

TYPE APPROVAL CERTIFICATE

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

with type designation(s)

KS-Flat-cable 4G35mm² + 13x1 mm² + 3x0,5mm², KS Flat-Cable 4xG6+3x(5x1,0), KS Flat-Cable 4xG25+13x1,0mm²+2x(1x1,0C) + 2x2,5mm²

Issued to

**Kabel Sterner GmbH
Gaimersheim Bayern, Germany**

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft**Application :****Flexible elevator flat cable with power, control and Bus elements.****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**

Type	Rated voltage (kV)	Temp. class (°C)
KS-Flat-cable 4G35mm² + 13x1 mm² + 3x0,5mm²	Pwr. 0,6/1kV Contr. 150/250V. Bus 100V	90
KS Flat-Cable 4xG6+3x(5x1,0)	Pwr. 0,6/1kV Contr. 150/250V. Bus 100V	90
KS Flat-Cable 4xG25+13x1,0mm²+2x(1x1,0C) + 2x2,5mm²	Pwr. 0,6/1kV Contr. 150/250V. Bus 100V	90

Issued at **Høvik** on **2018-04-03**This Certificate is valid until **2022-12-31**.for **DNV GL**DNV GL local station: **Essen**Approval Engineer: **Ivar Bull**

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Andreas Kristoffersen
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

1. Cable construction:

Type:	KS-Flat Kombicable Power / control /data
Conductors:	Plain stranded copper class 5
Power cores:	6,0 mm ² up to 35,0 mm ²
Core insulation:	TPE according UL 1581 Table 52.224
Inner covering:	Fleece foil over each core
Strenght member:	Kevlar braid over each core
Bus cables (optional):	0,50 mm ²
Filler:	PP-Filler
Core insulation:	TPE according UL 1581 Table 52.224
Electrostatic screen(s):	Individual and /or common screen (if any)
Inner sheath	TPE according UL 1581 Table 52.224
Control cores:	1,0 mm ²
Insulation:	TPE according UL 1581 Table 52.224
Inner covering:	Fleece foil over each stranded
Strenght member:	Kevlar braid over each stranded
Outer sheath:	TPU according DIN EN 50363-10-2 (flame retardant)

Cross sectional drawings:

Article number 815F000140 Flat-Cable 4G35mm² + 13x1 mm² + 3x0,5 mm²



Article number 815F000139 Flat-Cable 4xG6+3x(5x1,0):



Article number 815F000143 Flat-Cable 4xG25+13x1,0mm²+2x(1x1,0C) + 2x2,5mm²



2. Other cable properties:

Suitable for Gas Dangerous areas:	Cable without metallic braid may be installed in zone 2 only
Suitable for outdoor use:	Yes

3. Dynamic properties:

Intended use:	FLAT CABLE FOR SUSPENDED USE IN ELEVATORS.
Number of dynamic cycles:	70 000
Operating temperature range:	Tested in temperature interval -8°C to +35°C
Minimum bending radius [mm]:	195 mm
Maximum travel height [m]:	
Maximum speed [m/s]:	0,67 [m/s]
Maximum acceleration [m/s ²]:	
Designed for Torsion	No
Designed for use in cable chain:	No

4. Acceptance Criteria for passing dynamic tests:
- | | |
|-----------------------------|---|
| Insulation resistance: | > 200 MOhm x km |
| Conductor resistance: | < 10% increase |
| Visual inspection of cable: | No lumps, gaps, abrasions or other damage of outer sheath |

Application/Limitation

Manufacturers installation recommendations to be followed.
Minimum bending radius and dynamic limitations to be complied with.

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. (if relevant test IEC 60332-3-22 is done)

Type Approval documentation

Tests carried out

Dynamic lifetime test in test rig. Temperature interval -8°C to +35°C, 10 m travel length, 70 000 cycles.
Electrical Routine Tests (RT) and mechanical properties of insulation and sheath after zero cycles.
Electrical Routine Tests (RT) and mechanical properties of insulation and sheath after 70.000 cycles.
Artificial Sea water test
Weathering test according DIN EN ISO 4892-2, part A
Ozone test Test piece installed according to VDE 0472 Part 805 Duration 72h@200ppm 40°C 20% elongation. Verdict: No cracks after ozopne exposure.
Arrhenius test with water
Flame retardant test IEC 60332-1
Resistance against oils and fuels test. Tensile strength and elongation @ break with:
- ASTM oil 1, IRM902, IRM903 21 days@100°C and 52weeks@60°C
- Bio oil 52 weeks@80°C, Bio diesel 52weeks @60°C, Bio oils 7 days @100°C, Bio oils 28 days @80°C

Marking of product

KS- Flat-cable 4G35mm² + 13x1 mm² + 3x0,5mm² – Power 0,6/1 kV. Control 150/250V. Bus 100V – Lot no or
KS- Flat-cable 4xG6+3x(5x1,0) – Power 0,6/1 kV. Control 150/250V. Bus 100V – Lot no or
KS- Flat-cable 4xG25+13x1,0mm²+2x(1x1,0C) + 2x2,5mm² – Power 0,6/1 kV. Control 150/250V. Bus

Job Id: **262.1-014825-3**
Certificate No: **TAE00002K8**

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