DNV·GL

Certificate No:
TAE000017H

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Power Cable

with type designation(s)
MarineLine & MarineLine+ & MarineFlex YOZp,
MarineLine YOZp & MarineLine+ YOZp EMC,
MarineFlex YOZp EMC, MarineFlex YOZp,
MarineLine YOZp EMC & MarineFlex YOZp EMC

Issued to
B.V. Twentsche Kabelfabriek
Haaksbergen, Netherlands

is found to comply with
DNV GL rules for classification – Ships and offshore units
DNV GL class programme DNVGL-CP-0399 – Type approval – Electric cables

Application :

General power and lighting.

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)
MarineLine & MarineLine+ & MarineFlex YOZp	0,6/1	90
MarineLine YOZp & MarineLine+ YOZp EMC	0,6/1	90
MarineFlex YOZp EMC	0,6/1	90
MarineFlex YOZp	1,8/3	90
MarineLine YOZp EMC & MarineFlex YOZp EMC	1,8/3	90

This Certificate is valid until **2021-06-30**.
Issued at **Høvik** on **2016-07-01**

DNV GL local station: **Rotterdam**

Approval Engineer: **Ivar Bull**

for **DNV GL**

Digitally Signed By: Laumann, Marit
Location: DNV GL Høvik, Norway
Signing Date: 2016-06-29

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

Construction:

Conductors:	Plain or tinned stranded copper class 2, round or sector shaped or class 5 (MarineFlex)
Core insulation:	XLPE
Inner covering:	Non hygroscopic tape or Halogen free filler (MarineLine+ and MarineFlex)
Metal covering:	Tinned or plain copper wire braid For EMC cables: Cu/Pet tape under braid
Outher sheath:	SHF1

MarineLine YOZp 0,6/1 kV

No of cores:	Cross sectional area [mm^{2}]
1 -37	1,5 2,5
1-5	4 – 300

MarineLine+ YOZp 0,6/1 kV

No of cores:	Cross sectional area [mm^{2}]
1-5	1 – 300

MarineFlex YOZp 0,6/1 kV

No of cores:	Cross sectional area [mm^{2}]
1 -37	1,5 2,5
1-5	4 – 300

MarineLine YOZp 1,8/3 kV & MarineFlex 1,8/3kV

No of cores:	Cross sectional area [mm^{2}]
1	10 – 300
3	10 – 300

MarineFlex EMC 0,6/1kV & MarineFlex EMC 1,8/3kV 3 x X + 3 x E

Construction:	
Conductors:	Tinned, stranded copper class 2 or class 5 (MarineFlex)
3x distributed earth conductors	Tinned, stranded copper class 2 or class 5 (MarineFlex)
Core insulation:	XLPE
Inner covering:	Halogen free compound
EMC screen:	Copper/pet tape, between filler and braid.
Metal covering:	Tinned copper wire braid
Outer sheath:	SHF1

No of cores:	Cross sectional area [mm^{2}]
3 + 3E	35 – 300 / 6 - 50

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.

Job Id: **262.1-022237-1**
Certificate No: **TAE000017H**

Type Approval documentation

Data sheets: TKF Catalogue Marine & Offshore cables 2012 dated March 2012
TKF Datasheets No 16531, 17197, 55900 and 55901 dated 2012-11-14
TKF Datasheets No 17214 and 17215 dated 2013-02-14

Test reports: Report no. 301 dated 2004-10-12
Certification of YOZp 1.8/3kV dated 27-06-2011

Tests carried out

Standard	Release	General description	Limitation
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 60092-353	2011-08	Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV	
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 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 - Part 1: Determination of the halogen acid gas content	Low Halogen: <0,5% Halogen
IEC 60754-2	2011-11	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
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%

Marking of product

TKF- Size - 0,6/1 kV - MarineLine YOZp HALOGEN FREE – {batch nr}
TKF- Size - 0,6/1 kV - MarineLine+ YOZp HALOGEN FREE – {batch nr}
TKF- Size - 0,6/1 kV - MarineFlex YOZp HALOGEN FREE – {batch nr}

TKF – Size - 1,8/3kV - MarineLine YOZp – HALOGEN FREE – {batch nr}
TKF - Size – 1,8/3 kV - MarineFlex YOZp – HALOGEN FREE – {batch nr}

TKF – Size – 0,6/1 kV - MarineFlex YOZp – EMC – HALOGEN FREE – {batch nr}
TKF - Size – 1,8/3 kV - Marineline YOZp – EMC – HALOGEN FREE – {batch nr}
TKF - Size – 1,8/3 kV - MarineFlex YOZp – EMC – HALOGEN FREE – {batch nr}

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.

Assessment to be performed at least every second year.

END OF CERTIFICATE