

**TYPE APPROVAL CERTIFICATE****This is to certify:****That the Electric Power Cable**

with type designation(s)

**MarineLine YZp X-FR 0,6/1 kV, MarineLine+ YZp X-FR 0,6/1 kV, MarineFlex YZp X-FR 0,6/1 kV**

Issued to

**B.V. Twentsche Kabelfabriek  
Haaksbergen, Netherlands**

is found to comply with

**DNV GL rules for classification – Ships and offshore units****Application :****General power and lighting.  
Fire resistant.****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**

Type	Voltage class (kV)	Temp. class (°C)
<b>MarineLine YZp X-FR 0,6/1 kV</b>	<b>0,6/1</b>	<b>90</b>
<b>MarineLine+ YZp X-FR 0,6/1 kV</b>	<b>0,6/1</b>	<b>90</b>
<b>MarineFlex YZp X-FR 0,6/1 kV</b>	<b>0,6/1</b>	<b>90</b>

This Certificate is valid until **2021-01-06**.Issued at **Høvik** on **2016-01-07**DNV GL local station: **Rotterdam**Approval Engineer: **Ivar Bull**for **DNV GL**

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**Marit Laumann  
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

Types: **MarineLine YZp X-FR 0,6/1 kV,**  
**MarineLine+ YZp X-FR 0,6/1 kV,**  
**MarineFlex YZp X-FR 0,6/1 kV**

### Construction:

Conductors: Plain stranded copper class 2, round or sector shaped or class 5 (MarineFlex)  
Core insulation: Mica tape plus XLHFFR (HF90)  
Filler: Non hygroscopic tape or Halogen free filler (MarineLine+ and MarineFlex)  
Outer sheath: SHF1

### MarineLine:

No of cores:	Cross sectional area [mm <sup>2</sup> ]
1	1 - 300
2	1 - 300
3	1 - 300
4	1 - 300
5	1 - 300
6-37	1 1,5 2,5

### MarineLine+

No of cores:	Cross sectional area [mm <sup>2</sup> ]
1	1,5 - 300
2	1,5 - 300
3	1,5 - 300
4	1,5 - 300
5	1,5 - 300

### MarineFlex

No of cores:	Cross sectional area [mm <sup>2</sup> ]
1	10 - 300
2	10 - 300
3	10 - 300
4	10 - 300
5	10 - 300

## Application/Limitation

This type of cable is fire resistant in accordance with IEC Publications 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

Data sheets: **MarineLine YZp X-FR 0,6/1 kV, Ver. 5 dated 2011-08-11**  
**MarineLine+ YZp X-FR 0,6/1 kV, Ver. 5 dated 2011-08-11**  
**MarineFlex YZp X-FR 0,6/1 kV, Ver. 5 dated 2011-08-11**

Test reports: **TKF Rapport no. 445 dated 2011-05-12**

## Tests carried out

IEC 60092-350	2014-08	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
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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 60092-353	2011-08	Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV	
IEC 60331-1/2	2009-05	Fire resistance / Circuit integrity – Test for method for fire <i>with shock</i> at temperature of at least 830°C 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 61034-1/2	2005-04	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Minimum 60% light transmittance.
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- Size - 0,6/1 kV - MarineLine YZp X-FR - HALOGEN FREE – IEC 60331–IEC 60332-3-22-Lot. No or  
 TKF- Size - 0,6/1 kV – MarineLine+ YZp X-FR - HALOGEN FREE - IEC 60331–IEC 60332-3-22 -Lot. No or  
 TKF- Size - 0,6/1 kV - MarineFlex YZp X-FR - HALOGEN FREE –IEC 60331 – IEC 60332-3-22 – Lot. no

### Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval is 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 Production Sample Tests (PST) and Routine Tests (RT) checked
- (if RT- and PST-test reports are not available, tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensure traceability between manufacturer's product type marking and Type Approval Certificate.

Assessment shall be performed at least every second year.

END OF CERTIFICATE