



TYPE APPROVAL CERTIFICATE

Certificate No:
TAE000017H
Revision No:
2

This is to certify:

That the Electric Power Cable

with type designation(s)

**MarineLine & MarineLine+ & Marine(E)Flex YOZp,
MarineLine YOZp EMC & MarineLine+ YOZp EMC,
Marine(E)Flex YOZp EMC, Marine(E)Flex YOZp,
MarineLine YOZp EMC & Marine(E)Flex 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.

Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Type	Rated voltage (kV)	Temp. class (°C)
MarineLine & MarineLine+ & Marine(E)Flex YOZp	0,6/1	90
MarineLine YOZp EMC & MarineLine+ YOZp EMC	0,6/1	90
Marine(E)Flex YOZp EMC	0,6/1	90
Marine(E)Flex YOZp	1,8/3	90
MarineLine YOZp EMC & Marine(E)Flex YOZp EMC	1,8/3	90

Issued at **Høvik** on **2021-07-08**

for **DNV**

This Certificate is valid until **2026-06-30**.

DNV local station: **Netherlands FIS**

Approval Engineer: **Ivar Bull**

**Marta Alonso Pontes
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

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 Marine(E)Flex)
Metal covering:	Tinned or plain copper wire braid
	For EMC cables: Cu/Pet tape under braid
Outer sheath:	SHF1

MarineLine YOZp 0,6/1 kV (EMC)

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

MarineLine+ YOZp 0,6/1 kV (EMC)

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

Marine(E)Flex YOZp 0,6/1 kV (EMC)

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

MarineLine YOZp 1,8/3 kV & Marine(E)Flex 1,8/3kV (EMC)

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

MarineLine+ / Marine(E)Flex EMC 0,6/1kV & Marine(E)Flex EMC 1,8/3kV 3 x X + 3 x E

Construction:	
Conductors:	Plain or tinned, stranded copper class 2 or class 5 (Marine(E)Flex)
3x distributed earth conductors	Plain or tinned, stranded copper class 2 or class 5 (Marine(E)Flex)
Core insulation:	XLPE
Inner covering:	Non hygroscopic tape or halogen free compound (Optional)
EMC screen:	Copper/pet tape, between filler and braid.
Metal covering:	Plain or tinned copper wire braid
Outer sheath:	SHF1

No of cores:	Cross sectional area [mm ²]
3 + 3E (0,6/1kV)	2,5– 300 / 1.5 – 50
3 + 3E (1,8/3kV)	10 – 300 / 4 - 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.

Type Approval documentation

Data sheets:	TKF Catalogue Marine & Offshore cables 2021 dated 2021-02-23 TKF Datasheets MarineLine YOZp 0,6/1 kV (EMC), dated 2021-02-23 TKF Datasheets MarineLine+ YOZp 0,6/1 kV (EMC), dated 2021-02-23 TKF Datasheets Marine(E)Flex YOZp 0,6/1 kV (EMC), dated 2021-02-23 TKF Datasheets MarineLine YOZp 1,8/3 kV & Marine(E)Flex 1,8/3kV (EMC), dated 2021-02-23
Test reports:	TKF Rapport no RD000693-1 dated 2018-04-19 Certification of YOZp 1.8/3kV dated 27-06-2011

Tests carried out

Standard	Release	General description	Limitation
IEC 60092-350	2020-01	Electrical installations in ships - Part 350: General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
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 60092-353	2016-09	Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV	
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 1: Determination of the halogen acid gas content	Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 61034-1/2	2019-11	Measurement of smoke density of cables burning under defined conditions – Part 1: Test apparatus Part 2: Test procedure and requirements	Low smoke Light transmittance >60%

Marking of product

TKF- Size - 0,6/1 kV - MarineLine YOZp (EMC) HALOGEN FREE – {batch nr}
 TKF- Size - 0,6/1 kV - MarineLine+ YOZp (EMC) HALOGEN FREE – {batch nr}
 TKF- Size - 0,6/1 kV – Marine(E)Flex YOZp HALOGEN FREE – {batch nr}

TKF – Size - 1,8/3kV - MarineLine YOZp – HALOGEN FREE – {batch nr}
 TKF - Size – 1,8/3 kV - Marine(E)Flex YOZp – HALOGEN FREE – {batch nr}

TKF – Size – 0,6/1 kV - Marine(E)Flex 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 - Marine(E)Flex 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) 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