

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Data transmission cables and systems

with type designation(s)
S/FTP CAT. 7A LSZH Cable 4 pair

Issued to

CAVICEL SPA
PIOLTELLO MI, Italy

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards
Type Approval Programme No. 6-827.50-2

Application :

Data communication cable, cat. 7

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

This Certificate is valid until **2016-06-30**.

Issued at **Høvik** on **2016-01-08**

DNV GL local station: **Milan**

Approval Engineer: **Ivar Bull**

for **DNV GL**

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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.

Product description

Type(s):	S/FTP CAT. 7A LSZH Cable 4 pair
Standards	Category 7, Installation cable according to IEC 61156-5
Construction:	
Conductors:	Stranded plain annealed copper wire, 23/7 AWG (7x0.22 mm)
Core insulation:	Foam-skin polyolefine, nom. diameter 1.55 mm
Individual screen:	Aluminium/polyester tape, aluminium outside
Metal covering:	Tinned, Copper wire braid
Outer sheath:	SHF1 or SHF2 or SHF2 MUD

Number of cores x conductor diameter [mm]	Overall diameter [mm]
4 x 2 x 0,22mm2	9,0

Electrical characteristics:

Max operating voltage	125 V
Dielectric test (cond.-cond.) (cond.-shield)	700 V r.m.s. for 1'
Conductors resistance (@ 20°C in d.c.)	max 72.0 Ω/km
Insulation resistance	min. 5.0 G Ω xkm
Capacitance	nom. 42 pF/mt
Capacitance umbalance	max. 1600 pF/km
Propagation velocity (@ 100 MHz)	75 %
Propagation delay (@ 100 MHz)	nom. 470 nsec/100m (max 520 nsec/100 m)
Delay skew (4÷1000 MHz)	nom. 15 nsec/100m (max 25 nsec/100 m)
Characteristic impedance	100 Ω (± 15%) 1-600MHz , 100 Ω (± 25%) 600-1000 MHz
Transfer impedance @ 1 MHz	10 mΩ/m
@ 10 MHz	10 mΩ/m
@ 30 MHz	30 mΩ/m
@ 100 MHz	100 mΩ/m

Electrical data at 20°C

Frequency MHz	Attenuation, nom [dB/100m]	PS NEXT [dB]
1	2.0	> 95
4	3.6	> 95
10	5.6	> 95
16	7.2	> 95
20	8.3	95
31,25	10.2	92
62,5	14.6	90
100	19.0	88
125	21.2	87
155,52	24.0	86
200	27.5	85
250	30.7	83
350	36.5	81
500	44.6	80
600	49.3	78

DC-loop resistance: ≤ 150 Ω/km

Application/Limitation

Operation: - 20°C to +75°C
 Installation: - 5°C to +50°C
 Minimum bending radius after installation: 8 x OD
 Minimum bending radius during installation: 12 x OD

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.

In order to achieve a transmission link compliant with Category 7, cables shall be installed with suitable termination equipment according to manufacturer's recommendations.

Type Approval documentation

Data sheet: ST/1209/22 Rev. 3 dated 26/07/2013
 Test report: Test report No 28760/13 dated 04/12/13
 Quality control plan rev. 0 dated 25/09/2013. 28760/13, 28764/13, 28774/13, 28766/13, 28765/13, 28767/13, 28771/13, 28772/13, 28773/13, 4579/13, 4578/13, 4580/13.
 Technical report dated 03-05-2012. Outer sheath. Mud compound.
 IMQ test report CN15S0447511-01 dated 2015/07/14. Test for Oil based drilling fluid EDC 95/11
 IMQ test report CN15S0523325-01/1 dated 2015/10/08. Test for IRM902 and IRM903.
 IMQ test report CN15S0523325-01/2 dated 2015/11/13. Test for CALCIUM BROMIDE BRINE.

Tests carried out

Standard	Release	General description	Limitation
DNV TAP 6-827.50-2	2010	DNV Type approval program for data communication cables	
IEC 61156-5	2009-02	<i>Symmetrical pair/quad cables for digital communications – Symmetrical pair/quad cables with transmission characteristics up to 1000MHz horizontal floor wiring.</i>	Cat. 7 – 600MHz
ISO/IEC 11801	2010-04	Information technology – Generic cabling for customer premises, inc Amd 1 and 2.	Reference to requirement for category cable: 7 (600MHz).
IEC 60332-3-24	2009-02	Flame retardant in bunch, cat. C	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 – Determination of the amount of halogen acid gas	Low Halogen: <0,5% Halogen
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.	IRM903 100°C 7d. Calcium Bromide 70°C 56d. <u>Oil based mud:</u> Carbo Sea 70°C 56d or EDC 95/11 70°C 56d

Job Id: **262.1-021091-1**
Certificate No: **TAE00000U1**

Marking of product

CAVICEL ITALY - P/102397 – CAT. 7A 1000MHz – ISO/IEC 11801 - IEC 61156-5- 4x2x23 AWG - LSZH - IEC 60332-3-24 cat. C - Batch no. – Meter marking (SHF1 or SHF2) or

CAVICEL ITALY - P/100679– CAT. 7A 1000MHz – ISO/IEC 11801 - IEC 61156-5- 4x2x23 AWG - LSZH - IEC 60332-3-24 cat. C - Batch no. – Meter marking (SHF2 MUD)

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 Periodical assessment 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.
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Periodical assessment to be performed at least every second year.

END OF CERTIFICATE