

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Power Cable

with type designation(s)

BFOU-JF 0,6/1 kV / 250 kW/m² / 1200° C

Issued to

**Draka Norsk Kabel - part of the Prysmian Group
DRAMMEN, Norway**

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. Control.

Jet fire resistant 30 minutes.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Voltage class (kV) 0,6/1

Temp. class (°C) 90

This Certificate is valid until **2021-06-29**.

Issued at **Høvik** on **2016-10-06**

for **DNV GL**

DNV GL local station: **Station Oslo Maritime and CAP**

Approval Engineer: **Ivar Bull**

Andreas Kristoffersen
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: **262.1-002558-9**
Certificate No: **TAE000016C**

Product description

Power cables designed according to IEC 60092-353 and NEK TS 606 Ed5: 2016
Type: BFOU-JF 0,6/1 kV / 250 kW/m² / 1200° C / 30 minutes.

Construction:

Conductors: Tinned, stranded copper and Mica-tape helically applied directly over the copper conductor
Core insulation: EPR
Inner covering: Extruded flame retardant halogen free compound
Metal covering: Tinned, Copper wire braid (O)
Outer sheath: SHF2 Mud resistant according to IEC 60092-360 Annex D. NEK TS 606.
JF protection: Extruded heat block compound
Tape: Lapped glass fibre tape
Overall sheath: Flame retardant, halogen free thermoplastic compound SHF1

No of cores:	Cross sectional area [mm ²]
1	16 - 630
2	1,5 - 240
3	1,5 *) - 240
4	1,5 - 185
5	1,5-150

*) Test performed on smallest cross section in range 3x 1,5mm².

Application/Limitation

This type of cable is Jet fire resistant for 30 minutes in accordance with International Standard ISO 22899-1.

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

Tests carried out

Tests carried out on a standard BFOU P5/P12 cable E-11343:

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 60092-353	2011-08	Single and multicore non-radial field power cables with extruded solid insulation for rated Voltages of 1 kV and 3 kV	
IEC 60092-360	2014-04	Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables	
IEC 60331-21	1999-04	Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to 0,6/1,0 kV	120 min. test @1000 °C

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Standard	Issued	General description	Limitation
IEC 60331-1/2	2009-05	Fire resistance / Circuit integrity – Test for method for fire <i>with shock</i> at temperature of at least 830°C for cables rated up to and including 0,6/1kV	120 minutes @830 °C + 15 minutes cooling down
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 – 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
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%

Additional test carried out on BFOU-JF cable:

NEK TS 606 Ed. 4	2009-05	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	
ISO 22899-1	2007-12	Determination of the resistance to jet fires of passive fire protection materials -- Part 1: General requirements	Successful test 30 minutes @ Heat flux 250W/m2. Acceptance criteria: Fault current <30mA

Marking of product

Eg. "meter" "year" "week no" DRAKA 01 "part no" BFOU-JF 0,6/1kV 12x2,5/10 mm2 1200/30 FLEX - FLAME IEC 60332-3-22, IEC 60092-353, "Prod. order no."

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