



TYPE APPROVAL CERTIFICATE

Certificate No:
TAE000015H
Revision No:
2

This is to certify:

That the Low Voltage Cable

with type designation(s)
FM2XH(I), FM2XAH, FM2XAAH

Issued to

2M Kablo Sanayi ve Ticaret A.S
TEKİRDAĞ, Turkey

is found to comply with

DNV rules for classification – Ships, offshore units, and high speed and light craft
DNV GL class programme DNVGL-CP-0399 – Type approval – Electric cables

Application :

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

| Type | Rated voltage (V) | Temp. class (°C) |
|-----------------|-------------------|------------------|
| FM2XH(I) | 250V | 90 |
| FM2XAH | 250V | 90 |
| FM2XAAH | 250V | 90 |

Issued at **Høvik** on **2021-09-14**

for **DNV**

This Certificate is valid until **2026-07-03**.

DNV local station: **Istanbul**

Approval Engineer: **Georgy Abramenko**

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

FM2XH(I) / FM2XAH / FM2XAAH 250 V

Construction:

| | |
|---|---|
| Conductors: | Plain annealed stranded copper class 2 or tinned copper class 5 |
| Core insulation: | XLPE |
| Individual separator and shielding (for (I) and (I&C) types): | Polyester tape + AL-PES tape (with tinned copper drain wire) |
| Overall separator and shielding (for (C) and (I&C) types): | Polyester tape + AL-PES tape (with tinned copper drain wire) |
| Inner sheath/ separator: | Halogen free filler or polyester tape |
| Outer sheath: | SHF1 |

| | No of Elements: | Cross sectional area [mm ²] |
|--------|--------------------------------|---|
| Pairs | 2 3 4 5 7 10 12 16 19 24 27 37 | 0,5 0,75 1 1,5 2,5 |
| Triads | 2 3 4 5 7 10 | 0,5 0,75 1 1,5 2,5 |
| Quads | 2 3 4 5 7 | 0,5 0,75 1 1,5 2,5 |

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 sheet: 2M Kablo datasheet ref. no. 0257-15, date 18.05.2015

Test reports: 2M Kablo test reports, ref. techdocs 24-32, received 03.06.2016, techdoc 19, received 04.09.2019

Statement of design description change dated 24.05.2021

Tests carried out

| Standard | Issued | 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 60092-376 | 2017-05 | Cables for control and instrumentation circuits 150/250 V (300 V) | |
| 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 | Bunch test Category A |
| IEC 60332-1-2 | 2006-07 | Tests on electric cables under fire conditions. Test for vertical flame propagation for a single insulated wire or cable. | |
| 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: <0,5% 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: pH > 4,3 Conductivity < 10µS |

| Standard | Issued | General description | Limitation |
|---------------|------------|---|------------|
| IEC 61034-1/2 | 2013-07/09 | Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements | Low smoke |

Marking of product

2M Kablo IEC 60092-376 - FM2XH(I)– 150/250 V – IEC 60332-3-22 – meters – year, or:
 2M Kablo IEC 60092-376 - FM2XAH – 150/250 V – IEC 60332-3-22 – meters – year, or:
 2M Kablo IEC 60092-376 - FM2XAAH – 150/250 V – IEC 60332-3-22 – meters – year.

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