

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Power Cable

with type designation(s)
BFOU P5 0,6/1kV, BFOU P5/P12 0,6/1 kV

Issued to
Untel Kablolari San. ve Tic. A.S.
Dilovasi, Turkey

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards
IEC 60092-353 (2011-08)
IEC 60331-1/2 (2009-05)
IEC 60332-3-22 (2009-02)
IEC 60754-1/2 (2011-11)
IEC 61034-2 (2005-04)
NEK TS 606 (2009-05)

Application :

General power and lighting.
Fire resistant. Flame retardant in bunch Cat. A. Halogen free. Low smoke.
Mud resistant.

| Type | Voltage class (kV) | Temp. class (°C) |
|----------------------|--------------------|------------------|
| BFOU P5 0,6/1kV | 0,6/1 | 90 |
| BFOU P5/P12 0,6/1 kV | 0,6/1 | 90 |

This Certificate is valid until **2018-12-31**.

Issued at **Høvik** on **2014-08-05**

DNV GL local station: **Istanbul**

Approval Engineer: **Ivar Bull**



for **DNV GL**
 Digitally Signed By: Sjøvåg, Trond
 Location: DNV Høvik, Norway
 Signing Date: 2014-08-06 , on behalf of

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. If any person suffers loss or damage which is proven to have been caused by any negligent act or omission of the Society, then the Society shall pay compensation to such person for his proven direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question. The maximum compensation shall never exceed USD 2 million. In this provision the "Society" shall mean DNV GL AS as well as all its direct and indirect owners, affiliates, subsidiaries, directors, officers, employees, agents and any other person or entity acting on behalf of DNV GL AS.

Certificate No: **E-13494**
 File No: **827.10**
 Job Id: **262.1-014256-1**

Product description

Type: BFOU P5 0,6/1kV or BFOU P5/P12 0,6/1 kV

Construction:

Conductors: Tinned stranded copper class 2 or class 5
 Core insulation: Mica tape + EPR or HEPR
 Bedding: Halogen free compound
 Metal covering: Tinned copper wire braid
 Outer sheath: SHF2 Mud

| Number of cores x cross-section mm ² | Overall diameter mm |
|--|------------------------|
| 1 x 1,5 | 9,5 |
| 1 x 2,5 | 9,9 |
| 1 x 4 | 10,5 |
| 1 x 6 | 11,0 |
| 1 x 10 | 11,9 |
| 1 x 16 | 13,2 |
| 1 x 25 | 15,2 |
| 1 x 35 | 16,5 |
| 1 x 50 | 18,3 |
| 1 x 70 | 20,2 |
| 1 x 95 | 22,6 |
| 1 x 120 | 24,2 |
| 1 x 150 | 26,3 |
| 1 x 185 | 28,8 |
| 1 x 240 | 31,9 |
| 1 x 300 | 35,7 |
| 1 x 400 | 40,0 |
| | |
| 2 x 1,5 | 14,2 |
| 2 x 2,5 | 15,0 |
| 2 x 4 | 16,4 |
| 2 x 6 | 17,4 |
| 2 x 10 | 19,4 |
| 2 x 16 | 21,8 |
| 2 x 25 | 25,2 |
| 2 x 35 | 27,4 |
| 2 x 50 | 31,4 |
| 2 x 70 | 35,8 |
| 2 x 95 | 40,6 |
| 2 x 120 | 44,4 |
| 2 x 150 | 48,4 |
| 2 x 185 | 53,4 |
| 2 x 240 | 60,0 |
| | |
| 3 x 1,5 | 14,9 |
| 3 x 2,5 | 16,0 |
| 3 x 4 | 17,3 |
| 3 x 6 | 18,3 |
| 3 x 10 | 20,5 |
| 3 x 16 | 23,1 |
| 3 x 25 | 26,7 |
| 3 x 35 | 29,3 |

| Number of cores x cross-section mm ² | Overall diameter mm |
|--|------------------------|
| 3 x 50 | 34,0 |
| 3 x 70 | 38,3 |
| 3 x 95 | 43,4 |
| 3 x 120 | 47,5 |
| 3 x 150 | 51,8 |
| 3 x 185 | 57,5 |
| 3 x 240 | 64,4 |
| 3 x 300 | 70,8 |
| | |
| 4 x 1,5 | 16,2 |
| 4 x 2,5 | 17,1 |
| 4 x 4 | 18,8 |
| 4 x 6 | 20,0 |
| 4 x 10 | 22,4 |
| 4 x 16 | 25,2 |
| 4 x 25 | 29,3 |
| 4 x 35 | 32,2 |
| 4 x 50 | 37,7 |
| 4 x 70 | 42,0 |
| 4 x 95 | 48,2 |
| 4 x 120 | 52,4 |
| 4 x 150 | 57,6 |
| 4 x 185 | 63,6 |
| 4 x 240 | 71,2 |
| | |
| 5 x 1,5 | 17,3 |
| 5 x 2,5 | 18,6 |
| 5 x 4 | 20,2 |
| 5 x 6 | 21,8 |
| 5 x 10 | 24,2 |
| 5 x 16 | 27,4 |
| 5 x 25 | 32,1 |
| 5 x 35 | 36,1 |
| 5 x 50 | 41,3 |
| 5 x 70 | 46,7 |
| 5 x 95 | 53,0 |
| 5 x 120 | 58,0 |
| 5 x 150 | 63,5 |
| 5 x 185 | 70,1 |
| 5 x 240 | 78,9 |
| | |
| 7 x 1,5 | 18,7 |

| Number of cores x cross-section mm ² | Overall diameter mm |
|--|------------------------|
| 10 x 1,5 | 23,0 |
| 14 x 1,5 | 25,0 |
| 19 x 1,5 | 27,3 |
| 24 x 1,5 | 31,8 |
| 30 x 1,5 | 34,7 |
| 37 x 1,5 | 37,1 |
| | |
| 7 x 2,5 | 19,9 |
| 10 x 2,5 | 24,8 |
| 14 x 2,5 | 26,7 |
| 19 x 2,5 | 29,5 |
| 24 x 2,5 | 34,8 |
| 30 x 2,5 | 37,9 |
| 37 x 2,5 | 40,1 |

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Application/Limitation

This type of cable is fire resistant in accordance with IEC Publication 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 sheet: FR 72-017 rev.0 01.05.2010
 Test reports: Type test report
 Fire test with shock dated 2014-05-12

Tests carried out

| Standard | Issued | General description | Limitation |
|----------------|---------|---|---|
| IEC 60092-350 | 2008-02 | General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications | |
| IEC 60092-351 | 2004-04 | Insulating materials for shipboard and offshore units, power, control, instrumentation, telecommunication and data cables | |
| IEC 60092-353 | 2001-04 | Single and multicore non-radial field power cables with extruded solid insulation for rated Voltages of 1 kV and 3 kV | |
| IEC 60092-359 | 1999-08 | Sheathing materials for shipboard power and telecommunication cables | |
| 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 | |
| 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 | 1994-01 | 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 | 1999-07 | 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 < 10 µS |
| IEC 61034-1/2 | 2005-04 | Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements | Low smoke |

Marking of product

ÜNTEL – BFOU (NEK 606 P5 or P5/P12) – size – 0,6/1 kV



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Periodical assessment

The scope of the retention/renewal survey 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 survey are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if 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
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Survey to be performed at least every second year.

END OF CERTIFICATE