

TYPE APPROVAL CERTIFICATE

This is to certify:

That the **Termination and Joint for Cable**

with type designation(s)

**Nexans ALU-FLEX (-V) Termination for aluminum power cable 70 mm2 with hole M8/M10/M12/M16,
Nexans ALU-FLEX (-V) Termination for aluminum power cable 95 mm2 with hole M10/M12/M16,
Nexans ALU-FLEX (-V) Termination for aluminum power cable 120 mm2 with hole M10/M12/M16,
Nexans ALU-FLEX (-V) Termination for aluminum power cable 150 mm2 with hole M10/M12/M16,
Nexans ALU-FLEX (-V) Termination for aluminum power cable 185 mm2 with hole M12/M16/M20,
Nexans ALU-FLEX (-V) Termination for aluminum power cable 240 mm2 with hole M12/M16/M20**

Issued to

NEXANS network solutions NV
Erembodegem, Belgium

is found to comply with

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

Application :

Special terminations for Aluminum power cables.

Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Issued at **Høvik** on **2022-09-15**

This Certificate is valid until **2027-08-15**.

DNV local station: **Belgium CMC**

for **DNV**

Approval Engineer: **Ivar Bull**

Frederik Tore Elter
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.

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 300,000 USD.



Product description

Tinned (-V = verzinkt) aluminium compression cable lugs suitable for fine stranded aluminum conductors according to ISO 6722-2, structure B. Cable lugs can be connected directly to copper busbars.

The outer diameter and the depth of the barrel is designed in adaption to DIN 46329.

Lugs are supplied with contact grease and delivered in plastic bag to avoid contamination.

Lugs are suitable for energy cables with flexible aluminum conductors of cross sections 70 mm² - 240 mm² which are operating at a maximum temperature of 90 °C during continuous load.

Approval covers terminations for cables with ISO 6722-2, structure B annealed aluminum conductors with cross sections 70, 95, 120, 150, 185 and 240 mm². ISO 6722-2 defines conductors up to 160 mm². Conductors 185 and 240 mm² are fine stranded according to Nexans standard and with resistance according to class 2 aluminum.

Nexans Cat.-No.	Marking on lug:	Nexans Kukdong conductor size Alu Cl 5*)	Max conductor Ø [mm]	Length (end to centre of stud hole)	Stud holes Ø [mm]	Stamp die UNDER	Stamp die OVER
70 x SH	70	70 mm ²	12,7	78 /80	8, 10, 12,	U3	O2
95 x SH	95	95 mm ²	14,2	84	10, 12, 16	U4	O2
120 x SH	120	120 mm ²	15,8	90	10, 12, 16	U5	O3
150 x SH	150	150 mm ²	17,8	91	10, 12, 16	U6	O3
185 X SH	185	185 mm ²	20,5	103	12, 16, 20	U7	O3
240 x SH	240	240 mm ²	22,8	103	12, 16, 20	U8	O4

In Nexans Catalogue number please replace SH with a stud hole Ø.

Lugs in this certificate are qualified together with Nexans Kukdong fine stranded aluminum according to ISO 6722-2, structure B.

Application/Limitation

Cable lugs approved for Nexans Kukdong cables with aluminium conductors 70 - and 240 mm² ref. DNV TA certificates TAE00004HA/B/C/D/E/F.

Special for cables with aluminum conductors:

1. Nexans Kukdong aluminium cables shall be terminated with DNV type approved ALU-FLEX (-V) terminations designed for aluminium conductors
2. Installation to be performed by trained personnel only, according to Nexans installation Instructions. Deep indent press to be performed with approved press tool and correct die sizes.
3. To prevent ingress of moisture, heat shrink tubing with melt glue shall be installed over pressed termination barrel and overlap cable sheath with minimum 50mm.

DNV Rules Part 4 Chapter 8 Section 9 [1.1.3] states: "The design of all electrical cables installed shall comply with the requirements of applicable IEC Publications.". Further, Section 1 Service Description [1.1.4] states: "The Society will consider the use of alternative standards if they are found to represent an overall safety concept equivalent to that of the rules."

Based on passed tests in DNV Class program CP-0409, DNV considers the aluminum cables and corresponding terminations listed in this certificate to represent an equivalent safety level as traditional copper cables.

At termination points, marking signs shall inform: *Service and repair on cables and terminations shall be done by trained workers only, using approved equipment and tools to maintain the safety level of aluminum cable system*

Type Approval documentation

Tests carried out

	Release	General description	Limitation
DNV-CP-0409	2021-09	Terminal lugs for LV power cables with aluminum conductors	
IEC 61238-1	2003-05	Compression and mechanical connectors for power cables for rated voltages up to 30kV (Um=36kV). Part 1: Test methods and requirements	Short circuit test Class A
DNV-CG-0339	2021-08	Environmental test specification for electrical, electronic and programmable equipment and systems	Relevant part as per CP-0409 table 1
ISO 6722-2	2013-12	Road vehicles – 60V and 600 V single core cables Part 2: Dimensions, test methods and requirements for aluminium conductor cables	(IEC 60228 does not define class 5 aluminium conductors)

Marking of product

Nexans Type designation and cross sectional area.

Example: 70xM10 Alu flex: 10-AL 70² FLEX GPH U3/O2

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 shall 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