

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Data transmission cables and systems**

with type designation(s)

Coaxial Cables Type RG6, RG11, RG12, RG59

Issued to

**LEONI Special Cables GmbH
Friesoythe, Niedersachsen, Germany**

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft**Application :****Coaxial Cables 75 Ohm****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Hamburg** on **2018-11-27**This Certificate is valid until **2023-11-26**.for **DNV GL**DNV GL local station: **Bremerhaven**Approval Engineer: **Carsten Hunsalz**

**Arne Schaarmann
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

Halogen free, flame retardant coaxial cables RG-types 75 Ohm.

Coaxial cable Type RG 6 2YCCH / 2YCCHX 0.74/4.8-75 STAKU FRNC

Construction	
Inner Conductor	Bare copper-clad steel wire
Insulation	Polyethylene (PE)
Shield braiding 1	Bare copper wires 0.15 mm dia
Shield braiding 2	Bare copper wires 0.15 mm dia
Sheath	SHF1 (2YCCH type) or SHF2 (2YCCHX type)

Coaxial cable Type RG 6 2YCCH(Z)H / 2YCCH(Z)HX 0.74/4.8-75 STAKU FRNC

Construction	
Inner Conductor	Bare copper-clad steel wire
Insulation	Polyethylene (PE)
Shield braiding 1	Bare copper wires 0.15 mm dia
Shield braiding 2	Bare copper wires 0.15 mm dia
Inner Sheath	SHF1 (2YCCH(Z)H type) or SHF2 (2YCCH(Z)HX type)
Shield braiding	Stainless steel wires 0.2 mm dia
Sheath	SHF1 (2YCCH(Z)H type) or SHF2 (2YCCH(Z)HX type)

Coaxial cable Type RG 11 2YCH / 2YCHX 1.2/7.25-75 LI VZN FRNC

Construction	
Inner Conductor	Stranded tinned copper wire 7 X 0.4 (18 AWG)
Insulation	Polyethylene (PE)
Shield braiding	Bare copper wires 0.18 mm dia (33 AWG)
Sheath	SHF1 (2YCH type) or SHF2 (2YCHX type)

Coaxial cable Type RG 11 2YCH(Z)H / 2YCH(Z)HX 1.2/7.25-75 LI VZN FRNC

Construction	
Inner Conductor	Stranded tinned copper wire 7 X 0.4 (18 AWG)
Insulation	Polyethylene (PE)
Shield braiding	Bare copper wires 0.18 mm dia (33 AWG)
Inner Sheath	SHF1 (2YCH(Z)H type) or SHF2 (2YCH(Z)HX type)
Shield braiding	Stainless steel wires 0.3 mm dia
Sheath	SHF1 (2YCH(Z)H type) or SHF2 (2YCH(Z)HX type)

Coaxial cable Type RG 12 2YCH(Z) / 2YCHX(Z) 1.2/7.25-75 LI VZN FRNC

Construction	
Inner Conductor	Stranded tinned copper wire 7 X 0.4 (18 AWG)
Insulation	Polyethylene (PE)
Shield braiding	Bare copper wires 0.18 mm dia (33 AWG)
Inner Sheath	SHF1 (2YCH(Z) type) or SHF2 (2YCHX(Z) type)
Shield braiding	Stainless steel wires 0.3 mm dia

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Coaxial cable Type RG 59 2YCH / 2YCHX 0.6/3.7-75 FRNC

Construction	
Inner Conductor	Bare copper wire (23 AWG)
Insulation	Polyethylene (PE)
Shield braiding	Bare copper wires 0.15 mm dia (35 AWG)
Sheath	SHF1 (2YCH type) or SHF2 (2YCHX type)

Coaxial cable Type RG 59 2YCH(Z)H / 2YCH(Z)HX 0.6/3.7-75 FRNC

Construction	
Inner Conductor	Bare copper wire (23 AWG)
Insulation	Polyethylene (PE)
Shield braiding	Bare copper wires 0.15 mm dia (35 AWG)
Inner Sheath	SHF1 (2YCH(Z)H type) or SHF2 (2YCH(Z)HX type)
Shield braiding	Stainless steel wires 0.2 mm dia
Sheath	SHF1 (2YCH(Z)H type) or SHF2 (2YCH(Z)HX type)

For electrical data and transmission properties, please refer to relevant datasheets.

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.

Radio frequency coaxial cable
Flame retardant Cat. A. Halogen free. Low smoke.

Type Approval documentation

Test report : LEONI Nr. 2703_08_08 and Nr. 0059_07_08
Leoni, dated 2018-11-07
Specification: Leoni Special Cables GmbH Data Sheets

Tests carried out

Standard	Release	General description	Limitation
IEC 60096-0-1 Ed 3	2012	Radio frequency cables Part 0-1: Guide to the design of detail specifications Coaxial cables	
EN 50290-2-23	2013-11	Communication cables - Part 2-23: Common design rules and construction - Polyethylene insulation for multi-pair cables used in access telecommunication networks: Outdoor cables	
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.	

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Standard	Release	General description	Limitation
IEC 60332-3-22	2018-07	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	2013-06	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance >60%

Marking of product

Example:

"sequential length in metres" LEONI L SeaLine® * L45466-D14-B156 * 2YCH(Z)H 0.6/3.7-75 FRNC RG59 SHF1 * IEC 60332-3-22 * "internal lot number"

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) checked (if not available tests according to 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.

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