

TYPE APPROVAL CERTIFICATE**This is to certify:****That the Electric Power Cable**with type designation(s)
U-HFFR m, U-HFFR m (C)

Issued to

Unika Universal Kablo San. ve Tic. A.S.
ISTANBUL, Turkeyis found to comply with
DNV GL rules for classification – Ships and offshore units**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) |
|--------------|--------------------|------------------|
| U-HFFR m | 0,6/1 | 90 |
| U-HFFR m (C) | 0,6/1 | 90 |

This Certificate is valid until **2020-12-28**.Issued at **Høvik** on **2015-12-29**DNV GL local station: **Istanbul**Approval Engineer: **Ivar Bull**for **DNV GL**

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.

Job Id: **262.1-003326-11**
 Certificate No: **TAE00000HY**
 Revision No: **1**

Product description

Type: U-HFFR m & U-HFFR m (C) 0,6/1 kV

Construction:

Conductors: Plain or tinned stranded copper class 2 or class 5
 Core insulation: Mica tape + XLPE
 Inner covering: Halogen free compound
 Screen: Metal coated polyester tape w/plain or tinned drain wire (C)
 Outer sheath: SHF1 or SHF2

| No of cores: | Cross sectional area [mm ²] |
|------------------|---|
| 1 | 1,0 - 300 |
| 2 | 1,0 - 95 |
| 3 | 1,0 - 240 |
| 4 | 1,0 - 150 |
| 5, 7, 10, 19, 37 | 1,0 - 2,5 |

Application/Limitation

This type of cable is fire resistant in accordance with IEC Publication 60331-21/1.

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 and drawing U-HFFR m

Data sheet and drawing U-HFFR m (C)

IEC 60332-3 test report dated 28.09.2007.

Electrical and physical routine test report No. 08240 dated 28.09.2007.

Tests carried out

| Standard | Issued | General description | Limitation |
|----------------|---------|--|-----------------------|
| IEC 60092-350 | 2014-04 | 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 60331-1/2 | 2009-05 | Fire resistance / Circuit integrity – Test for method for fire with shock at temperature of at least 830°C for cables rated up to and including 0,6/1 kV | Minimum 90 min |
| IEC 60331-21 | 1999-04 | Fire resistance / Circuit integrity – Test for electric cables under fire conditions-Circuit integrity – Part 21 | |
| 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- | Test on gases evolved during combustion of | Low Halogen: |

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| Standard | Issued | General description | Limitation |
|-----------------|---------------|---|--|
| | 11 | materials from cables – Determination of the amount of halogen acid gas | <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 |
| 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

UNIKA KABLO - U-HFFR m or U-HFFR m (C) - size - 0,6/1 kV – IEC 60331-21/1 - IEC 60332-3-22 – Year

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