MarineCom & Marine2Com:

No of cores:	Cross sectional area [mm$^{2]}$
1-27 + 30, 32, 37 pairs	0,50 0,75 1 1,5 2,5

MarineSignal:

No of cores:	Cross sectional area [mm$^{2]}$
1-30 cores	0,50 0,75 1 1,5 2,5

Application/Limitation

This type of cable is fire resistant according to IEC 60331-1/2.

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

IEC 60092-350	2014-08	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
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 60092-376	2017-05	Electrical installations in ships - Part 376: Cables for control and instrumentation circuits 150/250 V (300 V)	
IEC 60331-1/2	2009-05	Fire resistance / Circuit integrity – Test for method for fire *with shock* at temperature of at least 830ºC for cables rated up to and including 0,6/1 kV	Minimum 90 min. test.
IEC 60332-3-22	2009-02	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	Bunch test Category A
IEC 60754-1	2011-11	Test on gases evolved during combustion of materials from cables – Determination of the amount of halogen acid gas	Low Halogen:

IEC 60754-2	2011-11	Test on gases evolved during combustion of materials from cables – Determination of the degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity	Halogen free:
IEC 60684-2	2003-05	Flexible insulating sleeving – Part 2: Methods of test.	Fluorine content < 0,1%
IEC 61034-1/2	2013-07 2013-09	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance >60%
IEC 60684-2	2011-08	Flexible insulating sleeving – Part 2: Methods of test Clause 45.2 Methods of determination of low levels of fluorine	HF max 0,1% [0,02% can be detected]

Marking of product

TKF- {Length} Size - 250V - CS 90 - mbzh - MarineCom YZafc-XFR HALOGEN FREE - FIRE RESISTANT - IEC 60332-3-22 – {Batch} or

TKF- {Length} Size - 250V - CS 90 - mbzh – Marine2Com YZ2afc-XFR HALOGEN FREE - FIRE RESISTANT - IEC 60332-3-22 – {Batch} or

TKF- {Length} Size - 250V - CS 90 - mbzh – MarineSignal YZs -XFR HALOGEN FREE - FIRE RESISTANT - IEC 60332-3-22 – {Batch}

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