DNV·GL

Certificate No:
TAE000031V

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)
RFOU (i) S1/S5/S101 & (c) S2/S6/S102 250 V

Issued to
TriCab (USA) Inc.
Worcester, MA, USA

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

Control and instrumentation.

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.
Rated voltage (V) 250
Temp. class (°C) 90

Issued at **Høvik** on **2019-01-23**
This Certificate is valid until **2023-06-30**.
DNV GL local station: **New York**

Approval Engineer: **Ivar Bull**

for **DNV GL**

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.

© DNV GL 2014. DNV GL and the Horizon Graphic are trademarks of DNV GL AS.

Job Id: **262.1-009092-5**
Certificate No: **TAE000031V**

Product description

Type: RFOU S1/S5/S101 (i) 250 V (FZC and FZM)
RFOU S2/S6/S102 (c) 250 V (RBC and RBM)

Construction:

Conductors:	Tinned stranded copper, Class 2 or Class 5
Core insulation:	EPR
Separator:	Polyester tape
Screen:	Aluminium/Laminated Tape w/tinned copper drain wire
Separator:	Polyester tape
Inner covering:	SHF1
Metal covering:	Tinned copper wire braid
Outer sheath:	SHF2 for FZC and RBC SHF2 MUD for FZM and RBM

RFOU S1/S5/S101 or RFOU S2/S6/S102 (c)

No of Elements:	Cross sectional area [mm^{2}]
1, 2, 4, 8, 10, 12, 16, 20, 24, 27, 36 pairs	0,75 1,5 2,5
1, 3, 4, 7 triples	0,75 2,5
1, 3, 4, 6, 7, 12 triples	1,5

Items not included in NEK 606 but included design standard IEC 60092-376:

No of Elements:	Cross sectional area [mm^{2}]
1, 2, 4, 8, 10, 12, 16, 20, 24, 27, 36 pairs	0,5 1

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

Tests carried out

	Release	General description	Limitation
DNVGL-CP-0399	2016-03	Class Programme Electric cables	
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	Electrical installations in ships - Part 376: Cables for control and instrumentation circuits 150/250 V (300 V)	
IEC 60332-1-2	2006-07	Tests on eletric cables under fire conditions. Test for vertical flame propagation for a single insulated wire or cable.	
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

	Release	General description	Limitation
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	2013-07 2013-09	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance ≥60%
NEK TS606 Ed5	2016	Cables for offshore installations - halogen-free low smoke flame-retardant / fire-resistant (HFFR-LS). Technical specification.	Mud resistance test: Required Max variations ±: IRM902 & 903 100°C 7d. TS & E@B, weight & vol.: ±30% Calc. Bromide 70°C 56d. TS & E@B: ±25%, weight: ±15%, vol.: ±20% Oil based mud: EDC 95/11 70°C 56d TS & E@B ±30%, weight & vol.: ±25%

Marking of product

TRICAB (USA) – RFOU S1/S5/S101 (i) or S2/S6/S102(c) – size – 250 V – IEC 60332-3-22 – Lot 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) 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.

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