

TYPE APPROVAL CERTIFICATE

This is to certify:

that the **Electric Power Cable**

with type designation(s)

RADOX 155(S) / RADOX Elastomer S (FHLR91XC13X and FHLR4GC13X)

issued to

Huber+Suhner AG

Pfäffikon, ZH, Switzerland

is found to comply with

DNV rules for classification – Ships, offshore units, and high speed and light craft

Application:

Special cable for wiring of the battery and or fuel cell energy systems on ships and boats.

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

Rated voltage (kV) 1,5 DC or 1 AC

Temp. class (°C) 95 acc. to DNV-RU-SHIP Pt.4 Ch.8 or acc. to manufacturer's instruction

Issued at **Hamburg** on **2025-07-08**

This Certificate is valid until **2030-07-07**.

for **DNV**

DNV local unit: **Augsburg**

Approval Engineer: **Carsten Hunsalz**

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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300 000.

Product description

Type RADOX 155(S) / RADOX Elastomer S (FHLR91XC13X and FHLR4GC13X)

Rated voltage:	1500V DC or 1000V AC max. continuous voltage of conductor to its system ground
Maximum operating conductor temperature:	95 °C acc. to DNV-RU-SHIP Pt.4 Ch.8 or according to manufacturer's instruction
Conductor:	Bare copper, stranded according to ISO 6722-1 / ISO 19642-9, structure B
Insulation:	RADOX 155S (91X) for $\leq 6 \text{ mm}^2$ RADOX 155 (4G) for $> 6 \text{ mm}^2$
EMC-screen:	Tin plated copper braid
Outer sheath:	RADOX Elastomer S (13X)
No. of cores:	Nominal cross section mm^2
1	4, 6, 8, 10, 12, 16, 25, 35, 50, 70, 95, 120
2	4, 6

Application/Limitation

Special cable for wiring of the battery and or fuel cell energy systems on ships and boats. For example, for Electrical and Plug in Hybrid Electric Ship and Boats, engine and battery wiring, PDU (Power Distribution Unit), OBC (Onboard Charger), AC/DC charging socket as well as corresponding auxiliary equipment and other electrical components.

Operating temperature: -40°C to +130°C 50000h

The cables should not be installed in accommodation spaces and passenger areas due to missing halogen-free and low emission of smoke properties in case of fire.

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
ISO 19642-1	2023-08	Road vehicles - Automotive cables - Part 1: Vocabulary and design guidelines	
ISO 19642-2	2023-08	Road vehicles - Automotive cables - Part 2: Test methods	
ISO 19642-5	2019-01	Road vehicles - Automotive cables - Part 5: Dimensions and requirements for 600 V a.c. or 900 V d.c. and 1 000 V a.c. or 1500 V d.c. single core copper conductor cables	
ISO 19642-9	2019-01	Road vehicles - Automotive cables - Part 9: Dimensions and requirements for 600 V a.c. or 900 V d.c. and 1 000 V a.c. or 1 500 V d.c. round, sheathed, screened or unscreened multi or single core copper conductor cables	
IEC 60332-1-2	2015-07	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 –Procedure for 1 kW pre-mixed flame	
NEK TS 606	2022	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	Category b - Enhanced oil resistance sheath. Resistance test: IRM902+IRM903 100°C 7d.

Marking of product

HUBER+SUHNER RADOX 155(S) / RADOX Elastomer S (FHLR91XC13X and FHLR4GC13X) 1500V DC or 1000V AC
-size- IEC 60332- 1- 2 [batch no] [date of manufacture] [prod- place]

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