DNV·GL

Certificate No:
TAE000015U

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, RFCU (i) & (c) 250 V

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 :

Control. Instrumentation and Communication.

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

Type	Voltage class (V)	Temp. class (°C)
RFOU (i) S1/S5/S101 & (c) S2/S6/S102 250 V	**250**	**90**
RFCU (i) & (c) 250 V	**250**	**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.

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Job Id: **262.1-002558-9**
Certificate No: **TAE000015U**

Instrument cables designed according to IEC 60092-376 and NEK TS 606 Ed5 2016
Type: RFOU (i) S1/S5 / S101 & (c) S2/S6 / S102 250 V & RFCU (i) & (c) 250 V*
On request: Cold bend -40°C / Cold impact -35°C.

Construction:

Conductors:	Tinned, stranded copper
Core insulation:	EPR
Inner covering:	Extruded flame retardant halogen free compound
Metal covering:	Tinned, Copper wire braid (O) or Galv. Steel wire braid (C)
Outer sheath:	SHF2 mud resistant according to IEC 60092-360 Annex D. NEK TS 606.
*	S1/S5 and S2/S6 is designed according to NEK TS 606 Ed4: 2009

Individual screen (i):

No of Elements:	Cross sectional area [mm2]
1, 2, 4, 8, 10, 12, 16, 19, 24, 32 pairs	0,75 1,5 mm^2
1, 2, 4, 6, 8, 12, 16, 19, 24 triples	0,75 1,5 mm^2
1, 2, 4 pairs	2,5

Collective screen (c):

No of Elements:	Cross sectional area [mm2]
2, 4, 5, 6, 8, 12, 16, 19, 24 pairs	0,75 1,5 mm^2
2, 4, 6, 8, 12, 16, 19, 24 triples	0,75 1,5 mm^2
2,4, 5, 12 pairs	2,5

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

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 60092-376	*2003-05*	*Cables for control and instrumentation circuits 150/250 V (300 V)*	
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 1-2: Test for vertical flame propagation for a single insulated wire or cable	

Standard	Issued	General description	Limitation
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%
NEK TS606 Ed5	2016	Cables for offshore installations - halogen-free low smoke flame-retardant / fire-resistant (HFFR-LS). Technical specification.	Mud resistance test: IRM903 100°C 7d. Calcium Brom. 70°C 56d. Oil based test fluid: EDC 95/11 70°C 56d

On special request: Arctic Grade

IEC 60092-350	2014-08	Annex E: Cold bend test and impact test for low temperature behaviour	Cold bend: -40°C
IEC 60092-350	2014-08	Annex E: Cold bend test and impact test for low temperature behaviour	Cold impact: -35°C
CSA C22.2 No. 03	2009	4.12 Flexibility at any specified temperature	Cold bend: -40°C
CSA C22.2 No. 03	2009	4.13 Abnormal low temperature – impact	Cold impact: -35°C

Marking of product

"meter" "year" "week" DRAKA 01 "part no." RFOU (i) S1/S5 or (c) S2/S6 – ARCTIC GRADE (optional) – size – 250 V– IEC 60332-3-22 "prod. Order no" or

"meter" "year" "week" DRAKA 01 "part no." RFCU (i) or (c) – ARCTIC GRADE (optional) – size – 250 V– IEC 60332-3-22 "prod. Order no".

Periodical assessment

The scope of the Periodical assessment 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