

TYPE APPROVAL CERTIFICATE

This is to certify:**That the High Voltage Cable**

with type designation(s)

P2 RFOU (M3-C) & P2 RFOU-VFD (B3-C) & P2/P9 RFOU(M3-M) & P2/P9 RFOU-VFD (B3-M), P3 RFOU (M4-C) & P3 RFOU-VFD (B4-C) & P3/P10 RFOU(M4-M) & P3/P10 RFOU-VFD (B4-M), P4 RFOU (M5-C) & P4 RFOU-VFD (B5-C) & P4/P11 RFOU(M5-M) & P4/P11 RFOU-VFD (B5-M), P19 RFOU (M6-C) & P19/P21 RFOU(M6-M)

Issued to

TriCab (Australia) Pty Ltd
PORT MELBOURNE VICTORIA, Australia

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft**Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**

Type	Voltage (kV)	Temp. class (°C)
P2 RFOU (M3-C) & P2 RFOU-VFD (B3-C) & P2/P9 RFOU(M3-M) & P2/P9 RFOU-VFD (B3-M)	3,6/6	90
P3 RFOU (M4-C) & P3 RFOU-VFD (B4-C) & P3/P10 RFOU(M4-M) & P3/P10 RFOU-VFD (B4-M)	6/10	90
P4 RFOU (M5-C) & P4 RFOU-VFD (B5-C) & P4/P11 RFOU(M5-M) & P4/P11 RFOU-VFD (B5-M)	8,7/15	90
P19 RFOU (M6-C) & P19/P21 RFOU(M6-M)	12/20	90

This Certificate is valid until **2021-09-15**.Issued at **Høvik** on **2016-09-16**for **DNV GL**DNV GL local station: **Melbourne**Approval Engineer: **Marta Alonso Pontes**-----
Trond Sjøvåg
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.

Product description

Construction :

Conductors :	Fine wire plain or tinned annealed copper
Conductor screen :	Semi-conducting material
Core insulation :	HF HEPR
Insulation screen:	Semi-conducting material
Metallic screen :	Tinned annealed copper wire braid
Inner covering :	Extruded LSZH
Metal covering :	Tinned annealed copper wire braid
Outer sheath :	SHF2 (-C versions), SHF MUD (-M versions)

P2 RFOU (M3-C) & P2/P9 RFOU(M3-M) 3,6/6kV:

Number of cores :	Cross sectional area [mm ²] (live conductor/earth conductor)
1	16, 25, 35, 50, 70, 95, 120, 150, 185, 240, 300, 400, 500, 630
3	16, 25, 35, 50, 70, 95, 120, 150, 185, 240, 300

P2 RFOU-VFD (B3-C) & P2/P9 RFOU-VFD (B3-M) 3,6/6kV:

Number of cores :	Cross sectional area [mm ²] (live conductor/earth conductor)
3 + 3E	10/2,5 ; 16/2,5 ; 25/4 ; 35/6 ; 50/10 ; 70/16 ; 95/16 ; 120/25 ; 150/25 ; 185/35 ; 240/50 ; 300/50

P3 RFOU (M4-C) & P3/P10 RFOU (M4-M) 6/10kV:

Number of cores :	Cross sectional area [mm ²] (live conductor/earth conductor)
1	16, 25, 35, 50, 70, 95, 120, 150, 185, 240, 300, 400, 500, 630
3	16, 25, 35, 50, 70, 95, 120, 150, 185, 240

P3 RFOU-VFD (B4-C) & P3/P10 RFOU-VFD (B4-M) 6/10kV:

Number of cores :	Cross sectional area [mm ²] (live conductor/earth conductor)
3 + 3E	16/2,5 ; 25/4 ; 35/6 ; 50/10 ; 70/16 ; 95/16 ; 120/25 ; 150/25 ; 185/35 ; 240/50 ; 300/50

P4 RFOU (M5-C) & P4/P11 RFOU(M5-M) 8,7/15kV:

Number of cores :	Cross sectional area [mm ²] (live conductor/earth conductor)
1	25, 35, 50, 70, 95, 120, 150, 185, 240, 300, 400, 500, 630
3	25, 35, 50, 70, 95, 120, 150, 185, 240

P4 RFOU-VFD (B5-C) & P4/P11 RFOU-VFD (B5-M) 8,7/15kV:

Number of cores :	Cross sectional area [mm ²] (live conductor/earth conductor)
3 + 3E	25/4 ; 35/6 ; 50/10 ; 70/16 ; 95/16 ; 120/25 ; 150/25 ; 185/35 ; 240/50 ; 300/50

P19 RFOU (M6-C) & P19/P21 RFOU(M6-M) 12/20kV:

Number of cores :	Cross sectional area [mm ²] (live conductor/earth conductor)
1	35, 50, 70, 95, 120, 150, 185, 240, 300, 400, 500, 630
3	35, 50, 70, 95, 120, 150, 185, 240

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 Bundles of Cables or Wires) are fulfilled without any additional measures.

Type Approval documentation

Tests carried out

Standard	Release	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 60092-354	2014-08	Electrical installations in ships - Part 354: Single- and three-core power cables with extruded solid insulation for rated voltages 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)	
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 60332-1-2	2004-07	Tests on electric and optical fibre cables under fire conditions – Part 1-1: Test for vertical flame propagation for a single insulated wire or cable – Apparatus	Flame retardant small scale
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	Charred portion of sample does not exceed 2,5m above bottom edge of burner.
IEC 60754-1	2011-11	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	2011-11	Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity	Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 61034-1/2	2005-04	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance >60%
NEK 606 Ed. 4	2009-05	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	Mud resistance test: IRM903 100°C 7d. Calcium Bromide 70°C 56d. Carbo Sea 70°C 56d or EDC 95/11 70°C 56d

Marking of product

TRICAB – P2 RFOU (M3-C) or P2 RFOU-VFD (B3-C) or P2/P9 RFOU(M3-M) or P2/P9 RFOU-VFD (B3-M)– size – 3,6/6kV – IEC 603323-22 –TR Lot No.

TRICAB –P3 RFOU (M4-C) or P3 RFOU-VFD (B4-C) or P3/P10 RFOU(M4-M) or P3/P10 RFOU-VFD (B4-M)– size – 6/10kV – IEC 603323-22 –TR Lot No.

TRICAB –P4 RFOU (M5-C) or P4 RFOU-VFD (B5-C) or P4/P11 RFOU(M5-M) or P4/P11 RFOU-VFD (B5-M)– size – 8,7/15kV – IEC 603323-22 –TR Lot No.

TRICAB – P19 RFOU (M6-C) or P19/P21 RFOU(M6-M)– size – 8,7/15kV – IEC 603323-22 –TR Lot No.



Job Id: **262.1-019663-1**
Certificate No: **TAE00001DT**

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.

Assessment to be performed at least every second year.

END OF CERTIFICATE