

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)
RFCU (i) 250V, RFCU (c) 250 V, RFCU(i+c) 250V

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 60092-376 (2003-05)
IEC 60332-3-22 (2009-02)
IEC 60754-1/2 (2011-11)
IEC 61034-2 (2005-04)

Application :

Instrumentation, communication and control.
Flame retardant in bunch Cat. A. Halogen free. Low smoke.
Mud resistant.

Type	Voltage class (V)	Temp. class (°C)
RFCU (i) 250V	250	90
RFCU (c) 250 V	250	90
RFCU(i+c) 250V	250	90

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

Issued at **Høvik** on **2014-07-17**

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-13540**
 File No: **827.20**
 Job Id: **262.1-014256-1**

Product description

Type: RFCU (i), RFCU (c) & RFCU (i+c) 250V

Construction:

Conductors: Tinned, stranded copper class 2 or class 5
 Core insulation: EPR or HEPR
 Screen: Copper polyester tape w/ tinned copper drain wire
 Bedding: Halogen-free compound
 Metal covering: Galvanized steel wire braid
 Sheath: SHF2 or SHF Mud

Number of pairs x conductor cross-section	Overall diameter Approx.	Overall diameter Approx.	Overall diameter Approx.
mm ²	mm	mm	mm
	RFCU(i)	RFCU(c)	RFCU(i+c)
1 x 2 x 0,75	10,1	10,1	
2 x 2 x 0,75	14,7	13,8	15,0
4 x 2 x 0,75	16,8	15,6	17,1
7 x 2 x 0,75	19,6	17,9	19,9
10 x 2 x 0,75	24,4	22,2	24,9
14 x 2 x 0,75	26,5	23,9	26,8
19 x 2 x 0,75	29,3	26,4	29,6
24 x 2 x 0,75	34,6	30,5	34,9
1 x 3 x 0,75	10,5	10,5	
2 x 3 x 0,75	16,1	14,9	16,4
4 x 3 x 0,75	18,3	17,0	18,8
7 x 3 x 0,75	21,7	19,8	22,0
14 x 3 x 0,75	27,0	24,7	27,3
19 x 3 x 0,75	29,4	26,6	29,7
24 x 3 x 0,75	33,0	29,5	33,3
1 x 2 x 1,5	11,3	11,3	
2 x 2 x 1,5	17,0	15,9	17,3
4 x 2 x 1,5	19,6	18,0	19,9
7 x 2 x 1,5	23,0	21,1	23,3
10 x 2 x 1,5	29,0	26,4	29,3
14 x 2 x 1,5	31,6	28,6	32,3
19 x 2 x 1,5	35,8	32,1	36,1
24 x 2 x 1,5	41,8	37,8	42,1
1 x 3 x 1,5	11,8	11,8	
2 x 3 x 1,5	18,7	17,4	19,0

Number of pairs x conductor cross-section	Overall diameter Approx.	Overall diameter Approx.	Overall diameter Approx.
mm ²	mm	mm	mm
	RFCU(i)	RFCU(c)	RFCU(i+c)
4 x 3 x 1,5	21,6	19,9	21,9
7 x 3 x 1,5	25,5	23,4	25,8
10 x 3 x 1,5	32,7	29,5	33,0
14 x 3 x 1,5	36,0	32,4	36,3
19 x 3 x 1,5	40,1	36,3	40,4
24 x 3 x 1,5	47,2	42,3	47,5
1 x 2 x 2,5	12,1	12,1	
2 x 2 x 2,5	18,6	17,3	18,9
4 x 2 x 2,5	21,3	19,8	21,8
7 x 2 x 2,5	25,4	23,2	25,7
10 x 2 x 2,5	32,5	29,2	32,8
14 x 2 x 2,5	35,7	32,1	36,0
19 x 2 x 2,5	39,6	36,0	40,1
24 x 2 x 2,5	46,9	42,0	47,2
1 x 3 x 2,5	12,8	12,8	
2 x 3 x 2,5	20,4	19,1	20,7
4 x 3 x 2,5	23,6	22,0	23,9
7 x 3 x 2,5	28,2	25,9	28,5
10 x 3 x 2,5	36,5	33,1	37,0
14 x 3 x 2,5	40,0	36,3	40,3
19 x 3 x 2,5	44,7	40,4	45,0
24 x 3 x 2,5	52,5	47,6	52,8
1 x 4 x 0,75	10,1	10,1	
1 x 4 x 1,5	11,3	11,3	
1 x 4 x 2,5	12,1	12,1	

Application/Limitation

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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 72-080 rev.0 dated 01.05.2010
FR 72-082 rev.0 dated 01.05.2010
FR 72-0xx rev.0 dated 01.05.2010
Test report : Type test report

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 60092-376	2003-05	Cables for control and instrumentation circuits 150/250 V (300 V)	
IEC 60092-359	1999-08	Sheathing materials for shipboard power and telecommunication cables	
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 Light transmittance ≥60%

Marking of product


ÜNTEL – RFCU (i) or RFCU (c) or RFCU (i+c) – size – 250 V

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



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- 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