

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Lightweight Electric Cable**

with type designation(s)

High temperature instrumentation and thermocouple cables, armored.

Issued to

SAMI SPA**Liscate MI, MI, Italy**

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft**Application :****Special high temperature cable designed for gas turbines and combustion engines.****Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.****Rated voltage (kV) 600V****Temp. class (°C) 200**Issued at **Høvik** on **2019-07-02**This Certificate is valid until **2024-06-18**.DNV GL local station: **Milan**for **DNV GL**Approval Engineer: **Ivar Bull**

Trond Sjøvåg
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: High temperature instrumentation or thermocouple cables

Conductors: Nickel coated copper (NCC) or thermocouple extension alloy (Kx or Tx)
Core insulation: PFA
Screen (IS/OS): helically aluminium/polyester tape or nickel coated copper braid (when required)
Inner sheath: PFA (when required)
Brading: AISI 304 or Nikel
Outer sheath: Silicone rubber

Number of cores x conductor cross-section
4 x 2 x 24 AWG OS A
5 x 2 x 24 AWG OS A
4 x 2 x 22 AWG IS A
4 x 2 x 22 AWG OS A
2 x 3 x 22 AWG OS A
6 x 4 x 22 AWG IS A
8 x 4 x 22 AWG IS A
2 x 20 AWG OS A
2 x 20 AWG Kx OS A
3 x 20 AWG OS A
1 + (2 x 20 AWG IS) A
4 x 20 AWG A
4 x 20 AWG OS A
5 x 20 AWG OS A
5 x 2 x 20 AWG IS A
2 x 2 x 20 AWG A
2 x 2 x 20 AWG IS A
2 x 2 x 20 AWG A Kx
3 x 2 x 20 AWG IS A
4 x 2 x 20 AWG IS A Ex
6 x 2 x 20 AWG IS A
7 x 2 x 20 AWG IS A
7 x 2 x 20 AWG A
2 x 3 x 20 AWG IS A
6 x 3 x 20 AWG IS A
7 x 3 x 20 AWG IS A
10 x 3 x 20 AWG IS A
2 x 20 AWG + 3 x 20 AWG IS A
2 x 18 AWG (1,00 mm ²) A Kx
2 x 18 AWG (1,00 mmq) OS A
2 x 18 AWG (1,00 mmq) OS A Kx
2 x 18 AWG (1,00 mm ²) OS A Tx
3 x 18 AWG (1,00 mmq) OS A
4 x 18 AWG (1,00 mmq) OS A
6 x 18 AWG (1,00 mmq) OS A
2 x 2 x 18 AWG (1,00 mm ²) A

Number of cores x conductor cross-section
2 x 2 x 18 AWG (1,00 mmq) IS A
2 x 2 x 18 AWG (1,00 mmq) A Kx
2 x 2 x 18 AWG (1,00 mmq) IS A Kx
2 x 2 x 18 AWG (1,00 mmq) OS A Kx
2 x 2 x 18 AWG (1,00 mmq) IS A Tx
2 x 2 x 18 AWG (1,00 mmq) IS A Jx
3 x 2 x 18 AWG (1,00 mmq) A Kx
3 x 2 x 18 AWG (1,00 mmq) IS A
4 x 2 x 18 AWG (1,00 mmq) OS A Kx
4 x 2 x 18 AWG (1,00 mmq) A Kx
5 x 2 x 18 AWG (1,00 mmq) IS A
6 x 2 x 18 AWG (1,00 mmq) IS A
7 x 2 x 18 AWG (1,00 mmq) IS A
7 x 2 x 18 AWG (1,00 mmq) IS A Kx
7 x 2 x 18 AWG (1,00 mmq) IS A Tx
8 x 2 x 20 AWG (1,00 mmq) IS A Kx
8 x 2 x 18 AWG (1,00 mmq) IS A
10 x 2 x 18 AWG (1,00 mmq) IS A
12 x 2 x 18 AWG (1,00 mmq) A
12 x 2 x 18 AWG (1,00 mmq) IS A
14 x 2 x 18 AWG (1,00 mmq) IS A
14 x 2 x 18 AWG (1,00 mmq) IS A Kx
16 x 2 x 18 AWG (1,00 mmq) IS A
7 x 3 x 18 AWG (1,00 mmq) IS A
3 x 2 + 1 x 3 x 18 AWG (1,00 mmq) IS A
4 x 2 + 2 x 3 x 18 AWG (1,00 mmq) IS A
2 x 18 AWG (1,00 mmq) IS + 2 x 18 AWG (1,00 mmq) OS A
1 x 4 x 20 AWG + 6 x 2 x 18 AWG (1,0 mmq) IS A
4 x 2 x 20 AWG + 4 x 3 x 20 AWG IS A
8 x 2 x 20 AWG Kx + 4 x 2 x 20 AWG Ex IS A
2 x 2 x 16 AWG IS A
2 x 2 x 16 AWG IS A Kx
2 x 2 x 16 AWG IS A Ex
3 x 2 x 16 AWG IS A
5 x 2 x 16 AWG IS A

Job Id: **262.1-014224-2**
 Certificate No: **TAE00003JX**

Number of cores x conductor cross-section
8 x 2 x 16 AWG IS A Kx
2 x 3 x 16 AWG IS A
4 x 3 x 16 AWG IS A
6 x 3 x 16 AWG IS A
8 x 2 x 16 AWG + 8 x 2 x 20 AWG IS A
2 x 2 x 16 AWG + 2 x 2 x 20 AWG + 2 x 3 x 20 AWG IS A
4 x 2 + 2 x 3 x 18 AWG (1,00 mmq) IS A
2 x 16 AWG A
2 x 16 AWG OS A
2 x 16 AWG Kx OS A
3 x 16 AWG OS A
4 x 16 AWG OS A
2 x 2 x 16 AWG IS A
2 x 1,50 mmq OS A
3 x 1,50 mmq OS A
4 x 1,50 mmq OS A
2 x 2 x 1,50 mmq IS A Kx
2 x 2 x 1,50 mmq IS A
7 x 2 x 1,50 mmq IS A
7 x 2 x 1,50 mmq IS A Kx
8 x (2 x 1,5 mmq) IS A
2 x 3 x 1,50 MMQ IS A

Number of cores x conductor cross-section
12 x 2 x 1,5 mmq IS A
2 x 14 AWG A
2 x 2,50 mmq A
2 x 2,50 mmq OS A
3 x 2,50 mmq A
3 x 2,50 mmq OS A
6 x 2 x 2,5 mmq IS A
2 x 12 AWG OS A
3 x 12 AWG A
3 x 12 AWG OS A
2 x 4 mmq A
2 x 4 mmq OS A
3 x 4 mmq A
4 x 4 mmq A
3 X 10 AWG A
4 x 4 mmq + 2 x 2 mmq OS A
2 x 24 AWG + 2 x 22 AWG IS A
2 x 24 AWG + 2 x 22 AWG OS A
2 x 24 AWG + 2 x 22 AWG A
2 x 9 AWG A
3 x 9 AWG A
3 x 6 mmq A
3 x 10 mmq A

Application/Limitation

Special high temperature cable designed for gas turbines and combustion engines.

Type Approval documentation

Job Id: **262.1-014224-2**
Certificate No: **TAE00003JX**

Tests carried out

Standard	Release	General description	Limitation
DNVGL-CP-0400	2015-12	Lightweight electric cables	Relevant parts.
		Complete cable has passed accelerated ageing test	20.000h@180°C
IEC 60332-1-2	2006-07	Tests on electric cables under fire conditions. Test for vertical flame propagation for a single insulated wire or cable.	
UL 758 CSA 22.2 No	09/05/2014	PHYSICAL PROPERTIES OF EXTRUDED JACKETS, CSA C22.2 NO. 210-11	Silicone rubber insulation and jacket long term aging tests
EN50363-2-1	2006(11)	Cross linked sheathing material EM-9. Max operating temperature 180°C.	Heat ageing test in air 10 days@200°C

Marking of product

SAMI SPA – Type designation - size – 600 V - Batch n°

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) and selected type tests (ref. to applicable class programs) checked (if not available these tests 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