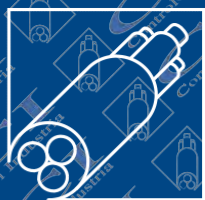


2021



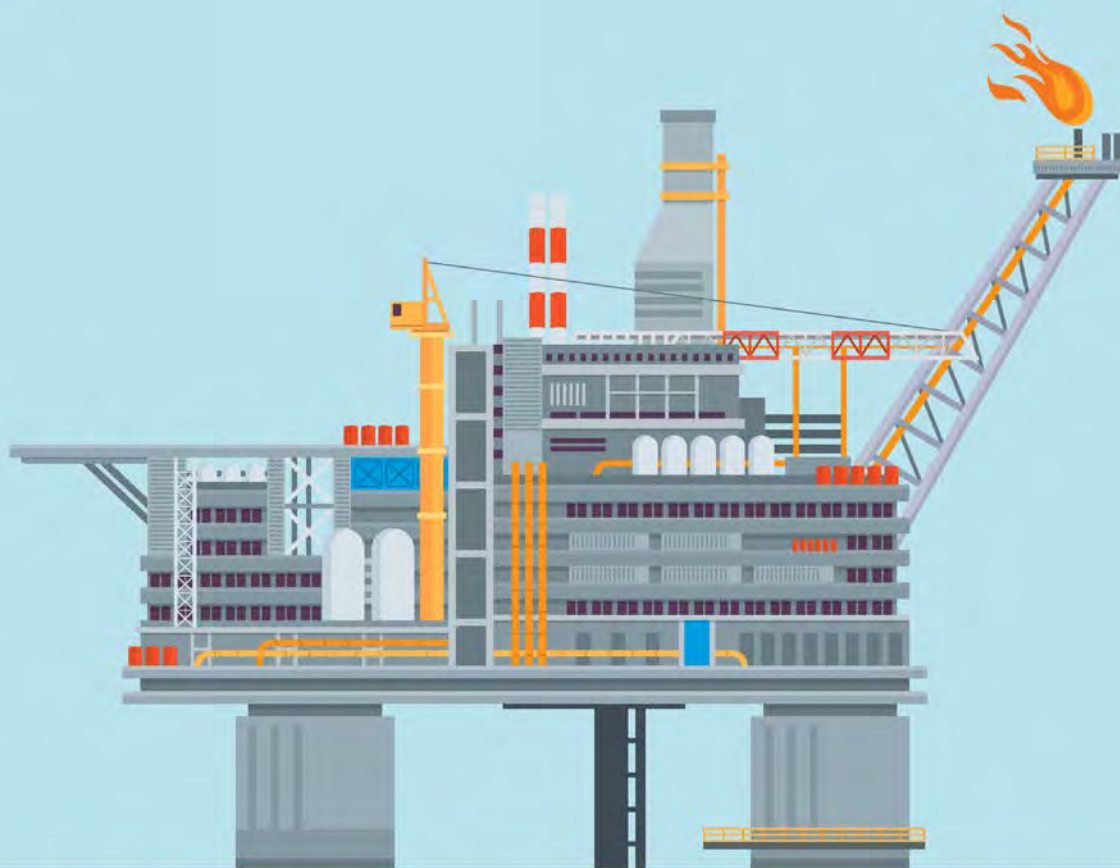
CCI

ControlCavi Industria

OFFSHORE CABLES

NEK 606 : 2016

with **FIREBAR**[®] the TOTAL SAFETY fire and water resistant cable



CCI Quality

DNV-GL

MANAGEMENT SYSTEM CERTIFICATE

Certificate No.: 117016-2012-46-ITA-ACCREDIA Initial certification date: 03 September 2008 Valid: 03 November 2020 - 31 October 2023

This is to certify that the management system of

CONTROLCAVI INDUSTRIA S.r.l.
 S.S. Casalina Km. 78.600 - 03013 Ferentino (FR) - Italy

has been found to conform to the Quality Management System standard:
ISO 9001:2015

This certificate is valid for the following scope:
Design and manufacture of conductors and electrical cables for low and medium voltages, through the phases of drawing, stranding, insulation, twisting, extrusion, packing and testing (IAF 19, 14)

Place and date:
 Vimercate (MB), 13 July 2020

ACCREDIA

For the issuing office:
 DNV GL - Business Assurance
 Via Energy Park, 14 - 20871 Vimercate (MB) - Italy

Zeno Beltrami
 Management Representative

Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid.

CCI Environmental

DNV-GL

MANAGEMENT SYSTEM CERTIFICATE

Certificate No.: 117016-2012-46-ITA-ACCREDIA Data prima emissione/First date: 29 giugno 2012 Validità/Valid: 29 giugno 2020 - 31 giugno 2023

Si certifica che il sistema di gestione di/This is to certify that the management system of

CONTROLCAVI INDUSTRIA S.r.l.- Sede Amministrativa ed Operativa
 S.S. Casalina Km. 78.600 - 03013 Ferentino (FR) - Italy

È conforme ai requisiti della norma per il Sistema di Gestione Ambientale/ Has been found to conform to the Environmental Management System standard:
ISO 14001:2015

Valutato secondo le prescrizioni del Regolamento Tecnico RT-09/ Evaluated according to the requirements of Technical Regulations RT-09

Questa certificazione è valida per il seguente campo applicativo:
Progettazione e produzione di conduttori e cavi elettrici per bassa e media tensione, attraverso le fasi di trafilatura, trefolatura, isolamento, spiratura, estrusione, confezionamento e collaudo (EA 19, 14)

This certificate is valid for the following scope:
Design and manufacture of conductors and electrical cables for low and medium voltages, through the phases of drawing, stranding, insulation, twisting, extrusion, packing and testing (EA 19, 14)

Luogo e Data/Place and date:
 Vimercate (MB), 28 maggio 2018

ACCREDIA

Per l'Organismo di Certificazione/ For the Certification Body:
 DNV GL - Business Assurance
 Via Energy Park, 14 - 20871 Vimercate (MB) - Italy

Zeno Beltrami
 Management Representative

La validità del presente Certificato è subordinata al rispetto delle condizioni contrattuali del Certificato di Certificazione/ Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid.

CCI Health & Safety

DNV-GL

MANAGEMENT SYSTEM CERTIFICATE

Certificate No.: 117020-2012-46-ITA-ACCREDIA Initial certification date: 12 September 2015 Valid: 12 September 2018 - 11 September 2021

This is to certify that the management system of

CONTROLCAVI INDUSTRIA S.r.l.- Sede Amministrativa e Operativa
 S.S. Casalina Km. 78.600 - 03013 Ferentino (FR) - Italy

has been found to conform to the Occupational Health and Safety Management System standard:
ISO 45001:2018

This certificate is valid for the following scope:
Design and manufacturing of conductors and electrical cables for low and medium voltages (IAF 19, 14)

Place and date:
 Vimercate (MB), 04 July 2020

ACCREDIA

For the issuing office:
 DNV GL - Business Assurance
 Via Energy Park, 14 - 20871 Vimercate (MB) - Italy

Zeno Beltrami
 Management Representative

Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid.

CABLE SERVICE Quality

DNV-GL

RINA

CISQ is a member of
IONet

CERTIFICATO N. 108/94/S
CERTIFICATE No. 108/94/S

SI CERTIFICA CHE IL SISTEMA DI GESTIONE PER LA QUALITÀ DI/ IT IS HEREBY CERTIFIED THAT THE QUALITY MANAGEMENT SYSTEM OF

CABLE SERVICE S.R.L.
 VIALE CAMPANIA, 31 20133 Milano (MI) ITALIA

NELLE SEGUENTI UNITÀ OPERATIVE / IN THE FOLLOWING OPERATIONAL UNITS

STRADA PROVINCIALE, 117 20010 Benate Ticino (MI) ITALIA

È CONFORME ALLA NORMA / IS IN COMPLIANCE WITH THE STANDARD:
ISO 9001:2015

PER I SEGUENTI CAMPI DI ATTIVITÀ / FOR THE FOLLOWING FIELDS OF ACTIVITIES

FABRILIO MISURAZIONE, CONFEZIONAMENTO E COMMERCIALIZZAZIONE DI CAVI ELETTRICI/ IAF 29 IAF 19

CUTTING, MEASURING, PACKAGING AND TRADE OF ELECTRICAL CABLES

La validità del presente certificato è subordinata al rispetto delle condizioni contrattuali e amministrative del presente contratto del sistema di gestione del processo certificato.
 The validity of this certificate is dependent on full and complete fulfilment of the conditions of the management system.
 This is a valid and accurate certificate when subject to the terms and conditions of the Regulation on the Certification of Systems of Quality for Quality Management Systems.
 The use and validity of the certificate are subject to compliance with the terms and conditions of the Certification of Quality Management Systems.

| | | | |
|-------------------------------|------------|---|------------|
| Prima emissione/ First issue: | 09.05.1994 | Data decisione di rinnovo/ Renewal decision date: | 15.05.2018 |
| Data scadenza/ Expiry date: | 27.05.2021 | Data revisione/ Revision date: | 03.04.2019 |

Fabrizio Fressi
 Milan Management System
 Certification Head

ACCREDIA

IAF

RINA Services S.p.A.
 Via Corchia 12 - 10128 Genova Italy

CISQ

Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid.

Offshore cables NEK 606 : 2016

Halogen free

Low smoke

Flame retardant

Fire resistant

FIREBAR® Fire & water resistant

Oils & MUDs resistant



CCI offshore cables according to NEK 606:2016



Are designed and manufactured for installations in the inhospitable conditions where oil & gas rigs are usually working (saline atmosphere, UV radiation, extremes of temperature, hydrocarbons, oils, drilling fluids and muds) still maintaining the highest levels of performance. Recognized by the most acknowledged Certification Bodies (refer to page 8), they present remarkable characteristics such as:

■ **CONDUCTOR:** an unique flexible Class 2 conductor, originally patented by CCI and still utilised in all ships and offshore cables designs, allows for such ease of installation and thus reducing the time and cost, an ease of handling in the restrictions and confines of vessels and offshore platforms.

The formation and manufacture process of our conductors, not only allows for the cables to safely be handled/installed at 4 times the Outer Diameter of the cable (normally allowed by Class 5 conductors), but with a cable affording superior handling characteristics (normally found with Class 5 conductors) we still maintain the Class 2 electrical characteristics, giving the added advantage over Class 5 conductors, which have higher resistance values and thus reduced ampacity.

■ **INSULATION:** improved Ethylene Propylene Rubber (EPR) and Hard grade Ethylene Propylene Rubber (HEPR) for MV cables, are formulated and proven for conductor operating temperatures greater than 100 °C (refer to page 7)

■ **FLAMEBAR®:** CCI has never compromised in choosing the components used to produce its cables, and Flamebar® tapes used in all constructions are testament of this. The high temperature resistance of these fibre glass tapes afford a very good heat barrier and further enhance non propagation of the flame of all our cables.

■ **OUTER SHEATH SHF2 H-M oils & Muds resistant:** is compliant with SHF2, as stated in IEC 60092-360, together with the highest level of resistance when tested in Mineral, Hydraulic oils and Muds (type H-M) as defined in Table 1 Category d of NEK 606:2016 (refer to Generals section).

■ **LOW OPERATING TEMPERATURE:** CCI's compounds, used in the production of ship and offshore cables, are formulated and proven, according to CSA standards, to operate down to - 40 °C.

■ **SUNLIGHT, UV & OZONE RESISTANCE:** the whole range of sheathing compounds have been independently type tested to pass the most severe requirements of the standards for these critical factors when cables are installed externally on-board ships and offshore units.



CCI cable - Fire resistance

When fire breaks out in remote locations, such as oil/gas platforms or ships, the survival of all on board, and the containment of damage to equipment and structure, depends on the effectiveness of anti-fire devices, which are undoubtedly powered and controlled by electrical cables.

The cables installed in areas, with an assessed potential risk of fire, are always specified to be fire resistant.

At CCI, our manufacturing programme includes two cable constructions with substantial differences in their capabilities of maintaining circuit integrity, whilst sustain fire damage and the effects of extinguishing:

traditional

Until recently, standards have legislated for a resistance to fire, and maintaining circuit integrity against the effects of fire ONLY.

Once these cable types are attempted to be extinguished with water (the usual method for fire extinguishing) the cables fail, as the protection of conductors relies solely upon a mica glass tape(s) which do not support water.

Mica glass tape, as a sole fire barrier, also has limitations in that it is only useful for voltages up to 1kV.

Fire tests are according to IEC 60331-1 or IEC 60331-2, applicable to the appropriate diameter of cable under test, with a requirement of Fire (at least 830°C) only and Mechanical shocks for a duration up to 2 hours.

FIREBAR®

The research and development to the 'age old' issue of installing a fire resistant cable that survives all aspects of fire and the extinguishing effects and is as easy to install as a conventional cable, has culminated in the CCI patented design of FIREBAR®.

The extensive proving and re-proving of the design allowed CCI to offer a guarantee for all TOTAL SAFETY on board, with unequalled performance.

FIREBAR® not only continues to operate in fire conditions, as you would expect, but, due to a unique design, fully functions whilst subject simultaneously attack of Fire, Mechanical shocks and a Water spray or Water jets combination.

What this means is that FIREBAR® provides, for an extended time to 2 hours, for safe evacuation of personnel and subsequent fire extinguishing.

FIREBAR® cables are already installed on platforms operated by BP, Total & Saipem, Shell & Technip, on SBM FPSOs and FNLGs and also where significant numbers of people would potentially be contained on Cruise ships operated by Carnival Group and built by Fincantieri.

FIREBAR® constructions, when manufactured according to NEK 606:2016 standard, cover the range from 150/250 Volt (Instrument types) up to 12/20 kV (Medium Voltage), and all in between.

The most stringent requirements set for cable testing have been in accordance to:

- BS7846:2000 Category F3 for Instrumentation and Low voltage power cables
- BS8491 for Medium voltage power cables

When submitted to the requirements of the a.m. standards, **FIREBAR®** cables, powered at nominal voltage rate, demonstrate their survival and continued operation against the combined effects of Fire (at least 830°C) + Mechanical Shocks + Water Spray or Water Jets, for a test timing of 2 hours, even when considering Medium Voltage cables.

Furthermore, beyond the requirements of any fire resistant international standard, **FIREBAR®** burned cables, after fully surviving 2 hours tests, as detailed above, are then immersed in water, still powered, to demonstrate the integrity of the construction (even after the effects of fire damage and extinguishing) and continued operation.





Insulating Compound

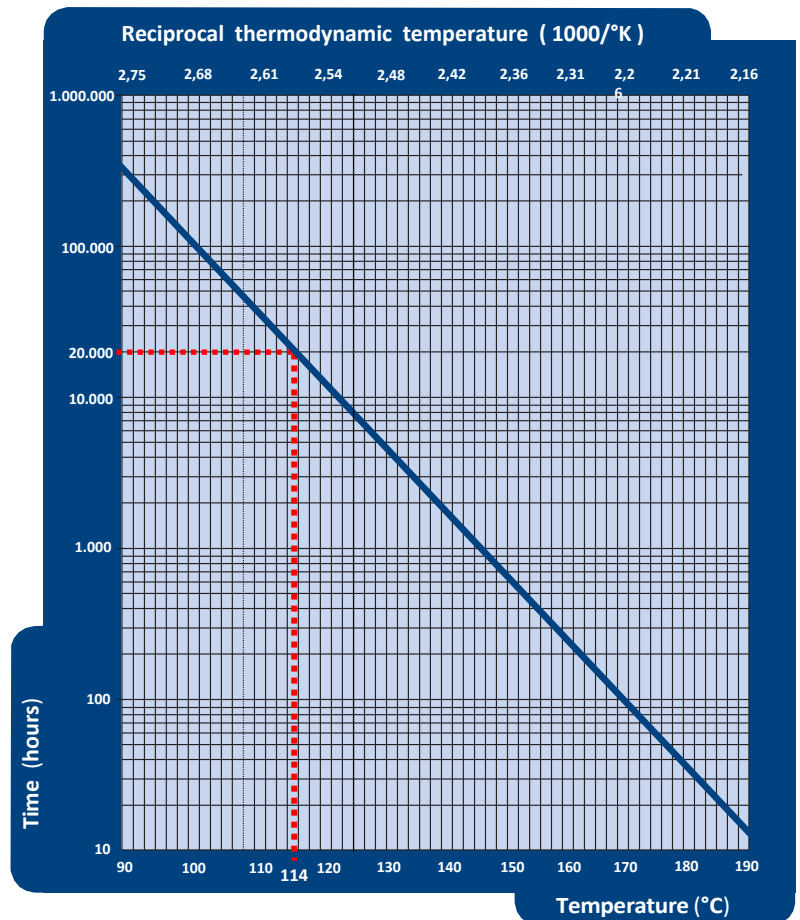
The maximum operating temperature allowed in an electrical cable depends on the insulating material.

CCI developed improved EPR and HEPR insulating compounds which offer superior insulation constant (Ki) and improved ageing performance at higher operating temperature than 90°C requested by IEC 60092-360

The Arrhenius graph, hereunder reported, shows the Temperature Index Ti(*) achieved by performing a Thermal Endurance Evaluation (witnessed by DNV) on (H)EPR compounds in accordance to IEC 60216 standards

$$T_i = 114 \text{ } ^\circ\text{C}$$

(*) The Temperature Index (Ti) is the the maximum continous working temperature at which full insulation characteristics are still maintained.





Product type approvals



American Bureau of Shipping (USA)



Det Norske Veritas -
Germanischer Lloyd (Norway)



Lloyd's Register (UK)



Reference standards

| | |
|----------------------|---|
| NEK 606 | Cables for offshore installations |
| IEC 60092-350 | General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications. Choice and installation of cables for low-voltage power system. |
| IEC 60092-352 | Electrical installations in ships – Choice and installation of electrical cables |
| IEC 60092-353 | Power cables for rated voltages 1 kV and 3 kV |
| IEC 60092-354 | Single and three core power cables with extruded solid insulation for rated voltages 6 kV up to 30 kV. |
| IEC 60092-360 | Insulation and sheathing materials for shipboard and offshore unit, power control and instrumentation cables. |
| IEC 60092-376 | Electrical installations in ships - Cables for control and instrumentation circuits 150 / 250 V (300 V). |
| IEC 60331-1 | Tests for electric cables under fire conditions. Part 1: Test method for fire with shock at a temperature of at least 830°C for cables of rated voltage up to and including 0,6/1,0 kV and with an overall diameter exceeding 20 mm. |
| IEC 60331-2 | Part 2: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV and with an overall diameter not exceeding 20 mm. |
| IEC 60332-1-2 | Test for vertical flame propagation for a single insulated wire or cable. Procedure for 1 kW pre-mixed flame |
| IEC 60332-3-22 | Tests on electric cables under fire conditions. Tests for vertical flame spread of vertically-mounted bunched wires of cables - Category A. |
| IEC 60754-1 | Test on gases evolved during combustion of electric cables. Part 1: Determination of the halogen acid gas |
| IEC 60754-2 | Part 2: Determination of acidity (by pH measurement) and conductivity. |
| IEC 61034-1 & 2 | Measurement of smoke density of cables burning under defined conditions. |
| IEC 60533 | Electrical and electronic installations in ships. Electromagnetic compatibility (EMC). Ships with a metallic hull |
| IEC 62153-4-3 | Electromagnetic compatibility (EMC) – Surface transfer impedance – Triaxial method |
| CSA C 22.2 N° 0.3-09 | Test methods for electrical wires and cables |
| CSA C 22.2 N° 38-18 | Thermoset insulated wires and cables Cold bend and impact @ - 40 Deg C |
| UL 1581 | § 1200 - Sunlight (UV) resistance. |
| BS 7846:2000 | Annex L – Fire resistance test Cat F3 |
| BS 8491 | Method for assessment of fire integrity of large diameter power cables |
| HD 308 S2 | Identification of cores in cables and flexible cords |

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cable codes according to NEK 606:2016

Flame Retardant

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| P101 RFOU H-M | | page 16 |
| Power & Control, armoured | 0,6/1 kV | |
| RFOU H-M VFD EMC | | page 18 |
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| P108 UX H-M | | page 20 |
| Earth | 0,6/1 kV | |
| P102/103/104/112/113 RFOU H-M MV | | page 21 |
| Radial field, armoured (3,6 /6 -6/10 –8,7/15 –12/20–18/30) kV | | |
| RFOU H-M VFD EMC MV | | page 24 |
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| S106 RU(c) H-M | | page 28 |
| Instrumentation, common screen, unarmoured | 250 V | |
| S101 RFOU(i) H-M | | page 30 |
| Instrumentation, individual screen, armoured | 250 V | |
| S102 RFOU(c) H-M | | page 32 |
| Instrumentation, common screen, armoured | 250 V | |

Flame Retardant - Fire Resistant

| | | |
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| Power & control, unarmoured | 0,6/1 kV | |
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| Power & control, armoured | 0,6/1 kV | |
| S107 BU(i) H-M | | page 40 |
| Instrumentation, individual screen, unarmoured | 250 V | |
| S108 BU(c) H-M | | page 42 |
| Instrumentation, ind. & com. screen, unarmoured | 250 V | |
| S103 BFOU(i) H-M | | page 44 |
| Instrumentation, individual screen, armoured | 250 V | |
| S104 BFOU(c) H-M | | page 46 |
| Instrumentation, common screen, armoured | 250 V | |

FIREBAR®

Flame Retardant - Fire & Water Resistant

| | | |
|---|----------|---------|
| P125 SFOU H-M FIREBAR® | | page 50 |
| Power & control, armoured | 0,6/1 kV | |
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| | | |
|---|-------|---------|
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Electrical data

Flame retardant - Fire resistant:

| | |
|----------------------|---------|
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FIREBAR® Fire & water resistant

| | |
|----------------------|---------|
| LV power and control | page 64 |
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| | |
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Flame retardant

Oils & MUDs resistant



Flame retardant tests

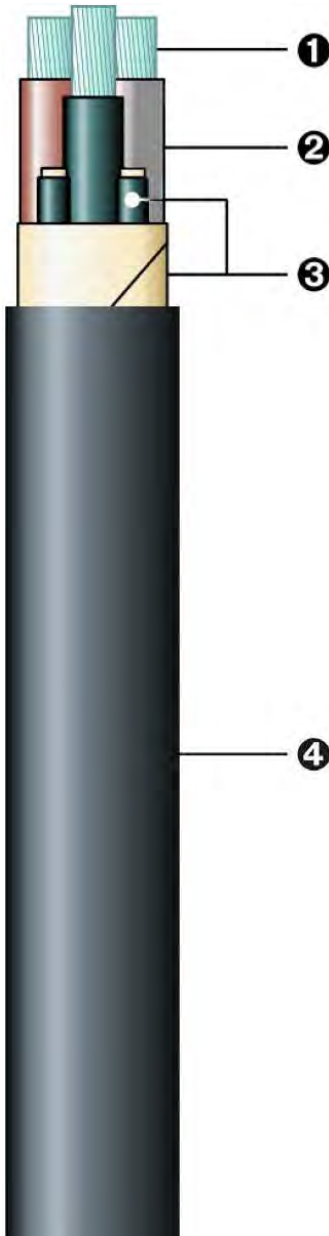
IEC 60332-1-2
on single cable



IEC 60332-3-22 Category A
on bunched cables



power & control 0,6/1 kV
 halogen free flame retardant
 unarmoured
 mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|----------------------------------|----------------------|
| Design and construction | IEC 60092-353 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 0,6/1 kV | |
| Max operating voltage U _{max} | 1,2 kV | |
| Maximum rated temperature | 90 °C according to IEC 60092-360 | |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092-360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold Bend and Impact test (-40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | | |
|---------------------|---|---------------|
| Construction | | |
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 IEC 60228 | |
| 2 INSULATION | EPR HF compound | IEC 60092-360 |
| 3 BEDDING & FILLERS | FLAMEBAR® fiberglass tape + fiberglass ropes EPR sheathed when 3 cores (sect. > 16 mm ²) | |
| 4 OUTER SHEATH | SHF2 H-M compound | NEK 606:2016 |
| | see Generals section | |

| | | | |
|--|------------------|------------|-----------------------|
| Cores identification according to HD 308 S2 and IEC 60445 | | | |
| 1 core | white or black | 4 cores | blue brown black grey |
| 2 cores | blue brown | multicores | white numbered |
| 3 cores | brown black grey | | |

| | |
|----------------------|-------|
| Sheath colour | black |
|----------------------|-------|

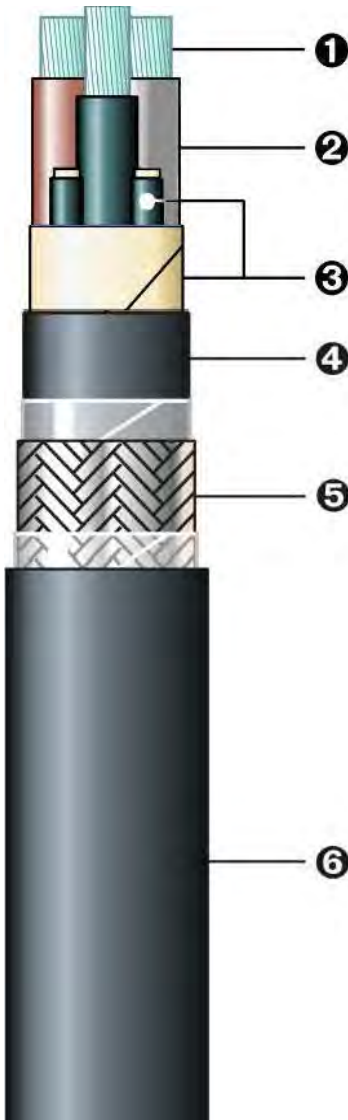
| | | | |
|-----------------------|---------------|--------------------------|---------------|
| Sheath marking | | | |
| CCI P111 RU H-M | 0,6/1 kV | n x sect mm ² | IEC 60092-353 |
| IEC 60332-3-22 Cat A | meter marking | year | NEK 606 QA n° |

- Minimum Bending Radius: 4D (Overall Diameter) - see Generals section

0,6/1 kV

| CONSTRUCTION | | | CONDUCTOR DIAMETER | INSULATION THICKNESS | OVERALL DIAMETER | WEIGHT |
|--------------|---|---------------------|--------------------|----------------------|------------------|-------------------|
| n | x | [mm ²] | nominal [mm] | nominal [mm] | approx [mm] | approx. [kg/km] |
| 1 | x | 16 | 5,2 | 1,0 | 10 | 300 |
| 1 | x | 25 | 6,5 | 1,2 | 12 | 440 |
| 1 | x | 35 | 7,5 | 1,2 | 13 | 560 |
| 1 | x | 50 | 8,3 | 1,4 | 14 | 720 |
| 1 | x | 70 | 10,0 | 1,4 | 16 | 950 |
| 1 | x | 95 | 11,8 | 1,6 | 19 | 1.300 |
| 1 | x | 120 | 13,2 | 1,6 | 20 | 1.560 |
| 1 | x | 150 | 14,6 | 1,8 | 22 | 1.920 |
| 1 | x | 185 | 16,5 | 2,0 | 25 | 2.410 |
| 1 | x | 240 | 19,0 | 2,2 | 28 | 3.100 |
| 1 | x | 300 | 21,8 | 2,4 | 31 | 3.740 |
| 2 | x | 1,5 | 1,6 | 1,0 | 10 | 140 |
| 2 | x | 2,5 | 2,0 | 1,0 | 11 | 170 |
| 2 | x | 4 | 2,8 | 1,0 | 13 | 220 |
| 2 | x | 6 | 3,3 | 1,0 | 14 | 290 |
| 2 | x | 10 | 4,1 | 1,0 | 15 | 370 |
| 2 | x | 16 | 5,2 | 1,0 | 18 | 540 |
| 3 | x | 1,5 | 1,6 | 1,0 | 11 | 170 |
| 3 | x | 2,5 | 2,0 | 1,0 | 12 | 210 |
| 3 | x | 4 | 2,8 | 1,0 | 13 | 280 |
| 3 | x | 6 | 3,3 | 1,0 | 15 | 370 |
| 3 | x | 10 | 4,1 | 1,0 | 17 | 490 |
| 3 | x | 16 | 5,2 | 1,0 | 19 | 730 |
| 3 | x | 25 | 6,5 | 1,2 | 23 | 1.040 |
| 3 | x | 35 | 7,5 | 1,2 | 25 | 1.370 |
| 3 | x | 50 | 8,3 | 1,4 | 28 | 1.800 |
| 3 | x | 70 | 10,0 | 1,4 | 32 | 2.450 |
| 3 | x | 95 | 11,8 | 1,6 | 38 | 3.400 |
| 3 | x | 120 | 13,2 | 1,6 | 41 | 4.140 |
| 3 | x | 150 | 14,6 | 1,8 | 45 | 5.040 |
| 3 | x | 185 | 16,5 | 2,0 | 50 | 5.580 |
| 3 | x | 240 | 19,0 | 2,2 | 57 | 7.280 |
| 3 | x | 300 | 21,8 | 2,4 | 65 | 9.970 |
| 4 | x | 1,5 | 1,6 | 1,0 | 12 | 190 |
| 4 | x | 2,5 | 2,0 | 1,0 | 13 | 240 |
| 4 | x | 4 | 2,8 | 1,0 | 15 | 320 |
| 4 | x | 6 | 3,3 | 1,0 | 16 | 440 |
| 4 | x | 10 | 4,1 | 1,0 | 18 | 600 |
| 4 | x | 16 | 5,2 | 1,0 | 21 | 900 |
| 4 | x | 25 | 6,5 | 1,2 | 25 | 1.300 |
| 4 | x | 35 | 7,5 | 1,2 | 28 | 1.730 |
| 4 | x | 50 | 8,3 | 1,4 | 31 | 2.270 |
| 4 | x | 70 | 10,0 | 1,4 | 36 | 3.110 |
| 4 | x | 95 | 11,8 | 1,6 | 42 | 4.340 |
| 4 | x | 120 | 13,2 | 1,6 | 45 | 5.280 |
| 4 | x | 150 | 14,6 | 1,8 | 50 | 6.290 |
| 4 | x | 185 | 16,5 | 2,0 | 56 | 8.040 |
| 4 | x | 240 | 19,0 | 2,2 | 63 | 11.000 |
| 4 | x | 300 | 21,8 | 2,4 | 71 | 13.280 |
| 5 | x | 1,5 | 1,6 | 1,0 | 13 | 260 |
| 7 | x | 1,5 | 1,6 | 1,0 | 14 | 320 |
| 12 | x | 1,5 | 1,6 | 1,0 | 19 | 500 |
| 19 | x | 1,5 | 1,6 | 1,0 | 22 | 720 |
| 27 | x | 1,5 | 1,6 | 1,0 | 27 | 1.000 |
| 37 | x | 1,5 | 1,6 | 1,0 | 30 | 1.320 |
| 5 | x | 2,5 | 2,0 | 1,0 | 14 | 330 |
| 7 | x | 2,5 | 2,0 | 1,0 | 15 | 400 |
| 12 | x | 2,5 | 2,0 | 1,0 | 20 | 640 |
| 19 | x | 2,5 | 2,0 | 1,0 | 24 | 940 |
| 27 | x | 2,5 | 2,0 | 1,0 | 29 | 1.310 |
| 37 | x | 2,5 | 2,0 | 1,0 | 33 | 1.740 |

power & control 0,6/1 kV
 halogen free flame retardant
 armoured
 mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|----------------------------------|----------------------|
| Design and construction | IEC 60092-353 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 0,6/1 kV | |
| Max operating voltage U _{max} | 1,2 kV | |
| Maximum rated temperature | 90 °C according to IEC 60092-360 | |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092-360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold Bend and Impact test (-40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | | |
|---|--|---------------|
| Construction | | |
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 IEC 60228 | |
| 2 INSULATION | EPR HF compound | IEC 60092-360 |
| 3 BEDDING & FILLERS | FLAMEBAR® fiberglass tape + fiberglass ropes EPR sheathed when 3 cores (sect. > 16 mm ²) | |
| 4 INNER SHEATH | SHF2 extruded compound | IEC 60092.360 |
| 5 ARMOUR | tinned copper wire braid (*) | |
| 6 OUTER SHEATH | SHF2 H-M compound | NEK 606:2016 |
| (*) on request braiding section when used as earth - see Generals section | | |

| | | | |
|---|------------------|------------|-----------------------|
| Cores identification according to HD 308 S2 and IEC 60445 | | | |
| 1 core | white or black | 4 cores | blue brown black grey |
| 2 cores | blue brown | multicores | white numbered |
| 3 cores | brown black grey | | |

| | |
|---------------|-------|
| Sheath colour | black |
|---------------|-------|

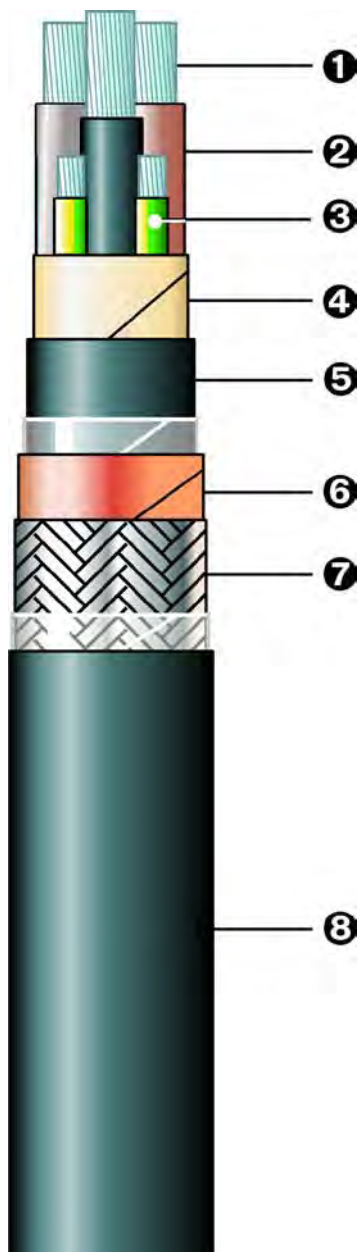
| | | | |
|-----------------------|---------------|--------------------------|-----------------------|
| Sheath marking | | | |
| CCI P101 RFOU H-M | 0,6/1 kV | n x sect mm ² | IEC 60092-353 NEK 606 |
| IEC 60332-3-22 Cat A | meter marking | year | QA n° |

- Minimum Bending Radius: 4D (Overall Diameter) – see Generals section

0,6/1 kV

| CONSTRUCTION | | CONDUCTOR DIAMETER | INSULATION THICKNESS | DIAMETER UNDER ARMOUR | OVERALL DIAMETER | WEIGHT |
|--------------|---------------------|--------------------|----------------------|-----------------------|------------------|-------------------|
| n | [mm ²] | nominal [mm] | nominal [mm] | nominal [mm] | approx [mm] | approx. [kg/km] |
| 1 | x 16 | 5,2 | 1,0 | 10,9 | 15 | 480 |
| 1 | x 25 | 6,5 | 1,2 | 12,6 | 17 | 620 |
| 1 | x 35 | 7,5 | 1,2 | 13,6 | 18 | 745 |
| 1 | x 50 | 8,3 | 1,4 | 14,7 | 19 | 900 |
| 1 | x 70 | 10,0 | 1,4 | 16,4 | 21 | 1145 |
| 1 | x 95 | 11,8 | 1,6 | 18,6 | 24 | 1500 |
| 1 | x 120 | 13,2 | 1,6 | 20,4 | 26 | 1800 |
| 1 | x 150 | 14,6 | 1,8 | 22,2 | 28 | 2150 |
| 1 | x 185 | 16,5 | 2,0 | 24,5 | 30 | 2630 |
| 1 | x 240 | 19,0 | 2,2 | 27,8 | 34 | 3320 |
| 1 | x 300 | 21,8 | 2,4 | 31 | 38 | 4030 |
| 2 | x 1,5 | 1,6 | 1,0 | 9,5 | 14 | 290 |
| 2 | x 2,5 | 2,0 | 1,0 | 10,5 | 15 | 350 |
| 2 | x 4 | 2,8 | 1,0 | 12,1 | 17 | 470 |
| 2 | x 6 | 3,3 | 1,0 | 13,1 | 18 | 560 |
| 2 | x 10 | 4,1 | 1,0 | 15,3 | 21 | 770 |
| 2 | x 16 | 5,2 | 1,0 | 17,5 | 24 | 990 |
| 3 | x 1,5 | 1,6 | 1,0 | 9,8 | 14 | 320 |
| 3 | x 2,5 | 2,0 | 1,0 | 10,6 | 16 | 380 |
| 3 | x 4 | 2,8 | 1,0 | 12,4 | 18 | 560 |
| 3 | x 6 | 3,3 | 1,0 | 13,4 | 19 | 640 |
| 3 | x 10 | 4,1 | 1,0 | 15,2 | 22 | 890 |
| 3 | x 16 | 5,2 | 1,0 | 17,6 | 25 | 1.190 |
| 3 | x 25 | 6,5 | 1,2 | 21,2 | 29 | 1.610 |
| 3 | x 35 | 7,5 | 1,2 | 23,4 | 32 | 2.100 |
| 3 | x 50 | 8,3 | 1,4 | 26,0 | 35 | 2.720 |
| 3 | x 70 | 10,0 | 1,4 | 30,0 | 39 | 3.550 |
| 3 | x 95 | 11,8 | 1,6 | 34,8 | 45 | 4.700 |
| 3 | x 120 | 13,2 | 1,6 | 37,8 | 49 | 5.650 |
| 3 | x 150 | 14,6 | 1,8 | 42,1 | 53 | 6.970 |
| 3 | x 185 | 16,5 | 2,0 | 47,1 | 59 | 8.520 |
| 3 | x 240 | 19,0 | 2,2 | 53,3 | 66 | 10.790 |
| 3 | x 300 | 21,8 | 2,4 | 60,3 | 77 | 13.370 |
| 4 | x 1,5 | 1,6 | 1,0 | 11,0 | 15 | 390 |
| 4 | x 2,5 | 2,0 | 1,0 | 12,2 | 16 | 470 |
| 4 | x 4 | 2,8 | 1,0 | 14,5 | 19 | 680 |
| 4 | x 6 | 3,3 | 1,0 | 15,9 | 22 | 850 |
| 4 | x 10 | 4,1 | 1,0 | 18,5 | 24 | 1.100 |
| 4 | x 16 | 5,2 | 1,0 | 21,5 | 27 | 1.500 |
| 4 | x 25 | 6,5 | 1,2 | 25,3 | 33 | 2.110 |
| 4 | x 35 | 7,5 | 1,2 | 27,8 | 35 | 2.640 |
| 4 | x 50 | 8,3 | 1,4 | 31,0 | 38 | 3.440 |
| 4 | x 70 | 10,0 | 1,4 | 35,5 | 43 | 4.510 |
| 4 | x 95 | 11,8 | 1,6 | 41,2 | 49 | 5.950 |
| 4 | x 120 | 13,2 | 1,6 | 45,0 | 54 | 7.270 |
| 4 | x 150 | 14,6 | 1,8 | 48,2 | 57 | 8.550 |
| 4 | x 185 | 16,5 | 2,0 | 54,2 | 64 | 10.775 |
| 4 | x 240 | 19,0 | 2,2 | 61,0 | 71 | 13.760 |
| 4 | x 300 | 21,8 | 2,4 | 69,0 | 79 | 16.480 |
| 5 | x 1,5 | 1,6 | 1,0 | 13,3 | 18 | 500 |
| 7 | x 1,5 | 1,6 | 1,0 | 14,5 | 19 | 590 |
| 12 | x 1,5 | 1,6 | 1,0 | 19,2 | 25 | 930 |
| 19 | x 1,5 | 1,6 | 1,0 | 22,8 | 28 | 1240 |
| 37 | x 1,5 | 1,6 | 1,0 | 30,8 | 37 | 2140 |
| 5 | x 2,5 | 2,0 | 1,0 | 14,8 | 19 | 590 |
| 7 | x 2,5 | 2,0 | 1,0 | 16,1 | 21 | 720 |
| 12 | x 2,5 | 2,0 | 1,0 | 21,5 | 27 | 1150 |
| 19 | x 2,5 | 2,0 | 1,0 | 25,4 | 31 | 1480 |
| 37 | x 2,5 | 2,0 | 1,0 | 34,4 | 41 | 2755 |

power 1,8/3 kV
 for Variable Frequency Drive systems
 halogen free - flame retardant
 electromagnetic shield armoured
 mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|--|------------------------------------|----------------------|
| Design and construction | IEC 60092-353 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 1,8/3 kV (U _{max} 3,6 kV) | |
| Operating voltage U ₀ /U | 0,6/1 kV (with VFD systems) | |
| Maximum operating voltage U _{max} | 1,2 kV | |
| Maximum rated temperature | 90 °C according to IEC 60092-360 | |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092-360 | |
| Electromagnetic protection | IEC 60533 – IEC 62153-4-3 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold Bend and Impact test (-40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | | |
|--------------------------|--|---------------|
| Construction | | |
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 | IEC 60228 |
| 2 INSULATION | EPR HF compound | IEC 60092-360 |
| 3 EARTH CONDUCTORS | tinned copper flexible CI 2, EPR sheathed | |
| 4 BEDDING | FLAMEBAR® fiberglass tape | |
| 5 INNER SHEATH | SHF2 extruded compound | IEC 60092-360 |
| 6 ELECTROMAGNETIC SHIELD | plain copper tape | |
| 7 ARMOUR | tinned copper wire braid | |
| 8 OUTER SHEATH | SHF2 H-M compound | NEK 606:2016 |
| | see Generals section | |

| | | |
|-----------------------------|----------------|-------|
| Cores identification | | |
| 3 cores | brown | black |
| earth | green / yellow | |

| | |
|----------------------|-------|
| Sheath colour | black |
|----------------------|-------|

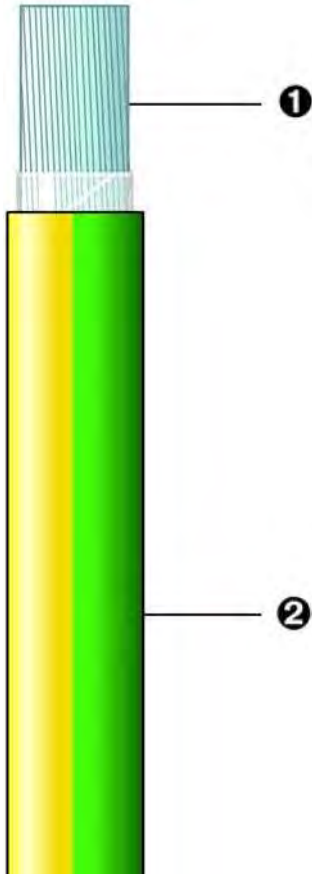
| | | | |
|-----------------------|---------------------------|--------------------------|---------------|
| Sheath marking | | | |
| CCI | RFOU H-M VFD EMC 1,8/3 kV | n x sect mm ² | IEC 60092-353 |
| IEC 60332-3-22 Cat A | meter marking | year | QA n° |

- Minimum Bending Radius: 4D (Overall Diameter) - see Generals section

1,8/3 kV

| CONSTRUCTION | | | | CONDUCTOR DIAMETER | INSULATION THICKNESS | DIAMETER UNDER ARMOUR | OVERALL DIAMETER | WEIGHT |
|--------------|--------------------|--------|--------------------|--------------------|----------------------|-----------------------|------------------|-----------|
| CONDUCTORS | | EARTHS | | nominal | nominal | nominal | approx | approx |
| n | [mm ²] | n | [mm ²] | [mm] | [mm] | [mm] | [mm] | [kg/km] |
| 3 | x 10 | 3 | x 2,5 | 4,1 | 2,2 | 22,9 | 29 | 1.390 |
| 3 | x 16 | 3 | x 4 | 5,2 | 2,2 | 25,2 | 32 | 1.750 |
| 3 | x 25 | 3 | x 6 | 6,5 | 2,2 | 28,0 | 35 | 2.200 |
| 3 | x 35 | 3 | x 6 | 7,5 | 2,2 | 30,2 | 37 | 2.530 |
| 3 | x 50 | 3 | x 10 | 8,3 | 2,2 | 32,4 | 39 | 2.870 |
| 3 | x 70 | 3 | x 16 | 10,0 | 2,2 | 36,2 | 43 | 3.690 |
| 3 | x 95 | 3 | x 16 | 11,7 | 2,4 | 40,8 | 48 | 4.720 |
| 3 | x 120 | 3 | x 25 | 13,0 | 2,4 | 44,0 | 51 | 5.680 |
| 3 | x 150 | 3 | x 25 | 14,4 | 2,4 | 47,0 | 55 | 6.630 |
| 3 | x 185 | 3 | x 35 | 16,3 | 2,4 | 52,2 | 60 | 8.230 |

earth 0,6/1 kV
 halogen free flame retardant
 mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|---------------------------------|----------------------|
| Design and construction | IEC 60092-353 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 0,6/1 kV | |
| Max operating voltage U _{max} | 1,2 kV | |
| Maximum rated temperature | 90 °C according to | IEC 60092-360 |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092-360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold Bend and Impact test (- 40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

Construction

| | | |
|----------------|--|--------------|
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 | IEC 60228 |
| 2 OUTER SHEATH | SHF2 H-M compound | NEK 606:2016 |
| | see Generals section | |

Sheath colour yellow - green

Sheath marking

CCI P108 UX H-M 0,6/1 kV sect mm² IEC 60092-353 NEK 606
 IEC 60332-3-22 Cat A meter marking year QA n°

- Minimum Bending Radius: 4D (Overall Diameter) - see Generals section

| CONSTRUCTION | | | CONDUCTOR DIAMETER | SHEATH THICKNESS | OVERALL DIAMETER | WEIGHT |
|--------------|---|---------------------|--------------------|------------------|------------------|-------------------|
| n | x | [mm ²] | nominal [mm] | nominal [mm] | approx [mm] | approx. [kg/km] |
| 1 | x | 6 | 3,3 | 1,0 | 5 | 115 |
| 1 | x | 10 | 4,1 | 1,0 | 6 | 155 |
| 1 | x | 16 | 5,2 | 1,0 | 7 | 220 |
| 1 | x | 25 | 6,5 | 1,2 | 9 | 300 |
| 1 | x | 35 | 7,5 | 1,2 | 10 | 390 |
| 1 | x | 50 | 8,3 | 1,4 | 11 | 490 |
| 1 | x | 70 | 10,0 | 1,4 | 13 | 670 |
| 1 | x | 95 | 11,8 | 1,6 | 15 | 920 |
| 1 | x | 120 | 13,2 | 1,6 | 16 | 1.170 |
| 1 | x | 150 | 14,6 | 1,8 | 18 | 1.445 |
| 1 | x | 185 | 16,5 | 2,0 | 20 | 1.930 |
| 1 | x | 240 | 19,0 | 2,2 | 23 | 2.425 |
| 1 | x | 300 | 21,8 | 2,4 | 31 | 3.000 |

(3,6/6 - 6/10 - 8,7/15 - 12/20 - 18/30) kV radial field
 halogen free flame retardant
 armoured
 mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|--|----------------------|
| Design and construction | IEC 60092-354 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 3,6/6 - 6/10 - 8,7/15 - 12/20 - 18/30 kV | |
| Max operating voltage U _{max} | 7,2 | 12 17,5 24 36 kV |
| Maximum rated temperature | 90 °C according to IEC 60092-360 | |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092-360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold Bend and Impact test (-40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

Construction

| | |
|---------------------|---|
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 IEC 60228 |
| 2 SEMICONDUCTORS | HF extruded compound |
| 3 INSULATION | HEPR HF compound IEC 60092-360 |
| 4 SCREEN | tinned copper wire braid |
| 5 BEDDING & FILLERS | FLAMEBAR® fiberglass tape + fiberglass ropes HEPR sheathed when 3 cores |
| 6 INNER SHEATH | SHF2 extruded compound IEC 60092.360 |
| 7 ARMOUR | tinned copper wire braid (*) |
| 8 OUTER SHEATH | SHF2 H-M compound NEK 606:2016 see Generals section |

Cores identification

| | |
|---------|--|
| 1 core | off-white |
| 3 cores | off-white (coloured or numbered tapes) |

Sheath colour

red

Sheath marking

| | | | | |
|----------------------|----------------------|--------------------------|---------------|---------|
| CCI PXXX RFOU H-M | U ₀ /U kV | n x sect mm ² | IEC 60092-354 | NEK 606 |
| IEC 60332-3-22 Cat A | meter marking | year | QA n° | |

- Minimum Bending Radius: 4/5D depending on Overall Diameter - see Generals section

P102 3,6/6 kV

| CONSTRUCTION | | CONDUCTOR DIAMETER | INSULATION THICKNESS | DIAMETER UNDER ARMOUR | OVERALL DIAMETER | WEIGHT |
|--------------|---------------------|--------------------|----------------------|-----------------------|------------------|------------------|
| n | [mm ²] | nominal [mm] | nominal [mm] | nominal [mm] | approx [mm] | approx [kg/km] |
| 1 | x 25 | 6,5 | 2,5 | 20,9 | 26 | 1.060 |
| 1 | x 35 | 7,5 | 2,5 | 21,8 | 27 | 1.200 |
| 1 | x 50 | 8,3 | 2,5 | 22,7 | 28 | 1.350 |
| 1 | x 70 | 10,0 | 2,5 | 24,4 | 30 | 1.620 |
| 1 | x 95 | 11,8 | 2,5 | 26,2 | 32 | 1.960 |
| 1 | x 120 | 13,2 | 2,5 | 27,6 | 34 | 2.250 |
| 1 | x 150 | 14,6 | 2,5 | 29,0 | 35 | 2.570 |
| 1 | x 185 | 16,5 | 2,5 | 30,9 | 38 | 3.120 |
| 1 | x 240 | 19,0 | 2,6 | 33,7 | 41 | 3.820 |
| 1 | x 300 | 21,8 | 2,8 | 37,4 | 45 | 4.570 |
| 3 | x 25 | 6,5 | 2,5 | 40,3 | 48 | 2.960 |
| 3 | x 35 | 7,5 | 2,5 | 43,3 | 51 | 3.540 |
| 3 | x 50 | 8,3 | 2,5 | 45,1 | 53 | 4.020 |
| 3 | x 70 | 10,0 | 2,5 | 48,8 | 57 | 4.890 |
| 3 | x 95 | 11,8 | 2,5 | 53,4 | 62 | 6.160 |
| 3 | x 120 | 13,2 | 2,5 | 56,8 | 66 | 7.040 |
| 3 | x 150 | 14,6 | 2,5 | 59,8 | 69 | 8.030 |
| 3 | x 185 | 16,5 | 2,5 | 64,5 | 74 | 9.600 |

P103 6/10 kV

| | | | | | | |
|---|-------|------|-----|------|----|--------|
| 1 | x 25 | 6,5 | 3,4 | 22,1 | 28 | 1.150 |
| 1 | x 35 | 7,5 | 3,4 | 23,1 | 29 | 1.290 |
| 1 | x 50 | 8,3 | 3,4 | 23,9 | 30 | 1.430 |
| 1 | x 70 | 10,0 | 3,4 | 25,6 | 31 | 1.710 |
| 1 | x 95 | 11,8 | 3,4 | 27,5 | 33 | 2.070 |
| 1 | x 120 | 13,2 | 3,4 | 28,9 | 36 | 2.350 |
| 1 | x 150 | 14,6 | 3,4 | 30,3 | 37 | 2.770 |
| 1 | x 185 | 16,5 | 3,4 | 32,2 | 39 | 3.250 |
| 1 | x 240 | 19,0 | 3,4 | 34,7 | 42 | 3.920 |
| 1 | x 300 | 21,8 | 3,4 | 38,1 | 45 | 4.630 |
| 3 | x 25 | 6,5 | 3,4 | 44,7 | 53 | 3.480 |
| 3 | x 35 | 7,5 | 3,4 | 46,8 | 55 | 3.920 |
| 3 | x 50 | 8,3 | 3,4 | 48,6 | 57 | 4.380 |
| 3 | x 70 | 10,0 | 3,4 | 53,0 | 62 | 5.460 |
| 3 | x 95 | 11,8 | 3,4 | 57,7 | 67 | 6.640 |
| 3 | x 120 | 13,2 | 3,4 | 60,3 | 69 | 7.460 |
| 3 | x 150 | 14,6 | 3,4 | 63,9 | 73 | 8.620 |
| 3 | x 185 | 16,5 | 3,4 | 68,0 | 78 | 10.080 |

P104 8,7/15 kV

| | | | | | | |
|---|-------|------|-----|------|----|-------|
| 1 | x 25 | 6,5 | 4,5 | 24,9 | 31 | 1.350 |
| 1 | x 35 | 7,5 | 4,5 | 25,8 | 32 | 1.490 |
| 1 | x 50 | 8,3 | 4,5 | 26,7 | 33 | 1.660 |
| 1 | x 70 | 10,0 | 4,5 | 28,4 | 35 | 1.940 |
| 1 | x 95 | 11,8 | 4,5 | 30,2 | 37 | 2.390 |
| 1 | x 120 | 13,2 | 4,5 | 31,6 | 39 | 2.700 |
| 1 | x 150 | 14,6 | 4,5 | 33,0 | 40 | 3.030 |
| 1 | x 185 | 16,5 | 4,5 | 35,0 | 42 | 3.520 |
| 1 | x 240 | 19,0 | 4,5 | 37,5 | 45 | 4.210 |
| 1 | x 300 | 21,8 | 4,5 | 40,8 | 48 | 4.940 |
| 3 | x 25 | 6,5 | 4,5 | 50,6 | 59 | 4.160 |
| 3 | x 35 | 7,5 | 4,5 | 52,6 | 61 | 4.680 |
| 3 | x 50 | 8,3 | 4,5 | 54,4 | 63 | 5.240 |
| 3 | x 70 | 10,0 | 4,5 | 58,5 | 67 | 6.110 |
| 3 | x 95 | 11,8 | 4,5 | 63,0 | 72 | 7.390 |
| 3 | x 120 | 13,2 | 4,5 | 66,0 | 76 | 8.330 |
| 3 | x 150 | 14,6 | 4,5 | 69,1 | 79 | 9.400 |

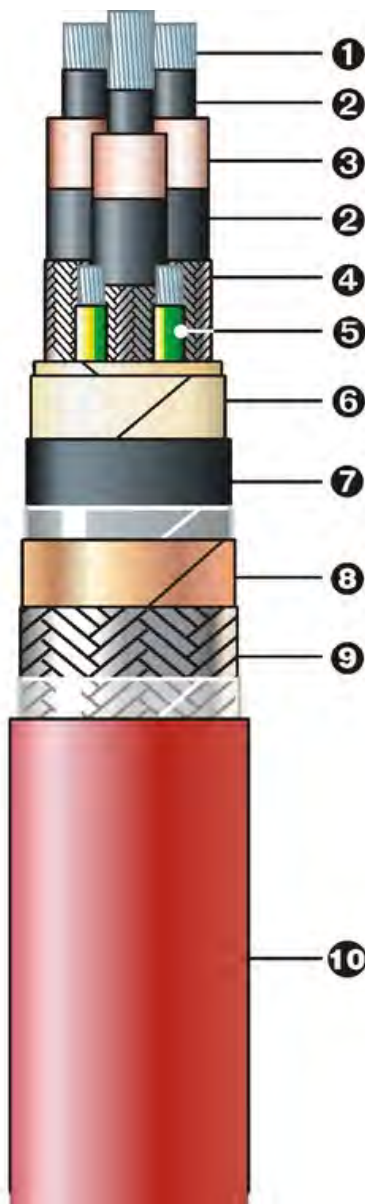
P112 12/20 kV

| CONSTRUCTION | | CONDUCTOR DIAMETER | INSULATION THICKNESS | DIAMETER UNDER ARMOUR | OVERALL DIAMETER | WEIGHT |
|--------------|---------------------|--------------------|----------------------|-----------------------|------------------|------------------|
| n | [mm ²] | nominal [mm] | nominal [mm] | nominal [mm] | approx [mm] | approx [kg/km] |
| 1 | x 35 | 7,5 | 5,5 | 27,9 | 34 | 1.660 |
| 1 | x 50 | 8,3 | 5,5 | 28,7 | 35 | 1.810 |
| 1 | x 70 | 10,0 | 5,5 | 30,4 | 37 | 2.200 |
| 1 | x 95 | 11,8 | 5,5 | 32,2 | 39 | 2.580 |
| 1 | x 120 | 13,2 | 5,5 | 33,7 | 41 | 2.900 |
| 1 | x 150 | 14,6 | 5,5 | 35,9 | 43 | 3.420 |
| 1 | x 185 | 16,5 | 5,5 | 37,0 | 45 | 3.740 |
| 1 | x 240 | 19,0 | 5,5 | 39,5 | 47 | 4.440 |
| 1 | x 300 | 21,8 | 5,5 | 43,8 | 52 | 5.350 |
| 3 | x 35 | 7,5 | 5,5 | 57,3 | 66 | 5.270 |
| 3 | x 50 | 8,3 | 5,5 | 59,2 | 68 | 5.780 |
| 3 | x 70 | 10,0 | 5,5 | 63,4 | 73 | 6.810 |
| 3 | x 95 | 11,8 | 5,5 | 67,3 | 77 | 8.030 |
| 3 | x 120 | 13,2 | 5,5 | 70,3 | 80 | 9.010 |
| 3 | x 150 | 14,6 | 5,5 | 73,4 | 84 | 10.060 |

P113 18/30 kV

| | | | | | | |
|---|-------|------|-----|------|----|--------|
| 1 | x 50 | 8,3 | 8,0 | 33,8 | 41 | 2.390 |
| 1 | x 70 | 10,0 | 8,0 | 35,5 | 43 | 2.700 |
| 1 | x 95 | 11,8 | 8,0 | 37,3 | 45 | 3.100 |
| 1 | x 120 | 13,2 | 8,0 | 38,7 | 46 | 3.430 |
| 1 | x 150 | 14,6 | 8,0 | 40,1 | 48 | 3.790 |
| 1 | x 185 | 16,5 | 8,0 | 42,0 | 50 | 4.310 |
| 1 | x 240 | 19,0 | 8,0 | 45,5 | 53 | 5.170 |
| 1 | x 300 | 21,8 | 8,0 | 48,8 | 57 | 6.020 |
| 3 | x 50 | 8,3 | 8,0 | 70,6 | 81 | 7.470 |
| 3 | x 70 | 10,0 | 8,0 | 74,2 | 85 | 8.530 |
| 3 | x 95 | 11,8 | 8,0 | 78,1 | 89 | 9.790 |
| 3 | x 120 | 13,2 | 8,0 | 81,1 | 92 | 10.760 |
| 3 | x 150 | 14,6 | 8,0 | 84,2 | 95 | 11.980 |

(3,6/6 - 6/10 - 8,7/15 - 12/20) kV radial field
 halogen free flame retardant
 electromagnetic shield armoured
 mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|----------------------------------|----------------------|
| Design and construction | IEC 60092-354 | NEK 606.2016 |
| Nominal voltage U_0/U | 3,6/6 - 6/10 - 8,7/15 - 12/20 kV | |
| Max operating voltage U_{max} | 7,2 12 17,5 24 kV | |
| Maximum rated temperature | 90 °C according to IEC 60092-360 | |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092-360 | |
| Electromagnetic protection | IEC 60533 – IEC 62153-4-3 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold Bend and Impact test (-40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

Construction

| | |
|--------------------------|--|
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 IEC 60228 |
| 2 SEMICONDUCTORS | HF extruded compound |
| 3 INSULATION | HEPR HF compound IEC 60092-360 |
| 4 SCREEN | tinned copper wire braid |
| 5 EARTH CONDUCTORS | tinned copper flexible CI 2, HEPR sheathed |
| 6 BEDDING | FLAMEBAR® fiberglass tape |
| 7 INNER SHEATH | SHF2 extruded compound IEC 6002-360 |
| 8 ELECTROMAGNETIC SHIELD | plain copper tape |
| 9 ARMOUR | tinned copper wire braid |
| 10 OUTER SHEATH | SHF2 H-M compound NEK 606:2016 see Generals section |

Cores identification

| | |
|-------|--|
| cores | off-white (coloured or numbered tapes) |
| earth | yellow-green |

Sheath colour

red

Sheath marking

| | | | |
|----------------------|----------------------|------------------------|---------------|
| CCI RFOU H-M VFD EMC | U_0/U kV | $n \times$ sect mm^2 | IEC 60092-354 |
| NEK 606 | IEC 60332-3-22 Cat A | meter marking | year QA n° |

- Minimum Bending Radius: 4/5D depending on Overall Diameter - see Generals section

3,6/6 kV

| CONSTRUCTION | | | | CONDUCTOR DIAMETER | INSULATION THICKNESS | DIAMETER UNDER ARMOUR | OVERALL DIAMETER | WEIGHT |
|--------------|--------------------|--------|--------------------|--------------------|----------------------|-----------------------|------------------|-----------|
| CONDUCTORS | | EARTHS | | nominal | nominal | nominal | approx | approx |
| n | [mm ²] | n | [mm ²] | [mm] | [mm] | [mm] | [mm] | [kg/km] |
| 3 | x 25 | 3 | x 6 | 6,0 | 2,5 | 41,3 | 48 | 3.090 |
| 3 | x 35 | 3 | x 6 | 7,2 | 2,5 | 44,2 | 51 | 3.630 |
| 3 | x 50 | 3 | x 10 | 8,3 | 2,5 | 46,5 | 54 | 4.300 |
| 3 | x 70 | 3 | x 16 | 10,0 | 2,5 | 51,2 | 59 | 5.380 |
| 3 | x 95 | 3 | x 16 | 11,7 | 2,5 | 54,9 | 63 | 6.660 |
| 3 | x 120 | 3 | x 25 | 13,0 | 2,5 | 58,7 | 68 | 7.840 |
| 3 | x 150 | 3 | x 25 | 14,4 | 2,5 | 61,6 | 71 | 8.840 |
| 3 | x 185 | 3 | x 35 | 16,3 | 2,5 | 65,8 | 78 | 11.170 |

6/10 kV

| | | | | | | | | |
|---|-------|---|------|------|-----|------|----|--------|
| 3 | x 25 | 3 | x 6 | 6,0 | 2,5 | 45,6 | 52 | 3.600 |
| 3 | x 35 | 3 | x 6 | 7,2 | 2,5 | 48,1 | 55 | 4.080 |
| 3 | x 50 | 3 | x 10 | 8,3 | 3,4 | 51,3 | 59 | 4.920 |
| 3 | x 70 | 3 | x 16 | 10,0 | 3,4 | 55,1 | 63 | 5.980 |
| 3 | x 95 | 3 | x 16 | 11,7 | 3,4 | 59,4 | 69 | 7.290 |
| 3 | x 120 | 3 | x 25 | 13,0 | 3,4 | 62,6 | 72 | 8.390 |
| 3 | x 150 | 3 | x 25 | 14,4 | 3,4 | 65,5 | 75 | 9.400 |
| 3 | x 185 | 3 | x 35 | 16,3 | 3,4 | 69,7 | 82 | 11.850 |

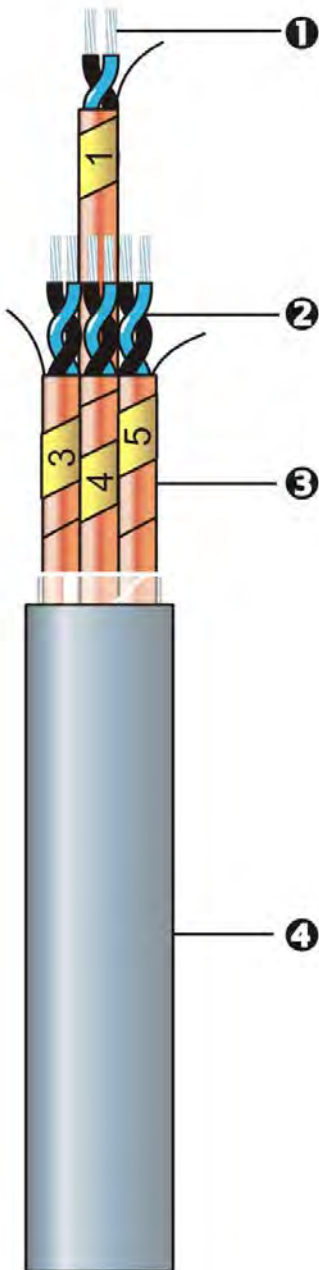
8,7/15kV

| | | | | | | | | |
|---|-------|---|------|------|-----|------|----|--------|
| 3 | x 25 | 3 | x 6 | 6,0 | 4,5 | 51,3 | 58 | 4.290 |
| 3 | x 35 | 3 | x 6 | 7,2 | 4,5 | 53,8 | 61 | 4.850 |
| 3 | x 50 | 3 | x 10 | 8,3 | 4,5 | 57,1 | 65 | 5.830 |
| 3 | x 70 | 3 | x 16 | 10,0 | 4,5 | 60,9 | 69 | 6.700 |
| 3 | x 95 | 3 | x 16 | 11,7 | 4,5 | 64,5 | 74 | 7.980 |
| 3 | x 120 | 3 | x 25 | 13,0 | 4,5 | 67,4 | 77 | 9.120 |
| 3 | x 150 | 3 | x 25 | 14,4 | 4,5 | 70,3 | 80 | 10.160 |
| 3 | x 185 | 3 | x 35 | 16,3 | 4,5 | 74,5 | 87 | 12.710 |

12/20 kV

| | | | | | | | | |
|---|-------|---|------|------|-----|------|----|--------|
| 3 | x 50 | 3 | x 10 | 8,3 | 5,5 | 59,0 | 68 | 6.380 |
| 3 | x 70 | 3 | x 16 | 10,0 | 5,5 | 63,2 | 73 | 7.430 |
| 3 | x 95 | 3 | x 16 | 11,7 | 5,5 | 67,1 | 77 | 8.850 |
| 3 | x 120 | 3 | x 25 | 13,0 | 5,5 | 70,1 | 80 | 10.110 |
| 3 | x 150 | 3 | x 25 | 14,4 | 5,5 | 73,2 | 84 | 11.180 |

instrumentation 150/250 V
 halogen free flame retardant
 individual screen unarmoured
 mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|----------------------------------|----------------------|
| Design and construction | IEC 60092-376 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 150 / 250 V | |
| Max operating voltage U _{max} | 300 V | |
| Maximum rated temperature | 90 °C according to IEC 60092-360 | |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| Toxicity & smoke density | IMO RESOLUTION MSC 41(64) | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092.360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold bend and Impact test (- 40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | | |
|---------------------|--|---------------|
| Construction | | |
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 IEC 60092-376 | |
| 2 INSULATION | EPR HF compound | IEC 60092-360 |
| CORES TWISTING | in pairs / triples | |
| 3 INDIVIDUAL SCREEN | Cu/PE tape + tinned copper drain wire | |
| 4 OUTER SHEATH | SHF2 H-M compound | NEK 606:2016 |
| | see Generals section | |

| | | |
|----------------------|------------------------------|------------------|
| Cores identification | | |
| pair | black | light blue |
| triple | black | light blue brown |
| multi pairs/triples | progressively numbered tapes | |

| | |
|---------------|------|
| Sheath colour | grey |
|---------------|------|

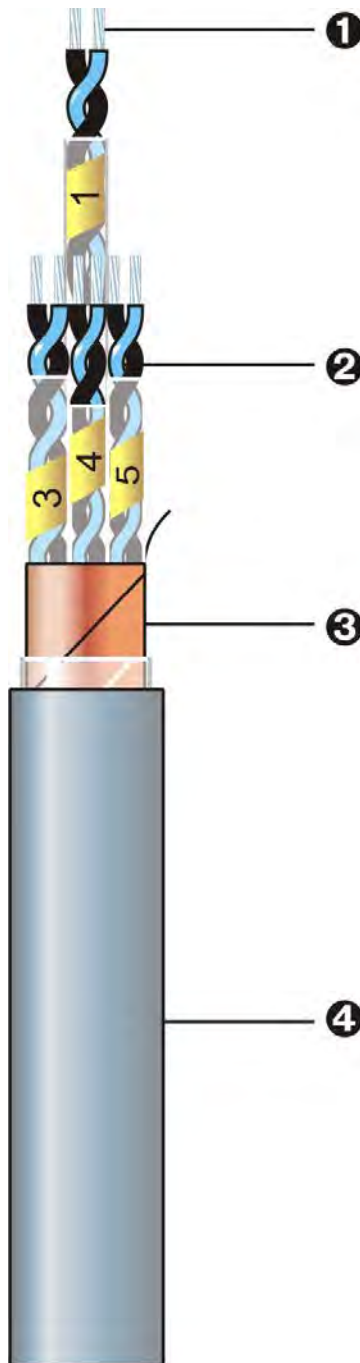
| | | |
|------------------------------|---------------|--|
| Sheath marking | | |
| CCI S105 RU(i) H-M | 150/250 V | n x (pair/triple) x sect mm ² IEC 60092-376 |
| NEK 606 IEC 60332-3-22 Cat A | meter marking | year QA n° |

- Minimum Bending Radius: 4D (Overall Diameter) – see Generals section

150/250 V

| CONSTRUCTION | | | | | CONDUCTOR DIAMETER | INSULATION THICKNESS | OVERALL DIAMETER | WEIGHT |
|--------------|------|--------|----------------------|--------|--------------------|----------------------|------------------|-----------|
| n | pair | triple | [m m ²] | [mm] | nominal | nominal | approx | approx |
| | | | | | [mm] | [mm] | [mm] | [kg/km] |
| 1 | x | 2 | x | 0,75 | 1,1 | 0,6 | 8 | 80 |
| 2 | x | 2 | x | 0,75 | 1,1 | 0,6 | 11 | 140 |
| 4 | x | 2 | x | 0,75 | 1,1 | 0,6 | 14 | 210 |
| 7 | x | 2 | x | 0,75 | 1,1 | 0,6 | 16 | 310 |
| 8 | x | 2 | x | 0,75 | 1,1 | 0,6 | 17 | 350 |
| 12 | x | 2 | x | 0,75 | 1,1 | 0,6 | 20 | 490 |
| 16 | x | 2 | x | 0,75 | 1,1 | 0,6 | 23 | 630 |
| 19 | x | 2 | x | 0,75 | 1,1 | 0,6 | 25 | 730 |
| 24 | x | 2 | x | 0,75 | 1,1 | 0,6 | 28 | 890 |
| 32 | x | 2 | x | 0,75 | 1,1 | 0,6 | 32 | 1.160 |
| 1 | x | 3 | x | 0,75 | 1,1 | 0,6 | 8 | 100 |
| 2 | x | 3 | x | 0,75 | 1,1 | 0,6 | 12 | 180 |
| 4 | x | 3 | x | 0,75 | 1,1 | 0,6 | 15 | 270 |
| 7 | x | 3 | x | 0,75 | 1,1 | 0,6 | 18 | 420 |
| 8 | x | 3 | x | 0,75 | 1,1 | 0,6 | 20 | 480 |
| 12 | x | 3 | x | 0,75 | 1,1 | 0,6 | 23 | 670 |
| 16 | x | 3 | x | 0,75 | 1,1 | 0,6 | 26 | 864 |
| 19 | x | 3 | x | 0,75 | 1,1 | 0,6 | 28 | 1.000 |
| 24 | x | 3 | x | 0,75 | 1,1 | 0,6 | 32 | 1.250 |
| 32 | x | 3 | x | 0,75 | 1,1 | 0,6 | 36 | 1.630 |
| 1 | x | 2 | x | 1 | 1,4 | 0,6 | 8 | 90 |
| 2 | x | 2 | x | 1 | 1,4 | 0,6 | 12 | 170 |
| 4 | x | 2 | x | 1 | 1,4 | 0,6 | 14 | 240 |
| 7 | x | 2 | x | 1 | 1,4 | 0,6 | 17 | 380 |
| 8 | x | 2 | x | 1 | 1,4 | 0,6 | 19 | 430 |
| 12 | x | 2 | x | 1 | 1,4 | 0,6 | 22 | 600 |
| 16 | x | 2 | x | 1 | 1,4 | 0,6 | 25 | 760 |
| 19 | x | 2 | x | 1 | 1,4 | 0,6 | 27 | 890 |
| 24 | x | 2 | x | 1 | 1,4 | 0,6 | 31 | 1.120 |
| 32 | x | 2 | x | 1 | 1,4 | 0,6 | 35 | 1.440 |
| 1 | x | 3 | x | 1 | 1,4 | 0,6 | 9 | 110 |
| 2 | x | 3 | x | 1 | 1,4 | 0,6 | 14 | 210 |
| 4 | x | 3 | x | 1 | 1,4 | 0,6 | 16 | 330 |
| 7 | x | 3 | x | 1 | 1,4 | 0,6 | 20 | 520 |
| 8 | x | 3 | x | 1 | 1,4 | 0,6 | 22 | 590 |
| 12 | x | 3 | x | 1 | 1,4 | 0,6 | 25 | 820 |
| 16 | x | 3 | x | 1 | 1,4 | 0,6 | 29 | 1.070 |
| 19 | x | 3 | x | 1 | 1,4 | 0,6 | 32 | 1.270 |
| 24 | x | 3 | x | 1 | 1,4 | 0,6 | 35 | 1.560 |
| 32 | x | 3 | x | 1 | 1,4 | 0,6 | 40 | 2.030 |
| 1 | x | 2 | x | 1,5 | 1,6 | 0,7 | 9 | 110 |
| 2 | x | 2 | x | 1,5 | 1,6 | 0,7 | 14 | 200 |
| 4 | x | 2 | x | 1,5 | 1,6 | 0,7 | 16 | 320 |
| 7 | x | 2 | x | 1,5 | 1,6 | 0,7 | 19 | 480 |
| 8 | x | 2 | x | 1,5 | 1,6 | 0,7 | 21 | 560 |
| 12 | x | 2 | x | 1,5 | 1,6 | 0,7 | 25 | 780 |
| 16 | x | 2 | x | 1,5 | 1,6 | 0,7 | 29 | 1.020 |
| 19 | x | 2 | x | 1,5 | 1,6 | 0,7 | 31 | 1.170 |
| 24 | x | 2 | x | 1,5 | 1,6 | 0,7 | 35 | 1.480 |
| 32 | x | 2 | x | 1,5 | 1,6 | 0,7 | 39 | 1.910 |
| 1 | x | 3 | x | 1,5 | 1,6 | 0,7 | 9 | 140 |
| 2 | x | 3 | x | 1,5 | 1,6 | 0,7 | 15 | 260 |
| 4 | x | 3 | x | 1,5 | 1,6 | 0,7 | 18 | 420 |
| 7 | x | 3 | x | 1,5 | 1,6 | 0,7 | 22 | 670 |
| 8 | x | 3 | x | 1,5 | 1,6 | 0,7 | 24 | 760 |
| 12 | x | 3 | x | 1,5 | 1,6 | 0,7 | 29 | 1.100 |
| 16 | x | 3 | x | 1,5 | 1,6 | 0,7 | 32 | 1.430 |
| 19 | x | 3 | x | 1,5 | 1,6 | 0,7 | 35 | 1.660 |
| 24 | x | 3 | x | 1,5 | 1,6 | 0,7 | 39 | 2.100 |
| 32 | x | 3 | x | 1,5 | 1,6 | 0,7 | 45 | 2.710 |

instrumentation 150/250 V
 halogen free flame retardant
 common screen unarmoured
 mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|----------------------------------|----------------------|
| Design and construction | IEC 60092-376 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 150 / 250 V | |
| Max operating voltage U _{max} | 300 V | |
| Maximum rated temperature | 90 °C according to IEC 60092-360 | |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| Toxicity & smoke density | IMO RESOLUTION MSC 41(64) | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092.360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold bend and Impact test (- 40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | |
|-----------------|--|
| Construction | |
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 IEC 60092-376 |
| 2 INSULATION | EPR HF compound IEC 60092-360 |
| CORES TWISTING | in pairs / triples |
| 3 COMMON SCREEN | Cu/PE tape + tinned copper drain wire |
| 4 OUTER SHEATH | SHF2 H-M compound NEK 606:2016 |
| | see Generals section |

| | |
|----------------------|--|
| Cores identification | |
| pair | black light blue |
| triple | black light blue brown |
| multi pairs/triples | identified by progressively numbered tapes |

| | |
|---------------|------|
| Sheath colour | grey |
|---------------|------|

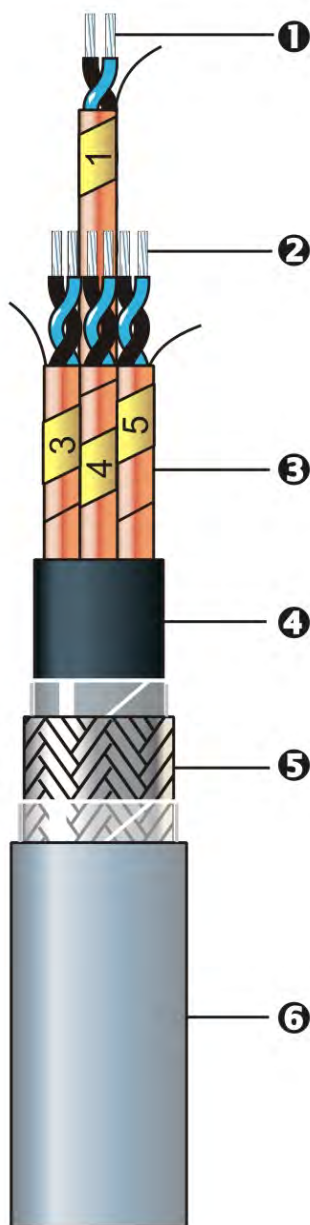
| | |
|------------------------------|--|
| Sheath marking | |
| CCI S106 RU(c) H-M | 150/250 V n x (pair/triple) x sect mm ² IEC 60092-376 |
| NEK 606 IEC 60332-3-22 Cat A | meter marking year QA n° |

- Minimum Bending Radius: 4D (Overall Diameter) – see Generals section

150/250 V

| CONSTRUCTION | | | | CONDUCTOR DIAMETER | INSULATION THICKNESS | OVERALL DIAMETER | WEIGHT |
|--------------|------|--------|----------------------|--------------------|----------------------|------------------|---------------------|
| n | pair | triple | [m m ²] | nominal [mm] | nominal [mm] | approx [mm] | approx [kg/km] |
| 1 | x | 2 | x 0,75 | 1,1 | 0,6 | 8 | 80 |
| 2 | x | 2 | x 0,75 | 1,1 | 0,6 | 11 | 140 |
| 4 | x | 2 | x 0,75 | 1,1 | 0,6 | 13 | 210 |
| 7 | x | 2 | x 0,75 | 1,1 | 0,6 | 16 | 310 |
| 8 | x | 2 | x 0,75 | 1,1 | 0,6 | 17 | 350 |
| 12 | x | 2 | x 0,75 | 1,1 | 0,6 | 20 | 500 |
| 16 | x | 2 | x 0,75 | 1,1 | 0,6 | 23 | 640 |
| 19 | x | 2 | x 0,75 | 1,1 | 0,6 | 25 | 740 |
| 24 | x | 2 | x 0,75 | 1,1 | 0,6 | 28 | 910 |
| 32 | x | 2 | x 0,75 | 1,1 | 0,6 | 31 | 1.180 |
| 1 | x | 3 | x 0,75 | 1,1 | 0,6 | 8 | 100 |
| 2 | x | 3 | x 0,75 | 1,1 | 0,6 | 12 | 180 |
| 4 | x | 3 | x 0,75 | 1,1 | 0,6 | 15 | 270 |
| 7 | x | 3 | x 0,75 | 1,1 | 0,6 | 18 | 420 |
| 8 | x | 3 | x 0,75 | 1,1 | 0,6 | 19 | 480 |
| 12 | x | 3 | x 0,75 | 1,1 | 0,6 | 23 | 680 |
| 16 | x | 3 | x 0,75 | 1,1 | 0,6 | 26 | 870 |
| 19 | x | 3 | x 0,75 | 1,1 | 0,6 | 28 | 1.020 |
| 24 | x | 3 | x 0,75 | 1,1 | 0,6 | 31 | 1.270 |
| 32 | x | 3 | x 0,75 | 1,1 | 0,6 | 36 | 1.650 |
| 1 | x | 2 | x 1 | 1,4 | 0,6 | 8 | 90 |
| 2 | x | 2 | x 1 | 1,4 | 0,6 | 12 | 170 |
| 4 | x | 2 | x 1 | 1,4 | 0,6 | 14 | 250 |
| 7 | x | 2 | x 1 | 1,4 | 0,6 | 17 | 380 |
| 8 | x | 2 | x 1 | 1,4 | 0,6 | 19 | 430 |
| 12 | x | 2 | x 1 | 1,4 | 0,6 | 22 | 600 |
| 16 | x | 2 | x 1 | 1,4 | 0,6 | 25 | 770 |
| 19 | x | 2 | x 1 | 1,4 | 0,6 | 27 | 900 |
| 24 | x | 2 | x 1 | 1,4 | 0,6 | 31 | 1.150 |
| 32 | x | 2 | x 1 | 1,4 | 0,6 | 35 | 1.470 |
| 1 | x | 3 | x 1 | 1,4 | 0,6 | 9 | 110 |
| 2 | x | 3 | x 1 | 1,4 | 0,6 | 14 | 210 |
| 4 | x | 3 | x 1 | 1,4 | 0,6 | 16 | 330 |
| 7 | x | 3 | x 1 | 1,4 | 0,6 | 20 | 520 |
| 8 | x | 3 | x 1 | 1,4 | 0,6 | 21 | 590 |
| 12 | x | 3 | x 1 | 1,4 | 0,6 | 25 | 830 |
| 16 | x | 3 | x 1 | 1,4 | 0,6 | 29 | 1.090 |
| 19 | x | 3 | x 1 | 1,4 | 0,6 | 31 | 1.280 |
| 24 | x | 3 | x 1 | 1,4 | 0,6 | 35 | 1.590 |
| 32 | x | 3 | x 1 | 1,4 | 0,6 | 40 | 2.060 |
| 1 | x | 2 | x 1,5 | 1,6 | 0,7 | 9 | 110 |
| 2 | x | 2 | x 1,5 | 1,6 | 0,7 | 14 | 210 |
| 4 | x | 2 | x 1,5 | 1,6 | 0,7 | 16 | 320 |
| 7 | x | 2 | x 1,5 | 1,6 | 0,7 | 19 | 490 |
| 8 | x | 2 | x 1,5 | 1,6 | 0,7 | 21 | 560 |
| 12 | x | 2 | x 1,5 | 1,6 | 0,7 | 25 | 790 |
| 16 | x | 2 | x 1,5 | 1,6 | 0,7 | 28 | 1.040 |
| 19 | x | 2 | x 1,5 | 1,6 | 0,7 | 30 | 1.190 |
| 24 | x | 2 | x 1,5 | 1,6 | 0,7 | 34 | 1.510 |
| 32 | x | 2 | x 1,5 | 1,6 | 0,7 | 39 | 1.940 |
| 1 | x | 3 | x 1,5 | 1,6 | 0,7 | 9 | 140 |
| 2 | x | 3 | x 1,5 | 1,6 | 0,7 | 15 | 260 |
| 4 | x | 3 | x 1,5 | 1,6 | 0,7 | 18 | 420 |
| 7 | x | 3 | x 1,5 | 1,6 | 0,7 | 22 | 680 |
| 8 | x | 3 | x 1,5 | 1,6 | 0,7 | 24 | 770 |
| 12 | x | 3 | x 1,5 | 1,6 | 0,7 | 28 | 1.120 |
| 16 | x | 3 | x 1,5 | 1,6 | 0,7 | 32 | 1.440 |
| 19 | x | 3 | x 1,5 | 1,6 | 0,7 | 35 | 1.680 |
| 24 | x | 3 | x 1,5 | 1,6 | 0,7 | 39 | 2.130 |
| 32 | x | 3 | x 1,5 | 1,6 | 0,7 | 44 | 2.750 |

instrumentation 150/250 V
 halogen free flame retardant
 individual screen armoured
 mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|---------------------------------|----------------------|
| Design and construction | IEC 60092-376 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 150 / 250 V | |
| Max operating voltage U _{max} | 300 V | |
| Maximum rated temperature | 90 °C according to | IEC 60092-360 |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Corrosivity | IEC 60754-1 / 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 / 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092.360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold bend and Impact test (- 40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | | |
|--------------------------------------|--|---------------|
| Construction | | |
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 | IEC 60092-376 |
| 2 INSULATION | EPR HF compound | IEC 60092-360 |
| CORES TWISTING in pairs / triples | | |
| 3 INDIVIDUAL SCREEN | Cu/PE tape + tinned copper drain wire | |
| 4 INNER SHEATH | SHF2 extruded compound | IEC 60092-360 |
| 5 ARMOUR | tinned copper wire braid | |
| 6 OUTER SHEATH | SHF2 H-M compound | NEK 606:2016 |
| | see Generals section | |

| | | | |
|-----------------------------|------------------------------|------------|-------|
| Cores identification | | | |
| pair | black | light blue | |
| triple | black | light blue | brown |
| multi pairs/triples | progressively numbered tapes | | |

| | |
|---------------|------|
| Sheath colour | grey |
|---------------|------|

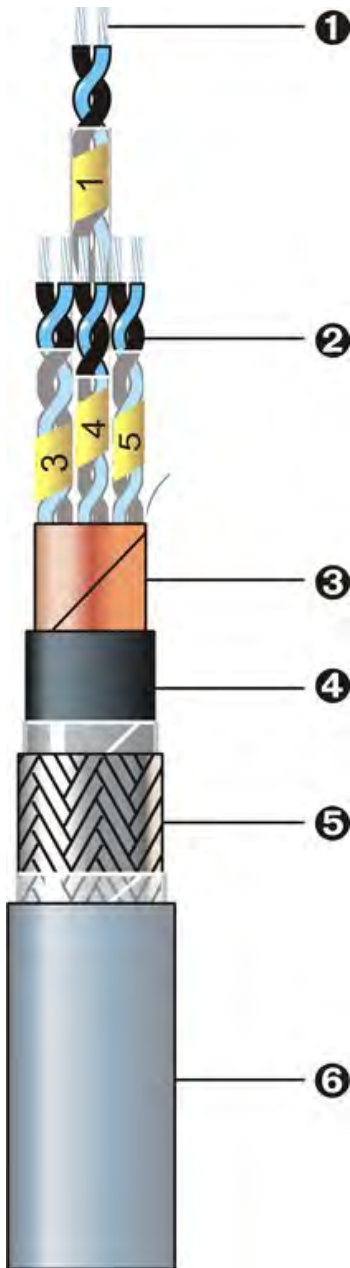
| | | |
|-----------------------|----------------------|--|
| Sheath marking | | |
| CCI S101 RFOU(i) H-M | 150/250 V | n x (pair/triple) x sect mm ² |
| NEK 606 | IEC 60332-3-22 Cat A | meter marking year QA n° |

- Minimum Bending Radius: 4D (Overall Diameter) – see Generals section

150/250 V

| CONSTRUCTION | | | CONDUCTOR DIAMETER | INSULATION THICKNESS | DIAMETER UNDER ARMOUR | OVERALL DIAMETER | WEIGHT |
|--------------|-------------|---------------------|--------------------|----------------------|-----------------------|------------------|------------------|
| n | pair triple | [m m ²] | nominal [mm] | nominal [mm] | nominal [mm] | approx [mm] | approx [kg/km] |
| 1 | x 2 | x 0,75 | 1,1 | 0,6 | 7,0 | 11 | 190 |
| 2 | x 2 | x 0,75 | 1,1 | 0,6 | 11,1 | 16 | 410 |
| 4 | x 2 | x 0,75 | 1,1 | 0,6 | 12,8 | 18 | 550 |
| 7 | x 2 | x 0,75 | 1,1 | 0,6 | 15,3 | 21 | 770 |
| 8 | x 2 | x 0,75 | 1,1 | 0,6 | 16,3 | 22 | 870 |
| 12 | x 2 | x 0,75 | 1,1 | 0,6 | 19,4 | 26 | 1.190 |
| 16 | x 2 | x 0,75 | 1,1 | 0,6 | 22,4 | 29 | 1.520 |
| 19 | x 2 | x 0,75 | 1,1 | 0,6 | 24,1 | 31 | 1.760 |
| 24 | x 2 | x 0,75 | 1,1 | 0,6 | 26,7 | 34 | 2.130 |
| 32 | x 2 | x 0,75 | 1,1 | 0,6 | 30,4 | 38 | 2.790 |
| 1 | x 3 | x 0,75 | 1,1 | 0,6 | 7,4 | 11 | 210 |
| 2 | x 3 | x 0,75 | 1,1 | 0,6 | 12,1 | 17 | 480 |
| 4 | x 3 | x 0,75 | 1,1 | 0,6 | 14,0 | 19 | 640 |
| 7 | x 3 | x 0,75 | 1,1 | 0,6 | 17,5 | 23 | 960 |
| 8 | x 3 | x 0,75 | 1,1 | 0,6 | 18,7 | 25 | 1.080 |
| 12 | x 3 | x 0,75 | 1,1 | 0,6 | 21,9 | 28 | 1.460 |
| 16 | x 3 | x 0,75 | 1,1 | 0,6 | 25,3 | 32 | 1.880 |
| 19 | x 3 | x 0,75 | 1,1 | 0,6 | 27,3 | 34 | 2.170 |
| 24 | x 3 | x 0,75 | 1,1 | 0,6 | 30,3 | 38 | 2.740 |
| 32 | x 3 | x 0,75 | 1,1 | 0,6 | 34,9 | 43 | 3.530 |
| 1 | x 2 | x 1 | 1,4 | 0,6 | 7,6 | 11 | 220 |
| 2 | x 2 | x 1 | 1,4 | 0,6 | 12,1 | 17 | 470 |
| 4 | x 2 | x 1 | 1,4 | 0,6 | 14,0 | 19 | 630 |
| 7 | x 2 | x 1 | 1,4 | 0,6 | 16,8 | 23 | 900 |
| 8 | x 2 | x 1 | 1,4 | 0,6 | 17,9 | 24 | 1.010 |
| 12 | x 2 | x 1 | 1,4 | 0,6 | 21,4 | 28 | 1.380 |
| 16 | x 2 | x 1 | 1,4 | 0,6 | 24,7 | 31 | 1.790 |
| 19 | x 2 | x 1 | 1,4 | 0,6 | 26,6 | 33 | 2.060 |
| 24 | x 2 | x 1 | 1,4 | 0,6 | 29,5 | 37 | 2.530 |
| 32 | x 2 | x 1 | 1,4 | 0,6 | 34,0 | 42 | 3.350 |
| 1 | x 3 | x 1 | 1,4 | 0,6 | 8,0 | 12 | 240 |
| 2 | x 3 | x 1 | 1,4 | 0,6 | 13,2 | 18 | 540 |
| 4 | x 3 | x 1 | 1,4 | 0,6 | 15,4 | 21 | 750 |
| 7 | x 3 | x 1 | 1,4 | 0,6 | 19,2 | 25 | 1.120 |
| 8 | x 3 | x 1 | 1,4 | 0,6 | 20,6 | 27 | 1.270 |
| 12 | x 3 | x 1 | 1,4 | 0,6 | 24,6 | 31 | 1.750 |
| 16 | x 3 | x 1 | 1,4 | 0,6 | 27,9 | 35 | 2.210 |
| 19 | x 3 | x 1 | 1,4 | 0,6 | 30,1 | 38 | 2.660 |
| 24 | x 3 | x 1 | 1,4 | 0,6 | 33,9 | 42 | 3.260 |
| 32 | x 3 | x 1 | 1,4 | 0,6 | 38,6 | 47 | 4.160 |
| 1 | x 2 | x 1,5 | 1,6 | 0,7 | 8,3 | 12 | 250 |
| 2 | x 2 | x 1,5 | 1,6 | 0,7 | 13,3 | 18 | 550 |
| 4 | x 2 | x 1,5 | 1,6 | 0,7 | 15,5 | 21 | 760 |
| 7 | x 2 | x 1,5 | 1,6 | 0,7 | 18,6 | 25 | 1.070 |
| 8 | x 2 | x 1,5 | 1,6 | 0,7 | 19,9 | 26 | 1.220 |
| 12 | x 2 | x 1,5 | 1,6 | 0,7 | 24,2 | 31 | 1.720 |
| 16 | x 2 | x 1,5 | 1,6 | 0,7 | 27,5 | 34 | 2.190 |
| 19 | x 2 | x 1,5 | 1,6 | 0,7 | 29,7 | 37 | 2.500 |
| 24 | x 2 | x 1,5 | 1,6 | 0,7 | 33,3 | 41 | 3.220 |
| 32 | x 2 | x 1,5 | 1,6 | 0,7 | 38,0 | 46 | 4.080 |
| 1 | x 3 | x 1,5 | 1,6 | 0,7 | 8,8 | 13 | 280 |
| 2 | x 3 | x 1,5 | 1,6 | 0,7 | 14,6 | 20 | 650 |
| 4 | x 3 | x 1,5 | 1,6 | 0,7 | 17,0 | 23 | 900 |
| 7 | x 3 | x 1,5 | 1,6 | 0,7 | 21,4 | 28 | 1.360 |
| 8 | x 3 | x 1,5 | 1,6 | 0,7 | 22,9 | 29 | 1.540 |
| 12 | x 3 | x 1,5 | 1,6 | 0,7 | 27,4 | 34 | 2.180 |
| 16 | x 3 | x 1,5 | 1,6 | 0,7 | 31,1 | 39 | 2.840 |
| 19 | x 3 | x 1,5 | 1,6 | 0,7 | 33,6 | 42 | 3.280 |
| 24 | x 3 | x 1,5 | 1,6 | 0,7 | 37,8 | 46 | 4.090 |
| 32 | x 3 | x 1,5 | 1,6 | 0,7 | 43,1 | 52 | 5.200 |

instrumentation 150/250 V
 halogen free flame retardant
 common screen armoured
 mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|----------------------------------|----------------------|
| Design and construction | IEC 60092-376 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 150 / 250 V | |
| Max operating voltage U _{max} | 300 V | |
| Maximum rated temperature | 90 °C according to IEC 60092-360 | |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Corrosivity | IEC 60754-1 / 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 / 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092.360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold bend and Impact test (- 40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | | |
|---------------------|--|--|
| Construction | | |
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 IEC 60092-376 | |
| 2 INSULATION | EPR HF compound IEC 60092-360 | |
| CORES TWISTING | in pairs / triples | |
| 3 COMMON SCREEN | Cu/PE tape + tinned copper drain wire | |
| 4 INNER SHEATH | SHF2 extruded compound IEC 60092-360 | |
| 5 ARMOUR | tinned copper wire braid | |
| 6 OUTER SHEATH | SHF2 H-M compound NEK 606:2016 | |
| | see Generals section | |

| | | |
|-----------------------------|------------------------------|------------------|
| Cores identification | | |
| pair | black | light blue |
| triple | black | light blue brown |
| multi pairs/triples | progressively numbered tapes | |

| | |
|---------------|------|
| Sheath colour | grey |
|---------------|------|

| | | |
|-----------------------|----------------------|--|
| Sheath marking | | |
| CCI S102 RFOU(c) H-M | 150/250 V | n x (pair/triple) x sect mm ² |
| NEK 606 | IEC 60332-3-22 Cat A | meter marking year QA n° |

- Minimum Bending Radius: 4D (Overall Diameter) – see Generals section

150/250 V

| CONSTRUCTION | | | CONDUCTOR DIAMETER | INSULATION THICKNESS | DIAMETER UNDER ARMOUR | OVERALL DIAMETER | WEIGHT |
|--------------|-------------|---------------------|--------------------|----------------------|-----------------------|------------------|------------------|
| n | pair triple | [m m ²] | nominal [mm] | nominal [mm] | nominal [mm] | approx [mm] | approx [kg/km] |
| 1 | x 2 | x 0,75 | 1,1 | 0,6 | 7,0 | 11 | 190 |
| 2 | x 2 | x 0,75 | 1,1 | 0,6 | 11,0 | 15 | 390 |
| 4 | x 2 | x 0,75 | 1,1 | 0,6 | 12,6 | 17 | 500 |
| 7 | x 2 | x 0,75 | 1,1 | 0,6 | 15,0 | 21 | 680 |
| 8 | x 2 | x 0,75 | 1,1 | 0,6 | 16,0 | 22 | 760 |
| 12 | x 2 | x 0,75 | 1,1 | 0,6 | 18,0 | 25 | 1.025 |
| 16 | x 2 | x 0,75 | 1,1 | 0,6 | 21,0 | 28 | 1.300 |
| 19 | x 2 | x 0,75 | 1,1 | 0,6 | 23,5 | 30 | 1.500 |
| 24 | x 2 | x 0,75 | 1,1 | 0,6 | 26,1 | 33 | 1.830 |
| 32 | x 2 | x 0,75 | 1,1 | 0,6 | 29,6 | 37 | 2.320 |
| 1 | x 3 | x 0,75 | 1,1 | 0,6 | 7,4 | 11 | 210 |
| 2 | x 3 | x 0,75 | 1,1 | 0,6 | 12,0 | 17 | 460 |
| 4 | x 3 | x 0,75 | 1,1 | 0,6 | 13,8 | 19 | 590 |
| 7 | x 3 | x 0,75 | 1,1 | 0,6 | 17,1 | 23 | 850 |
| 8 | x 3 | x 0,75 | 1,1 | 0,6 | 18,3 | 24 | 960 |
| 12 | x 3 | x 0,75 | 1,1 | 0,6 | 21,4 | 28 | 1.270 |
| 16 | x 3 | x 0,75 | 1,1 | 0,6 | 24,7 | 31 | 1.640 |
| 19 | x 3 | x 0,75 | 1,1 | 0,6 | 26,6 | 34 | 1.880 |
| 24 | x 3 | x 0,75 | 1,1 | 0,6 | 29,5 | 37 | 2.320 |
| 32 | x 3 | x 0,75 | 1,1 | 0,6 | 34,0 | 42 | 3.090 |
| 1 | x 2 | x 1 | 1,4 | 0,6 | 7,6 | 11 | 220 |
| 2 | x 2 | x 1 | 1,4 | 0,6 | 12,0 | 17 | 450 |
| 4 | x 2 | x 1 | 1,4 | 0,6 | 13,8 | 19 | 580 |
| 7 | x 2 | x 1 | 1,4 | 0,6 | 16,5 | 22 | 800 |
| 8 | x 2 | x 1 | 1,4 | 0,6 | 17,6 | 24 | 890 |
| 12 | x 2 | x 1 | 1,4 | 0,6 | 20,9 | 27 | 1.200 |
| 16 | x 2 | x 1 | 1,4 | 0,6 | 24,1 | 31 | 1.540 |
| 19 | x 2 | x 1 | 1,4 | 0,6 | 26,0 | 33 | 1.770 |
| 24 | x 2 | x 1 | 1,4 | 0,6 | 28,8 | 36 | 2.205 |
| 32 | x 2 | x 1 | 1,4 | 0,6 | 33,2 | 41 | 2.920 |
| 1 | x 3 | x 1 | 1,4 | 0,6 | 8,0 | 12 | 240 |
| 2 | x 3 | x 1 | 1,4 | 0,6 | 13,1 | 18 | 525 |
| 4 | x 3 | x 1 | 1,4 | 0,6 | 15,2 | 21 | 700 |
| 7 | x 3 | x 1 | 1,4 | 0,6 | 18,9 | 25 | 1.010 |
| 8 | x 3 | x 1 | 1,4 | 0,6 | 20,2 | 27 | 1.140 |
| 12 | x 3 | x 1 | 1,4 | 0,6 | 24,1 | 31 | 1.560 |
| 16 | x 3 | x 1 | 1,4 | 0,6 | 27,3 | 34 | 1.970 |
| 19 | x 3 | x 1 | 1,4 | 0,6 | 29,4 | 37 | 2.280 |
| 24 | x 3 | x 1 | 1,4 | 0,6 | 33,1 | 41 | 2.920 |
| 32 | x 3 | x 1 | 1,4 | 0,6 | 37,7 | 46 | 3.720 |
| 1 | x 2 | x 1,5 | 1,6 | 0,7 | 8,3 | 12 | 250 |
| 2 | x 2 | x 1,5 | 1,6 | 0,7 | 13,2 | 18 | 530 |
| 4 | x 2 | x 1,5 | 1,6 | 0,7 | 15,3 | 21 | 710 |
| 7 | x 2 | x 1,5 | 1,6 | 0,7 | 18,3 | 24 | 970 |
| 8 | x 2 | x 1,5 | 1,6 | 0,7 | 19,5 | 26 | 1.100 |
| 12 | x 2 | x 1,5 | 1,6 | 0,7 | 23,7 | 30 | 1.540 |
| 16 | x 2 | x 1,5 | 1,6 | 0,7 | 26,9 | 34 | 1.940 |
| 19 | x 2 | x 1,5 | 1,6 | 0,7 | 29,0 | 37 | 2.220 |
| 24 | x 2 | x 1,5 | 1,6 | 0,7 | 32,7 | 41 | 2.890 |
| 32 | x 2 | x 1,5 | 1,6 | 0,7 | 37,1 | 45 | 3.650 |
| 1 | x 3 | x 1,5 | 1,6 | 0,7 | 8,8 | 13 | 280 |
| 2 | x 3 | x 1,5 | 1,6 | 0,7 | 14,4 | 20 | 620 |
| 4 | x 3 | x 1,5 | 1,6 | 0,7 | 16,8 | 22 | 840 |
| 7 | x 3 | x 1,5 | 1,6 | 0,7 | 21,0 | 27 | 1.250 |
| 8 | x 3 | x 1,5 | 1,6 | 0,7 | 22,5 | 29 | 1.410 |
| 12 | x 3 | x 1,5 | 1,6 | 0,7 | 26,9 | 34 | 1.970 |
| 16 | x 3 | x 1,5 | 1,6 | 0,7 | 30,5 | 38 | 2.570 |
| 19 | x 3 | x 1,5 | 1,6 | 0,7 | 32,9 | 41 | 2.960 |
| 24 | x 3 | x 1,5 | 1,6 | 0,7 | 37,1 | 46 | 3.720 |
| 32 | x 3 | x 1,5 | 1,6 | 0,7 | 42,3 | 51 | 4.720 |



Fire resistant
Oils & muds resistant



Fire resistance tests

IEC 60331-2

overall diameter not exceeding 20 mm
flame @ 830 °C for 120 minutes
with mechanical shocks every 5 minutes



IEC 60331-1

overall diameter exceeding 20 mm
flame @ 830 °C for 120 minutes
with mechanical shocks every 5 minutes

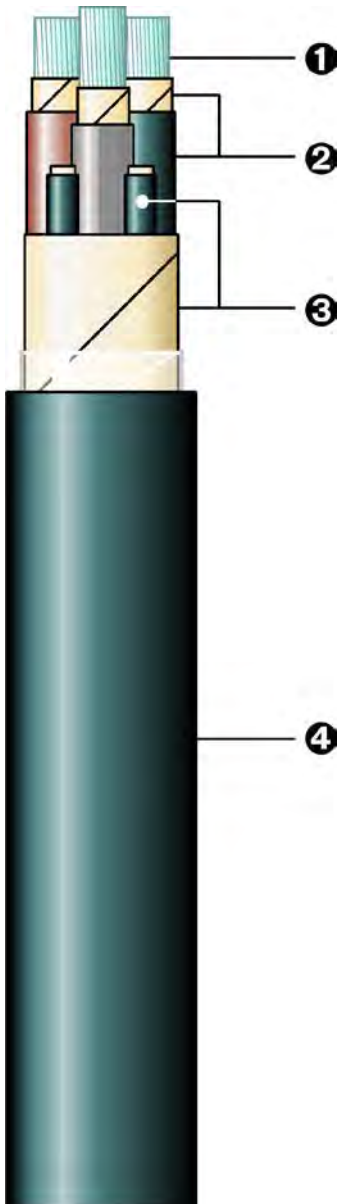


Shock-producing device



power & control 0,6/1 kV
 halogen free flame retardant
 unarmoured
fire resistant

mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|----------------------------------|----------------------|
| Design and construction | IEC 60092-353 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 0,6 / 1 kV | |
| Max operating voltage U _{max} | 1,2 kV | |
| Maximum rated temperature | 90 °C according to IEC 60092-360 | |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Fire resistance (see page 35) | IEC 60331-1 or 2 | |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092-360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold Bend and Impact test (- 40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | |
|---------------------|---|
| Construction | |
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 IEC 60228 |
| 2 INSULATION | mica tape + EPR HF compound IEC 60092-360 |
| 3 BEDDING & FILLERS | FLAMEBAR® fiberglass tape + fiberglass ropes EPR sheathed when 3 cores (sect. > 16 mm ²) |
| 4 OUTER SHEATH | SHF2 H-M compound NEK 606:2016 see Generals section |

Cores identification according to HD 308 S2 and IEC 60445

| | | | |
|---------|------------------|------------|-----------------------|
| 1 core | white or black | 4 cores | blue brown black grey |
| 2 cores | blue brown | multicores | white numbered |
| 3 cores | brown black grey | | |

Sheath colour black

Sheath marking

CCI P110 BU H-M 0,6/1 kV n x sect mm² IEC 60092-353 NEK 606
 IEC 60332-3-22 Cat A IEC 60331-1 or 2 meter marking year QA n°

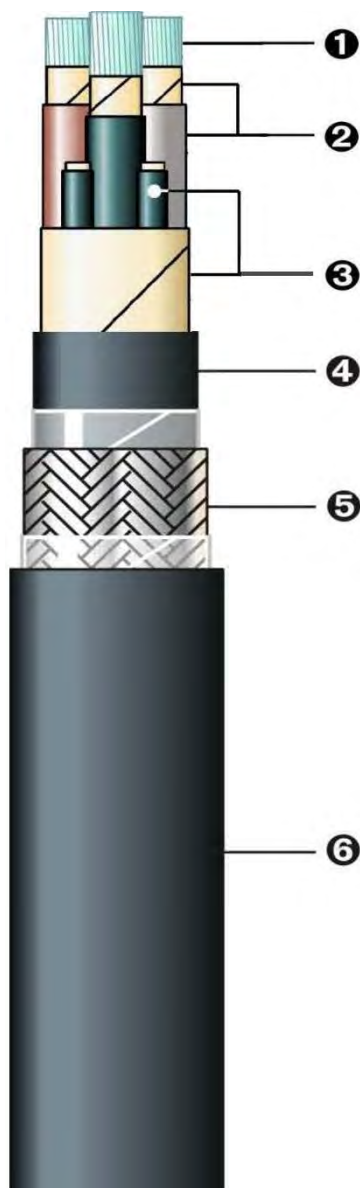
- Minimum Bending Radius: 4D (Overall Diameter) – see Generals section

0,6/1 kV

| CONSTRUCTION | | | CONDUCTOR DIAMETER | INSULATION THICKNESS | OVERALL DIAMETER | WEIGHT |
|--------------|---|---------------------|--------------------|----------------------|------------------|------------------|
| n | x | [mm ²] | nominal [mm] | nominal [mm] | approx [mm] | approx [kg/km] |
| 1 | x | 16 | 5,2 | 1,0 | 10 | 310 |
| 1 | x | 25 | 6,5 | 1,2 | 13 | 460 |
| 1 | x | 35 | 7,5 | 1,2 | 14 | 580 |
| 1 | x | 50 | 8,3 | 1,4 | 15 | 730 |
| 1 | x | 70 | 10,0 | 1,4 | 17 | 970 |
| 1 | x | 95 | 11,8 | 1,6 | 19 | 1.320 |
| 1 | x | 120 | 13,2 | 1,6 | 21 | 1.580 |
| 1 | x | 150 | 14,6 | 1,8 | 23 | 1.940 |
| 1 | x | 185 | 16,5 | 2,0 | 26 | 2.430 |
| 1 | x | 240 | 19,0 | 2,2 | 29 | 3.120 |
| 1 | x | 300 | 21,8 | 2,4 | 32 | 3.770 |
| 2 | x | 1,5 | 1,6 | 1,0 | 11 | 160 |
| 2 | x | 2,5 | 2,0 | 1,0 | 12 | 180 |
| 2 | x | 4 | 2,8 | 1,0 | 14 | 230 |
| 2 | x | 6 | 3,3 | 1,0 | 15 | 300 |
| 2 | x | 10 | 4,1 | 1,0 | 17 | 390 |
| 2 | x | 16 | 5,2 | 1,0 | 19 | 570 |
| 3 | x | 1,5 | 1,6 | 1,0 | 12 | 190 |
| 3 | x | 2,5 | 2,0 | 1,0 | 13 | 230 |
| 3 | x | 4 | 2,8 | 1,0 | 14 | 300 |
| 3 | x | 6 | 3,3 | 1,0 | 16 | 390 |
| 3 | x | 10 | 4,1 | 1,0 | 18 | 520 |
| 3 | x | 16 | 5,2 | 1,0 | 21 | 760 |
| 3 | x | 25 | 6,5 | 1,2 | 24 | 1.070 |
| 3 | x | 35 | 7,5 | 1,2 | 27 | 1.410 |
| 3 | x | 50 | 8,3 | 1,4 | 30 | 1.830 |
| 3 | x | 70 | 10,0 | 1,4 | 34 | 2.480 |
| 3 | x | 95 | 11,8 | 1,6 | 39 | 3.430 |
| 3 | x | 120 | 13,2 | 1,6 | 42 | 4.170 |
| 3 | x | 150 | 14,6 | 1,8 | 46 | 5.080 |
| 3 | x | 185 | 16,5 | 2,0 | 51 | 5.260 |
| 3 | x | 240 | 19,0 | 2,2 | 58 | 6.870 |
| 3 | x | 300 | 21,8 | 2,4 | 66 | 10.020 |
| 4 | x | 1,5 | 1,6 | 1,0 | 13 | 210 |
| 4 | x | 2,5 | 2,0 | 1,0 | 14 | 260 |
| 4 | x | 4 | 2,8 | 1,0 | 16 | 340 |
| 4 | x | 6 | 3,3 | 1,0 | 17 | 460 |
| 4 | x | 10 | 4,1 | 1,0 | 19 | 630 |
| 4 | x | 16 | 5,2 | 1,0 | 23 | 930 |
| 4 | x | 25 | 6,5 | 1,2 | 27 | 1.340 |
| 4 | x | 35 | 7,5 | 1,2 | 29 | 1.770 |
| 4 | x | 50 | 8,3 | 1,4 | 33 | 2.300 |
| 4 | x | 70 | 10,0 | 1,4 | 37 | 3.150 |
| 4 | x | 95 | 11,8 | 1,6 | 43 | 4.370 |
| 4 | x | 120 | 13,2 | 1,6 | 47 | 5.320 |
| 4 | x | 150 | 14,6 | 1,8 | 51 | 6.770 |
| 4 | x | 185 | 16,5 | 2,0 | 57 | 8.600 |
| 4 | x | 240 | 19,0 | 2,2 | 65 | 11.070 |
| 4 | x | 300 | 21,8 | 2,4 | 73 | 13.340 |
| 5 | x | 1,5 | 1,6 | 1,0 | 14 | 230 |
| 7 | x | 1,5 | 1,6 | 1,0 | 15 | 340 |
| 12 | x | 1,5 | 1,6 | 1,0 | 20 | 540 |
| 19 | x | 1,5 | 1,6 | 1,0 | 24 | 780 |
| 27 | x | 1,5 | 1,6 | 1,0 | 29 | 1.080 |
| 37 | x | 1,5 | 1,6 | 1,0 | 33 | 1.430 |
| 5 | x | 2,5 | 2,0 | 1,0 | 15 | 290 |
| 7 | x | 2,5 | 2,0 | 1,0 | 16 | 430 |
| 12 | x | 2,5 | 2,0 | 1,0 | 22 | 680 |
| 19 | x | 2,5 | 2,0 | 1,0 | 26 | 1.000 |
| 27 | x | 2,5 | 2,0 | 1,0 | 32 | 1.390 |
| 37 | x | 2,5 | 2,0 | 1,0 | 36 | 1.840 |

power & control 0,6/1 kV
 halogen free flame retardant
 armoured
fire resistant

mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|---------------------------------|----------------------|
| Design and construction | IEC 60092-353 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 0,6/1 kV | |
| Max operating voltage U _{max} | 1,2 kV | |
| Maximum rated temperature | 90 °C according to | IEC 60092-360 |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Fire resistance (see page 35) | IEC 60331-1 or 2 | |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092-360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold Bend and Impact test (-40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | | |
|---|---|---------------|
| Construction | | |
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 IEC 60228 | |
| 2 INSULATION | mica tape + EPR HF compound IEC 60092-360 | |
| 3 BEDDING & FILLERS | FLAMEBAR® fiberglass tape + fiberglass ropes EPR sheathed when 3 cores (sect. > 16 mm ²) | |
| 4 INNER SHEATH | SHF2 extruded compound | IEC 60092.360 |
| 5 ARMOUR | tinned copper wire braid (*) | |
| 6 OUTER SHEATH | SHF2 H-M compound | NEK 606:2016 |
| (*) on request braiding section when used as earth - see Generals section | | |

Cores identification according to HD 308 S2-2001 and IEC 60445

| | | | |
|---------|------------------|------------|-----------------------|
| 1 core | white or black | 4 cores | blue brown black grey |
| 2 cores | blue brown | multicores | white numbered |
| 3 cores | brown black grey | | |

Sheath colour black

Sheath marking

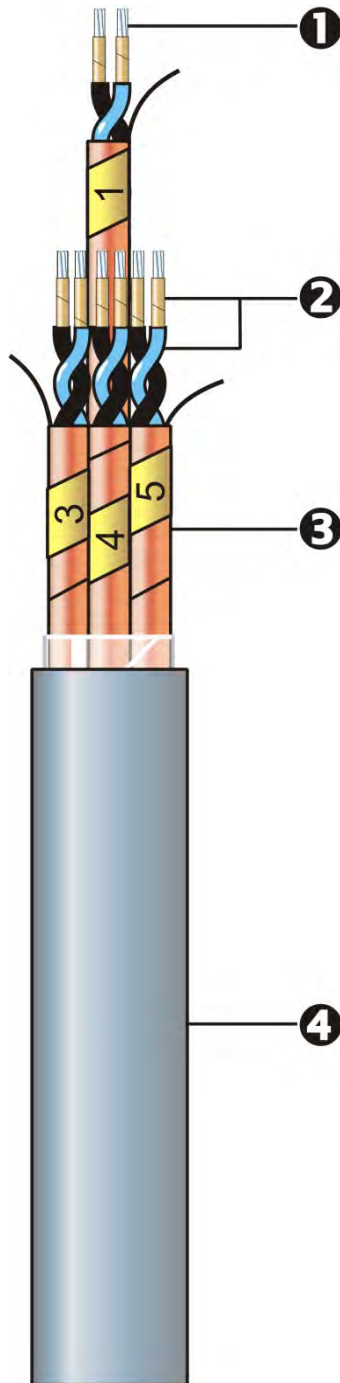
CCI P105 BFOU H-M 0,6/1 kV n x sect mm² IEC 60092-353 NEK 606
 IEC 60332-3-22 Cat A IEC 60331-1 or 2 meter marking year QA n°

- Minimum Bending Radius: 4D (Overall Diameter) – see Generals section

0,6/1 kV

| CONSTRUCTION | | CONDUCTOR DIAMETER | INSULATION THICKNESS | DIAMETER UNDER ARMOUR | OVERALL DIAMETER | WEIGHT |
|--------------|---------------------|--------------------|----------------------|-----------------------|------------------|-------------------|
| n | [mm ²] | nominal [mm] | nominal [mm] | nominal [mm] | approx [mm] | approx. [kg/km] |
| 1 | x 16 | 5,2 | 1,0 | 11,0 | 15 | 450 |
| 1 | x 25 | 6,5 | 1,2 | 12,7 | 17 | 610 |
| 1 | x 35 | 7,5 | 1,2 | 13,7 | 19 | 740 |
| 1 | x 50 | 8,3 | 1,4 | 14,8 | 20 | 900 |
| 1 | x 70 | 10,0 | 1,4 | 16,5 | 22 | 1.150 |
| 1 | x 95 | 11,8 | 1,6 | 18,7 | 25 | 1.500 |
| 1 | x 120 | 13,2 | 1,6 | 20,1 | 26 | 1.770 |
| 1 | x 150 | 14,6 | 1,8 | 21,9 | 28 | 2.120 |
| 1 | x 185 | 16,5 | 2,0 | 24,2 | 31 | 2.610 |
| 1 | x 240 | 19,0 | 2,2 | 27,5 | 34 | 3.310 |
| 1 | x 300 | 21,8 | 2,4 | 30,7 | 38 | 4.030 |
| 2 | x 1,5 | 1,6 | 1,0 | 10,3 | 15 | 360 |
| 2 | x 2,5 | 2,0 | 1,0 | 11,3 | 16 | 420 |
| 2 | x 4 | 2,8 | 1,0 | 13,1 | 18 | 510 |
| 2 | x 6 | 3,3 | 1,0 | 14,3 | 19 | 620 |
| 2 | x 10 | 4,1 | 1,0 | 16,5 | 22 | 810 |
| 2 | x 16 | 5,2 | 1,0 | 18,9 | 25 | 1.070 |
| 3 | x 1,5 | 1,6 | 1,0 | 10,9 | 16 | 400 |
| 3 | x 2,5 | 2,0 | 1,0 | 12,0 | 17 | 470 |
| 3 | x 4 | 2,8 | 1,0 | 14,0 | 19 | 560 |
| 3 | x 6 | 3,3 | 1,0 | 15,3 | 21 | 700 |
| 3 | x 10 | 4,1 | 1,0 | 17,6 | 23 | 910 |
| 3 | x 16 | 5,2 | 1,0 | 20,2 | 26 | 1.230 |
| 3 | x 25 | 6,5 | 1,2 | 24,1 | 30 | 1.680 |
| 3 | x 35 | 7,5 | 1,2 | 26,1 | 33 | 2.110 |
| 3 | x 50 | 8,3 | 1,4 | 28,7 | 36 | 2.640 |
| 3 | x 70 | 10,0 | 1,4 | 32,4 | 40 | 3.540 |
| 3 | x 95 | 11,8 | 1,6 | 37,1 | 45 | 4.720 |
| 3 | x 120 | 13,2 | 1,6 | 40,6 | 49 | 5.690 |
| 3 | x 150 | 14,6 | 1,8 | 44,9 | 54 | 6.830 |
| 3 | x 185 | 16,5 | 2,0 | 49,8 | 59 | 8.440 |
| 3 | x 240 | 19,0 | 2,2 | 56,5 | 66 | 10.760 |
| 3 | x 300 | 21,8 | 2,4 | 63,4 | 74 | 12.960 |
| 4 | x 1,5 | 1,6 | 1,0 | 11,9 | 17 | 440 |
| 4 | x 2,5 | 2,0 | 1,0 | 13,1 | 18 | 520 |
| 4 | x 4 | 2,8 | 1,0 | 15,3 | 21 | 670 |
| 4 | x 6 | 3,3 | 1,0 | 16,8 | 22 | 830 |
| 4 | x 10 | 4,1 | 1,0 | 19,3 | 25 | 1.090 |
| 4 | x 16 | 5,2 | 1,0 | 22,2 | 28 | 1.510 |
| 4 | x 25 | 6,5 | 1,2 | 26,5 | 33 | 2.070 |
| 4 | x 35 | 7,5 | 1,2 | 28,8 | 35 | 2.610 |
| 4 | x 50 | 8,3 | 1,4 | 31,6 | 39 | 3.380 |
| 4 | x 70 | 10,0 | 1,4 | 35,7 | 44 | 4.430 |
| 4 | x 95 | 11,8 | 1,6 | 41 | 49 | 5.940 |
| 4 | x 120 | 13,2 | 1,6 | 44,8 | 54 | 7.150 |
| 4 | x 150 | 14,6 | 1,8 | 49,5 | 59 | 8.780 |
| 4 | x 185 | 16,5 | 2,0 | 55,5 | 65 | 11.050 |
| 4 | x 240 | 19,0 | 2,2 | 62,5 | 73 | 14.050 |
| 4 | x 300 | 21,8 | 2,4 | 70,2 | 80 | 16.780 |
| 5 | x 1,5 | 1,6 | 1,0 | 13,3 | 18 | 540 |
| 7 | x 1,5 | 1,6 | 1,0 | 14,5 | 20 | 630 |
| 12 | x 1,5 | 1,6 | 1,0 | 19,1 | 25 | 990 |
| 19 | x 1,5 | 1,6 | 1,0 | 22,6 | 29 | 1.330 |
| 27 | x 1,5 | 1,6 | 1,0 | 27,4 | 34 | 1.870 |
| 37 | x 1,5 | 1,6 | 1,0 | 31 | 38 | 2.450 |
| 5 | x 2,5 | 2,0 | 1,0 | 14,4 | 19 | 640 |
| 7 | x 2,5 | 2,0 | 1,0 | 15,7 | 21 | 740 |
| 12 | x 2,5 | 2,0 | 1,0 | 20,9 | 27 | 1.190 |
| 19 | x 2,5 | 2,0 | 1,0 | 24,8 | 31 | 1.650 |
| 27 | x 2,5 | 2,0 | 1,0 | 28,8 | 36 | 2.320 |
| 37 | x 2,5 | 2,0 | 1,0 | 34 | 41 | 3.030 |

instrumentation 150/250 V
 halogen free flame retardant
 individual screen unarmoured
fire resistant
 mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|----------------------------------|----------------------|
| Design and construction | IEC 60092-376 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 150 / 250 V | |
| Max operating voltage U _{max} | 300 V | |
| Maximum rated temperature | 90 °C according to IEC 60092-360 | |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Fire resistance (see page 35) | IEC 60331-1 or 2 | |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092-360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 category d | |
| Cold bend and Impact test (- 40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | |
|--------------------------------|--|
| Construction | |
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 IEC 60092-376 |
| 2 INSULATION CORES TWISTING | mica tape + EPR HF compound IEC 60092-360 in pairs / triples |
| 3 INDIVIDUAL SCREEN | Cu/PE tape + tinned copper drain wire |
| 4 OUTER SHEATH | SHF2 H-M compound NEK 606:2016 see Generals section |

| | |
|-----------------------------|------------------------------|
| Cores identification | |
| pair | black light blue |
| triple | black light blue brown |
| multi pairs/triples | progressively numbered tapes |

| | |
|----------------------|------|
| Sheath colour | grey |
|----------------------|------|

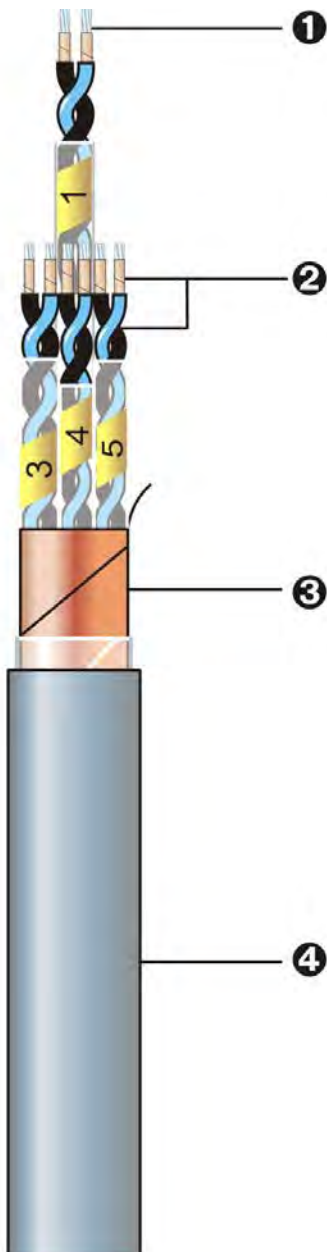
| | |
|------------------------------|--|
| Sheath marking | |
| CCI S107 BU(i) H-M | 150/250 V n x (pair/triple) x sect mm ² IEC 60092-376 |
| NEK 606 IEC 60332-3-22 Cat A | IEC 60331-1 or 2 meter marking year QA n° |

- Minimum Bending Radius: 4D (Overall Diameter) – see Generals section

150/250 V

| CONSTRUCTION | | | | CONDUCTOR DIAMETER | INSULATION THICKNESS | OVERALL DIAMETER | WEIGHT |
|--------------|------|--------|----------------------|--------------------|----------------------|------------------|------------------|
| n | pair | triple | [m m ²] | nominal [mm] | nominal [mm] | approx [mm] | approx [kg/km] |
| 1 | x | 2 | x 0,75 | 1,1 | 0,6 | 8 | 90 |
| 2 | x | 2 | x 0,75 | 1,1 | 0,6 | 12 | 150 |
| 4 | x | 2 | x 0,75 | 1,1 | 0,6 | 14 | 220 |
| 7 | x | 2 | x 0,75 | 1,1 | 0,6 | 17 | 330 |
| 8 | x | 2 | x 0,75 | 1,1 | 0,6 | 18 | 370 |
| 12 | x | 2 | x 0,75 | 1,1 | 0,6 | 22 | 530 |
| 16 | x | 2 | x 0,75 | 1,1 | 0,6 | 25 | 670 |
| 19 | x | 2 | x 0,75 | 1,1 | 0,6 | 27 | 780 |
| 24 | x | 2 | x 0,75 | 1,1 | 0,6 | 30 | 960 |
| 32 | x | 2 | x 0,75 | 1,1 | 0,6 | 35 | 1.240 |
| 1 | x | 3 | x 0,75 | 1,1 | 0,6 | 8 | 100 |
| 2 | x | 3 | x 0,75 | 1,1 | 0,6 | 13 | 190 |
| 4 | x | 3 | x 0,75 | 1,1 | 0,6 | 16 | 290 |
| 7 | x | 3 | x 0,75 | 1,1 | 0,6 | 20 | 450 |
| 8 | x | 3 | x 0,75 | 1,1 | 0,6 | 21 | 510 |
| 12 | x | 3 | x 0,75 | 1,1 | 0,6 | 25 | 720 |
| 16 | x | 3 | x 0,75 | 1,1 | 0,6 | 29 | 930 |
| 19 | x | 3 | x 0,75 | 1,1 | 0,6 | 31 | 1.080 |
| 24 | x | 3 | x 0,75 | 1,1 | 0,6 | 35 | 1.340 |
| 32 | x | 3 | x 0,75 | 1,1 | 0,6 | 40 | 1.740 |
| 1 | x | 2 | x 1 | 1,4 | 0,6 | 8 | 100 |
| 2 | x | 2 | x 1 | 1,4 | 0,6 | 13 | 180 |
| 4 | x | 2 | x 1 | 1,4 | 0,6 | 15 | 250 |
| 7 | x | 2 | x 1 | 1,4 | 0,6 | 18 | 390 |
| 8 | x | 2 | x 1 | 1,4 | 0,6 | 20 | 450 |
| 12 | x | 2 | x 1 | 1,4 | 0,6 | 24 | 620 |
| 16 | x | 2 | x 1 | 1,4 | 0,6 | 27 | 800 |
| 19 | x | 2 | x 1 | 1,4 | 0,6 | 29 | 920 |
| 24 | x | 2 | x 1 | 1,4 | 0,6 | 33 | 1.170 |
| 32 | x | 2 | x 1 | 1,4 | 0,6 | 37 | 1.500 |
| 1 | x | 3 | x 1 | 1,4 | 0,6 | 9 | 120 |
| 2 | x | 3 | x 1 | 1,4 | 0,6 | 14 | 220 |
| 4 | x | 3 | x 1 | 1,4 | 0,6 | 17 | 340 |
| 7 | x | 3 | x 1 | 1,4 | 0,6 | 21 | 540 |
| 8 | x | 3 | x 1 | 1,4 | 0,6 | 23 | 610 |
| 12 | x | 3 | x 1 | 1,4 | 0,6 | 27 | 850 |
| 16 | x | 3 | x 1 | 1,4 | 0,6 | 31 | 1.120 |
| 19 | x | 3 | x 1 | 1,4 | 0,6 | 33 | 1.320 |
| 24 | x | 3 | x 1 | 1,4 | 0,6 | 37 | 1.620 |
| 32 | x | 3 | x 1 | 1,4 | 0,6 | 42 | 2.110 |
| 1 | x | 2 | x 1,5 | 1,6 | 0,7 | 10 | 120 |
| 2 | x | 2 | x 1,5 | 1,6 | 0,7 | 15 | 220 |
| 4 | x | 2 | x 1,5 | 1,6 | 0,7 | 18 | 340 |
| 7 | x | 2 | x 1,5 | 1,6 | 0,7 | 21 | 520 |
| 8 | x | 2 | x 1,5 | 1,6 | 0,7 | 23 | 600 |
| 12 | x | 2 | x 1,5 | 1,6 | 0,7 | 28 | 840 |
| 16 | x | 2 | x 1,5 | 1,6 | 0,7 | 32 | 1.110 |
| 19 | x | 2 | x 1,5 | 1,6 | 0,7 | 34 | 1.270 |
| 24 | x | 2 | x 1,5 | 1,6 | 0,7 | 39 | 1.600 |
| 32 | x | 2 | x 1,5 | 1,6 | 0,7 | 44 | 2.060 |
| 1 | x | 3 | x 1,5 | 1,6 | 0,7 | 10 | 150 |
| 2 | x | 3 | x 1,5 | 1,6 | 0,7 | 16 | 280 |
| 4 | x | 3 | x 1,5 | 1,6 | 0,7 | 19 | 450 |
| 7 | x | 3 | x 1,5 | 1,6 | 0,7 | 25 | 720 |
| 8 | x | 3 | x 1,5 | 1,6 | 0,7 | 27 | 820 |
| 12 | x | 3 | x 1,5 | 1,6 | 0,7 | 32 | 1.190 |
| 16 | x | 3 | x 1,5 | 1,6 | 0,7 | 36 | 1.540 |
| 19 | x | 3 | x 1,5 | 1,6 | 0,7 | 39 | 1.790 |
| 24 | x | 3 | x 1,5 | 1,6 | 0,7 | 44 | 2.260 |
| 32 | x | 3 | x 1,5 | 1,6 | 0,7 | 50 | 2.920 |

instrumentation 150/250 V
 halogen free flame retardant
 common screen unarmoured
fire resistant
 mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|----------------------------------|----------------------|
| Design and construction | IEC 60092-376 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 150 / 250 V | |
| Max operating voltage U _{max} | 300 V | |
| Maximum rated temperature | 90 °C according to IEC 60092-360 | |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Fire resistance (see page 35) | IEC 60331-1 or 2 | |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092-360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold bend and Impact test (- 40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | | |
|---------------------|--|---------------|
| Construction | | |
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 IEC 60092-376 | |
| 2 INSULATION | mica tape + EPR HF compound IEC 60092-360 | |
| CORES TWISTING | in pairs / triples | IEC 60092-376 |
| 3 COMMON SCREEN | Cu/PE tape + tinned copper drain wire | |
| 4 OUTER SHEATH | SHF2 H-M compound | NEK 606:2016 |
| | see Generals section | |

| | | | |
|-----------------------------|------------------------------|------------|-------|
| Cores identification | | | |
| pair | black | light blue | |
| triple | black | light blue | brown |
| multi pairs/triples | progressively numbered tapes | | |

| | |
|---------------|------|
| Sheath colour | grey |
|---------------|------|

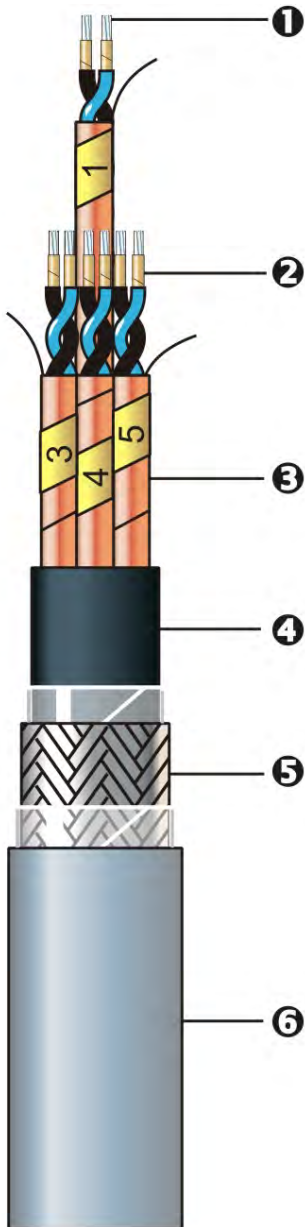
| | | |
|-----------------------|----------------------|---|
| Sheath marking | | |
| CCI S108 BU(c) H-M | 150/250 V | n x (pair/triple) x sect mm ² |
| NEK 606 | IEC 60332-3-22 Cat A | IEC 60331-1 or 2 meter marking year QA n° |

- Minimum Bending Radius: 4D (Overall Diameter) – see Generals section

150/250 V

| CONSTRUCTION | | | | CONDUCTOR DIAMETER | INSULATION THICKNESS | OVERALL DIAMETER | WEIGHT | |
|--------------|------|--------|---------------------|--------------------|----------------------|------------------|-----------|-------|
| n | pair | triple | [m m ²] | nominal | nominal | approx | approx | |
| | | | | [mm] | [mm] | [mm] | [kg/km] | |
| 1 | x | 2 | x | 0,75 | 1,1 | 0,6 | 8 | 90 |
| 2 | x | 2 | x | 0,75 | 1,1 | 0,6 | 12 | 150 |
| 4 | x | 2 | x | 0,75 | 1,1 | 0,6 | 14 | 220 |
| 7 | x | 2 | x | 0,75 | 1,1 | 0,6 | 17 | 330 |
| 8 | x | 2 | x | 0,75 | 1,1 | 0,6 | 18 | 380 |
| 12 | x | 2 | x | 0,75 | 1,1 | 0,6 | 22 | 540 |
| 16 | x | 2 | x | 0,75 | 1,1 | 0,6 | 25 | 680 |
| 19 | x | 2 | x | 0,75 | 1,1 | 0,6 | 27 | 790 |
| 24 | x | 2 | x | 0,75 | 1,1 | 0,6 | 30 | 980 |
| 32 | x | 2 | x | 0,75 | 1,1 | 0,6 | 34 | 1.270 |
| 1 | x | 3 | x | 0,75 | 1,1 | 0,6 | 8 | 100 |
| 2 | x | 3 | x | 0,75 | 1,1 | 0,6 | 13 | 190 |
| 4 | x | 3 | x | 0,75 | 1,1 | 0,6 | 16 | 300 |
| 7 | x | 3 | x | 0,75 | 1,1 | 0,6 | 20 | 450 |
| 8 | x | 3 | x | 0,75 | 1,1 | 0,6 | 21 | 520 |
| 12 | x | 3 | x | 0,75 | 1,1 | 0,6 | 25 | 730 |
| 16 | x | 3 | x | 0,75 | 1,1 | 0,6 | 28 | 940 |
| 19 | x | 3 | x | 0,75 | 1,1 | 0,6 | 31 | 1.090 |
| 24 | x | 3 | x | 0,75 | 1,1 | 0,6 | 34 | 1.370 |
| 32 | x | 3 | x | 0,75 | 1,1 | 0,6 | 39 | 1.770 |
| 1 | x | 2 | x | 1 | 1,4 | 0,6 | 8 | 100 |
| 2 | x | 2 | x | 1 | 1,4 | 0,6 | 13 | 180 |
| 4 | x | 2 | x | 1 | 1,4 | 0,6 | 15 | 260 |
| 7 | x | 2 | x | 1 | 1,4 | 0,6 | 18 | 400 |
| 8 | x | 2 | x | 1 | 1,4 | 0,6 | 20 | 450 |
| 12 | x | 2 | x | 1 | 1,4 | 0,6 | 23 | 630 |
| 16 | x | 2 | x | 1 | 1,4 | 0,6 | 26 | 808 |
| 19 | x | 2 | x | 1 | 1,4 | 0,6 | 29 | 930 |
| 24 | x | 2 | x | 1 | 1,4 | 0,6 | 32 | 1.190 |
| 32 | x | 2 | x | 1 | 1,4 | 0,6 | 37 | 1.520 |
| 1 | x | 3 | x | 1 | 1,4 | 0,6 | 9 | 120 |
| 2 | x | 3 | x | 1 | 1,4 | 0,6 | 14 | 220 |
| 4 | x | 3 | x | 1 | 1,4 | 0,6 | 17 | 340 |
| 7 | x | 3 | x | 1 | 1,4 | 0,6 | 21 | 540 |
| 8 | x | 3 | x | 1 | 1,4 | 0,6 | 23 | 620 |
| 12 | x | 3 | x | 1 | 1,4 | 0,6 | 26 | 870 |
| 16 | x | 3 | x | 1 | 1,4 | 0,6 | 30 | 1.130 |
| 19 | x | 3 | x | 1 | 1,4 | 0,6 | 33 | 1.330 |
| 24 | x | 3 | x | 1 | 1,4 | 0,6 | 37 | 1.650 |
| 32 | x | 3 | x | 1 | 1,4 | 0,6 | 42 | 2.140 |
| 1 | x | 2 | x | 1,5 | 1,6 | 0,7 | 10 | 120 |
| 2 | x | 2 | x | 1,5 | 1,6 | 0,7 | 15 | 220 |
| 4 | x | 2 | x | 1,5 | 1,6 | 0,7 | 18 | 350 |
| 7 | x | 2 | x | 1,5 | 1,6 | 0,7 | 21 | 530 |
| 8 | x | 2 | x | 1,5 | 1,6 | 0,7 | 23 | 610 |
| 12 | x | 2 | x | 1,5 | 1,6 | 0,7 | 28 | 860 |
| 16 | x | 2 | x | 1,5 | 1,6 | 0,7 | 32 | 1.120 |
| 19 | x | 2 | x | 1,5 | 1,6 | 0,7 | 34 | 1.280 |
| 24 | x | 2 | x | 1,5 | 1,6 | 0,7 | 38 | 1.630 |
| 32 | x | 2 | x | 1,5 | 1,6 | 0,7 | 44 | 2.090 |
| 1 | x | 3 | x | 1,5 | 1,6 | 0,7 | 10 | 150 |
| 2 | x | 3 | x | 1,5 | 1,6 | 0,7 | 17 | 280 |
| 4 | x | 3 | x | 1,5 | 1,6 | 0,7 | 19 | 450 |
| 7 | x | 3 | x | 1,5 | 1,6 | 0,7 | 25 | 730 |
| 8 | x | 3 | x | 1,5 | 1,6 | 0,7 | 26 | 830 |
| 12 | x | 3 | x | 1,5 | 1,6 | 0,7 | 32 | 1.210 |
| 16 | x | 3 | x | 1,5 | 1,6 | 0,7 | 36 | 1.570 |
| 19 | x | 3 | x | 1,5 | 1,6 | 0,7 | 39 | 1.830 |
| 24 | x | 3 | x | 1,5 | 1,6 | 0,7 | 44 | 2.300 |
| 32 | x | 3 | x | 1,5 | 1,6 | 0,7 | 50 | 2.970 |

instrumentation 150/250 V
 halogen free flame retardant
 individual screen armoured
fire resistant
 mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|---------------------------------|----------------------|
| Design and construction | IEC 60092-376 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 150 / 250 V | |
| Max operating voltage U _{max} | 300 V | |
| Maximum rated temperature | 90 °C according to | IEC 60092-360 |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Fire resistance (see page 35) | IEC 60331-1 or 2 | |
| Corrosivity | IEC 60754-1 / 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 / 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092.360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold bend and Impact test (- 40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | |
|---------------------|--|
| Construction | |
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 IEC 60092-376 |
| 2 INSULATION | mica tape + EPR HF compound IEC 60092-360 |
| CORES TWISTING | |
| | in pairs / triples |
| 3 INDIVIDUAL SCREEN | Cu/PE tape + tinned copper drain wire |
| 4 INNER SHEATH | SHF2 extruded compound IEC 60092-360 |
| 5 ARMOUR | tinned copper wire braid |
| 6 OUTER SHEATH | SHF2 H-M compound NEK 606:2016 |
| | see Generals section |

| | |
|-----------------------------|------------------------------|
| Cores identification | |
| pair | black light blue |
| triple | black light blue brown |
| multi pairs/triples | progressively numbered tapes |

| | |
|---------------|------|
| Sheath colour | grey |
|---------------|------|

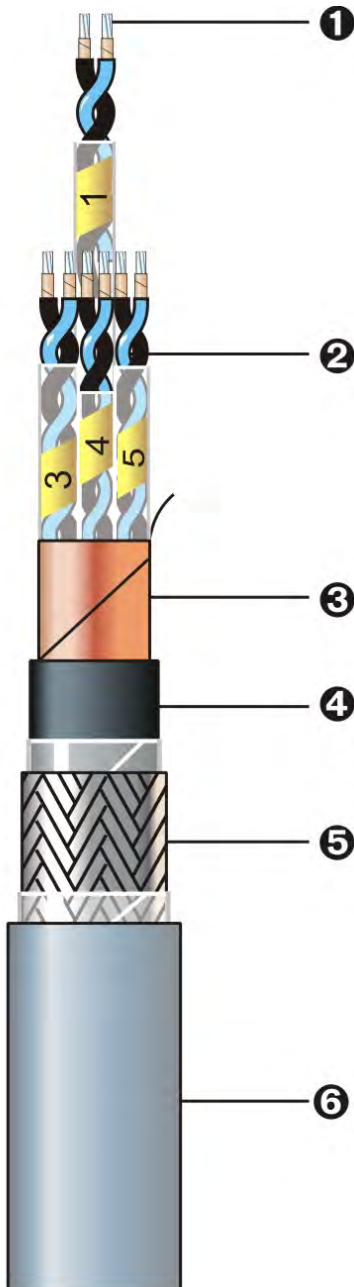
| | |
|---|---------------|
| Sheath marking | |
| CCI S103 BFOU(i) H-M 150/250 V n x (pair/triple) x sect mm ² | IEC 60092-376 |
| NEK 606 IEC 60332-3-22 Cat A meter marking year QA n° | |

- Minimum Bending Radius: 4D (Overall Diameter) – see Generals section

150/250 V

| CONSTRUCTION | | | CONDUCTOR DIAMETER | INSULATION THICKNESS | DIAMETER UNDER ARMOUR | OVERALL DIAMETER | WEIGHT |
|--------------|-------------|---------------------|--------------------|----------------------|-----------------------|------------------|----------------|
| n | pair triple | [m m ²] | nominal [mm] | nominal [mm] | nominal [mm] | approx [mm] | approx [kg/km] |
| 1 | x 2 | x 0,75 | 1,1 | 0,6 | 7,5 | 11 | 220 |
| 2 | x 2 | x 0,75 | 1,1 | 0,6 | 12,0 | 16 | 460 |
| 4 | x 2 | x 0,75 | 1,1 | 0,6 | 13,9 | 19 | 620 |
| 7 | x 2 | x 0,75 | 1,1 | 0,6 | 16,6 | 22 | 880 |
| 8 | x 2 | x 0,75 | 1,1 | 0,6 | 17,7 | 24 | 990 |
| 12 | x 2 | x 0,75 | 1,1 | 0,6 | 21,2 | 27 | 1.370 |
| 16 | x 2 | x 0,75 | 1,1 | 0,6 | 24,4 | 31 | 1.760 |
| 19 | x 2 | x 0,75 | 1,1 | 0,6 | 26,3 | 33 | 2.030 |
| 24 | x 2 | x 0,75 | 1,1 | 0,6 | 29,2 | 36 | 2.460 |
| 32 | x 2 | x 0,75 | 1,1 | 0,6 | 33,3 | 41 | 3.240 |
| 1 | x 3 | x 0,75 | 1,1 | 0,6 | 7,9 | 12 | 240 |
| 2 | x 3 | x 0,75 | 1,1 | 0,6 | 13,1 | 18 | 540 |
| 4 | x 3 | x 0,75 | 1,1 | 0,6 | 15,2 | 21 | 750 |
| 7 | x 3 | x 0,75 | 1,1 | 0,6 | 19,0 | 25 | 110 |
| 8 | x 3 | x 0,75 | 1,1 | 0,6 | 20,4 | 27 | 1.250 |
| 12 | x 3 | x 0,75 | 1,1 | 0,6 | 23,9 | 30 | 1.710 |
| 16 | x 3 | x 0,75 | 1,1 | 0,6 | 27,6 | 34 | 2.200 |
| 19 | x 3 | x 0,75 | 1,1 | 0,6 | 29,8 | 37 | 2.540 |
| 24 | x 3 | x 0,75 | 1,1 | 0,6 | 33,1 | 41 | 3.200 |
| 32 | x 3 | x 0,75 | 1,1 | 0,6 | 38,2 | 46 | 4.140 |
| 1 | x 2 | x 1 | 1,4 | 0,6 | 7,9 | 12 | 230 |
| 2 | x 2 | x 1 | 1,4 | 0,6 | 12,7 | 17 | 510 |
| 4 | x 2 | x 1 | 1,4 | 0,6 | 14,7 | 20 | 690 |
| 7 | x 2 | x 1 | 1,4 | 0,6 | 17,7 | 24 | 990 |
| 8 | x 2 | x 1 | 1,4 | 0,6 | 18,8 | 25 | 1.110 |
| 12 | x 2 | x 1 | 1,4 | 0,6 | 22,5 | 29 | 1.520 |
| 16 | x 2 | x 1 | 1,4 | 0,6 | 26,0 | 33 | 1.970 |
| 19 | x 2 | x 1 | 1,4 | 0,6 | 28,0 | 35 | 2.270 |
| 24 | x 2 | x 1 | 1,4 | 0,6 | 31,1 | 39 | 2.890 |
| 32 | x 2 | x 1 | 1,4 | 0,6 | 35,9 | 44 | 3.700 |
| 1 | x 3 | x 1 | 1,4 | 0,6 | 8,4 | 12 | 260 |
| 2 | x 3 | x 1 | 1,4 | 0,6 | 13,9 | 19 | 590 |
| 4 | x 3 | x 1 | 1,4 | 0,6 | 16,2 | 22 | 820 |
| 7 | x 3 | x 1 | 1,4 | 0,6 | 20,2 | 26 | 1.230 |
| 8 | x 3 | x 1 | 1,4 | 0,6 | 21,7 | 28 | 1.400 |
| 12 | x 3 | x 1 | 1,4 | 0,6 | 25,9 | 32 | 1.930 |
| 16 | x 3 | x 1 | 1,4 | 0,6 | 29,4 | 36 | 2.460 |
| 19 | x 3 | x 1 | 1,4 | 0,6 | 31,8 | 40 | 2.960 |
| 24 | x 3 | x 1 | 1,4 | 0,6 | 35,7 | 44 | 3.630 |
| 32 | x 3 | x 1 | 1,4 | 0,6 | 40,7 | 49 | 4.640 |
| 1 | x 2 | x 1,5 | 1,6 | 0,7 | 9,1 | 13 | 280 |
| 2 | x 2 | x 1,5 | 1,6 | 0,7 | 14,7 | 20 | 640 |
| 4 | x 2 | x 1,5 | 1,6 | 0,7 | 17,2 | 23 | 870 |
| 7 | x 2 | x 1,5 | 1,6 | 0,7 | 20,7 | 27 | 1.230 |
| 8 | x 2 | x 1,5 | 1,6 | 0,7 | 22,1 | 28 | 1.400 |
| 12 | x 2 | x 1,5 | 1,6 | 0,7 | 27,0 | 34 | 1.990 |
| 16 | x 2 | x 1,5 | 1,6 | 0,7 | 30,7 | 38 | 2.610 |
| 19 | x 2 | x 1,5 | 1,6 | 0,7 | 33,1 | 41 | 2.995 |
| 24 | x 2 | x 1,5 | 1,6 | 0,7 | 37,3 | 45 | 3.730 |
| 32 | x 2 | x 1,5 | 1,6 | 0,7 | 42,5 | 51 | 4.740 |
| 1 | x 3 | x 1,5 | 1,6 | 0,7 | 9,7 | 13 | 315 |
| 2 | x 3 | x 1,5 | 1,6 | 0,7 | 16,2 | 22 | 745 |
| 4 | x 3 | x 1,5 | 1,6 | 0,7 | 18,9 | 25 | 1.030 |
| 7 | x 3 | x 1,5 | 1,6 | 0,7 | 23,8 | 30 | 1.590 |
| 8 | x 3 | x 1,5 | 1,6 | 0,7 | 25,6 | 32 | 1.800 |
| 12 | x 3 | x 1,5 | 1,6 | 0,7 | 30,6 | 38 | 2.610 |
| 16 | x 3 | x 1,5 | 1,6 | 0,7 | 34,8 | 43 | 3.300 |
| 19 | x 3 | x 1,5 | 1,6 | 0,7 | 37,7 | 46 | 3.815 |
| 24 | x 3 | x 1,5 | 1,6 | 0,7 | 42,3 | 51 | 4.760 |
| 32 | x 3 | x 1,5 | 1,6 | 0,7 | 48,4 | 57 | 6.060 |

instrumentation 150/250 V
 halogen free flame retardant
 common screen armoured
fire resistant
 mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|---------------------------------|----------------------|
| Design and construction | IEC 60092-376 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 150 / 250 V | |
| Max operating voltage U _{max} | 300 V | |
| Maximum rated temperature | 90 °C according to | IEC 60092-360 |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Fire resistance (see page 35) | IEC 60331-1 or 2 | |
| Corrosivity | IEC 60754-1 / 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 / 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092.360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold bend and Impact test (- 40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | | |
|---------------------|--|--------------|
| Construction | | |
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 IEC 60092-376 | |
| 2 INSULATION | mica tape + EPR HF compound IEC 60092-360 | |
| CORES TWISTING | in pairs / triples | |
| 3 COMMON SCREEN | Cu/PE tape + tinned copper drain wire | |
| 4 INNER SHEATH | SHF2 extruded compound IEC 60092-360 | |
| 5 ARMOUR | tinned copper wire braid | |
| 6 OUTER SHEATH | SHF2 H-M compound | NEK 606:2016 |
| | see Generals section | |

| | | | |
|-----------------------------|------------------------------|------------|-------|
| Cores identification | | | |
| pair | black | light blue | |
| triple | black | light blue | brown |
| multi pairs/triples | progressively numbered tapes | | |

| | |
|---------------|------|
| Sheath colour | grey |
|---------------|------|

| | | | |
|-----------------------|----------------------|--|---------------|
| Sheath marking | | | |
| CCI S104 BFOU(c) H-M | 150/250 V | n x (pair/triple) x sect mm ² | IEC 60092-376 |
| NEK 606 | IEC 60332-3-22 Cat A | meter marking | year QA n° |

- Minimum Bending Radius: 4D (Overall Diameter) – see Generals section

150/250 V

| CONSTRUCTION | | | CONDUCTOR DIAMETER | INSULATION THICKNESS | DIAMETER UNDER ARMOUR | OVERALL DIAMETER | WEIGHT |
|--------------|--------|---------------------|--------------------|----------------------|-----------------------|------------------|-----------|
| | | | nominal | nominal | nominal | approx | approx |
| n | pair | [m m ²] | [mm] | [mm] | [mm] | [mm] | [kg/km] |
| | triple | | | | | | |
| 1 | x 2 | x 0,75 | 1,1 | 0,6 | 7,5 | 11 | 220 |
| 2 | x 2 | x 0,75 | 1,1 | 0,6 | 11,9 | 16 | 450 |
| 4 | x 2 | x 0,75 | 1,1 | 0,6 | 13,7 | 18 | 580 |
| 7 | x 2 | x 0,75 | 1,1 | 0,6 | 16,3 | 22 | 800 |
| 8 | x 2 | x 0,75 | 1,1 | 0,6 | 17,4 | 23 | 900 |
| 12 | x 2 | x 0,75 | 1,1 | 0,6 | 20,7 | 27 | 1.230 |
| 16 | x 2 | x 0,75 | 1,1 | 0,6 | 23,9 | 30 | 1.580 |
| 19 | x 2 | x 0,75 | 1,1 | 0,6 | 25,7 | 32 | 1.810 |
| 24 | x 2 | x 0,75 | 1,1 | 0,6 | 28,6 | 35 | 2.210 |
| 32 | x 2 | x 0,75 | 1,1 | 0,6 | 32,4 | 40 | 2.920 |
| 1 | x 3 | x 0,75 | 1,1 | 0,6 | 7,9 | 12 | 240 |
| 2 | x 3 | x 0,75 | 1,1 | 0,6 | 13,0 | 18 | 520 |
| 4 | x 3 | x 0,75 | 1,1 | 0,6 | 15,0 | 21 | 710 |
| 7 | x 3 | x 0,75 | 1,1 | 0,6 | 18,7 | 25 | 1.020 |
| 8 | x 3 | x 0,75 | 1,1 | 0,6 | 20,0 | 26 | 1.150 |
| 12 | x 3 | x 0,75 | 1,1 | 0,6 | 23,4 | 30 | 1.565 |
| 16 | x 3 | x 0,75 | 1,1 | 0,6 | 27,0 | 34 | 2.000 |
| 19 | x 3 | x 0,75 | 1,1 | 0,6 | 29,1 | 36 | 2.310 |
| 24 | x 3 | x 0,75 | 1,1 | 0,6 | 32,4 | 40 | 2.940 |
| 32 | x 3 | x 0,75 | 1,1 | 0,6 | 37,3 | 46 | 3.800 |
| 1 | x 2 | x 1 | 1,4 | 0,6 | 7,9 | 12 | 230 |
| 2 | x 2 | x 1 | 1,4 | 0,6 | 12,5 | 17 | 495 |
| 4 | x 2 | x 1 | 1,4 | 0,6 | 14,5 | 20 | 645 |
| 7 | x 2 | x 1 | 1,4 | 0,6 | 17,4 | 23 | 900 |
| 8 | x 2 | x 1 | 1,4 | 0,6 | 18,5 | 25 | 1.010 |
| 12 | x 2 | x 1 | 1,4 | 0,6 | 22,1 | 38 | 1.360 |
| 16 | x 2 | x 1 | 1,4 | 0,6 | 25,4 | 32 | 1.760 |
| 19 | x 2 | x 1 | 1,4 | 0,6 | 27,4 | 34 | 2.030 |
| 24 | x 2 | x 1 | 1,4 | 0,6 | 30,5 | 38 | 2.600 |
| 32 | x 2 | x 1 | 1,4 | 0,6 | 35,1 | 43 | 3.340 |
| 1 | x 3 | x 1 | 1,4 | 0,6 | 8,4 | 12 | 260 |
| 2 | x 3 | x 1 | 1,4 | 0,6 | 13,7 | 18 | 570 |
| 4 | x 3 | x 1 | 1,4 | 0,6 | 15,9 | 22 | 780 |
| 7 | x 3 | x 1 | 1,4 | 0,6 | 19,9 | 26 | 1.150 |
| 8 | x 3 | x 1 | 1,4 | 0,6 | 21,3 | 28 | 1.300 |
| 12 | x 3 | x 1 | 1,4 | 0,6 | 25,4 | 32 | 1.790 |
| 16 | x 3 | x 1 | 1,4 | 0,6 | 28,8 | 36 | 2.270 |
| 19 | x 3 | x 1 | 1,4 | 0,6 | 31,1 | 39 | 2.720 |
| 24 | x 3 | x 1 | 1,4 | 0,6 | 35,0 | 43 | 3.370 |
| 32 | x 3 | x 1 | 1,4 | 0,6 | 39,8 | 48 | 4.300 |
| 1 | x 2 | x 1,5 | 1,6 | 0,7 | 9,1 | 13 | 280 |
| 2 | x 2 | x 1,5 | 1,6 | 0,7 | 14,6 | 20 | 620 |
| 4 | x 2 | x 1,5 | 1,6 | 0,7 | 17,0 | 23 | 830 |
| 7 | x 2 | x 1,5 | 1,6 | 0,7 | 20,4 | 26 | 1.150 |
| 8 | x 2 | x 1,5 | 1,6 | 0,7 | 21,8 | 28 | 1.300 |
| 12 | x 2 | x 1,5 | 1,6 | 0,7 | 26,5 | 33 | 1.840 |
| 16 | x 2 | x 1,5 | 1,6 | 0,7 | 30,1 | 37 | 2.330 |
| 19 | x 2 | x 1,5 | 1,6 | 0,7 | 32,5 | 40 | 2.750 |
| 24 | x 2 | x 1,5 | 1,6 | 0,7 | 36,6 | 45 | 3.460 |
| 32 | x 2 | x 1,5 | 1,6 | 0,7 | 41,7 | 50 | 4.390 |
| 1 | x 3 | x 1,5 | 1,6 | 0,7 | 9,7 | 13 | 310 |
| 2 | x 3 | x 1,5 | 1,6 | 0,7 | 16,0 | 22 | 730 |
| 4 | x 3 | x 1,5 | 1,6 | 0,7 | 18,7 | 24 | 990 |
| 7 | x 3 | x 1,5 | 1,6 | 0,7 | 23,5 | 30 | 1.500 |
| 8 | x 3 | x 1,5 | 1,6 | 0,7 | 25,2 | 32 | 1.700 |
| 12 | x 3 | x 1,5 | 1,6 | 0,7 | 30,1 | 37 | 2.370 |
| 16 | x 3 | x 1,5 | 1,6 | 0,7 | 34,3 | 42 | 3.120 |
| 19 | x 3 | x 1,5 | 1,6 | 0,7 | 37,0 | 45 | 3.600 |
| 24 | x 3 | x 1,5 | 1,6 | 0,7 | 41,6 | 50 | 4.490 |
| 32 | x 3 | x 1,5 | 1,6 | 0,7 | 47,5 | 56 | 5.710 |



FIREBAR®

Fire & water resistant
Oils & muds resistant





FIREBAR[®]
the TOTAL SAFETY
FIRE AND WATER RESISTANT CABLE

in accordance with

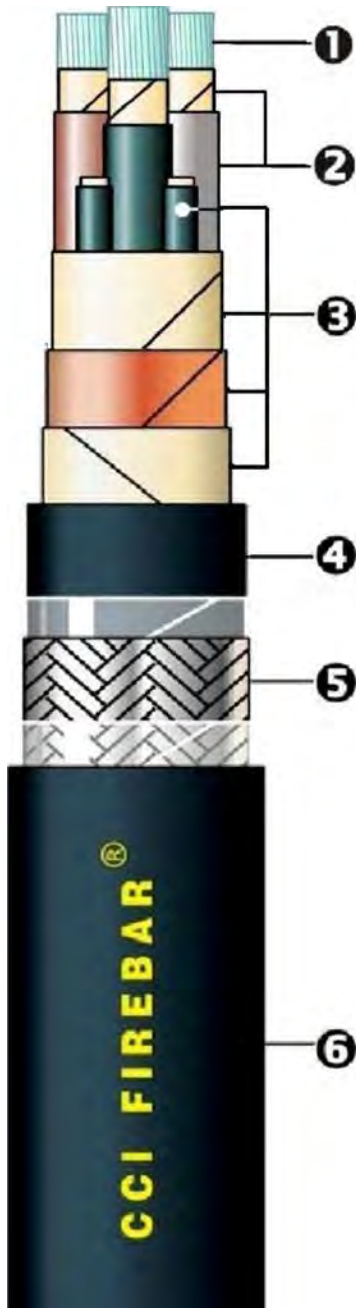
instrumentation
power low voltage
medium voltage

BS 7846:2000 Cat F3
BS 8491 F120

when submitted to
fire + mechanical shocks + water spray / water jets
followed by
water immersion of burned sample still powered

power & control 0,6/1 kV
 halogen free flame retardant
 armoured

fire + mechanical shocks + water spray + water immersion resistant
 mineral / hydraulic oils & muds resistant



| | | |
|---|---|----------------------|
| Design and construction | IEC 60092-353 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 0,6 / 1 kV | |
| Max operating voltage U _{max} | 1,2 kV | |
| Maximum rated temperature | 95 °C according to | IEC 60092-360 |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Fire resistance | BS 7846 :2000 Cat F3 (120 min) (see NOTE) IEC 60331-1 or 2 (see page 35) | |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092-360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold Bend and Impact test (- 40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | | |
|---|--|-------------------|
| Construction | | |
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or | Class 5 IEC 60228 |
| 2 INSULATION | mica tape + S95 HF comp. IEC 60092-360 | |
| 3 FIREBAR® protection | <ul style="list-style-type: none"> • FLAMEBAR® fiberglass tapes + fiberglass ropes • S95 sheathed when 3 cores (sect. > 16 mm²) • Cu-PET tape | |
| 4 INNER SHEATH | SHF2 extruded compound | IEC 60092.360 |
| 5 ARMOUR | tinned copper wire braid (*) | |
| 6 OUTER SHEATH | SHF2 H-M compound | NEK 606:2016 |
| (*) on request braiding section when used as earth - see Generals section | | |

| | | | |
|--|------------------|------------|-----------------------|
| Cores identification according to HD 308 S2 and IEC 60445 | | | |
| 1 core | white or black | 4 cores | blue brown black grey |
| 2 cores | blue brown | multicores | white numbered |
| 3 cores | brown black grey | | |

Sheath colour black

Sheath marking

CCI P125 SFOU H-M FIREBAR® 0,6/1 kV n x sect mm² IEC 60092-353
 NEK 606 IEC 60332-3-22 Cat A BS 7846:2000 Cat F3 meter marking year QA n°

• Minimum Bending Radius: 4D (Overall Diameter) – see Generals section

FIRE & MECHANICAL SHOCKS



WATER SPRAY



WATER IMMERSION



NOTE BS 7846 Cat F3 : 2000 - test parameters

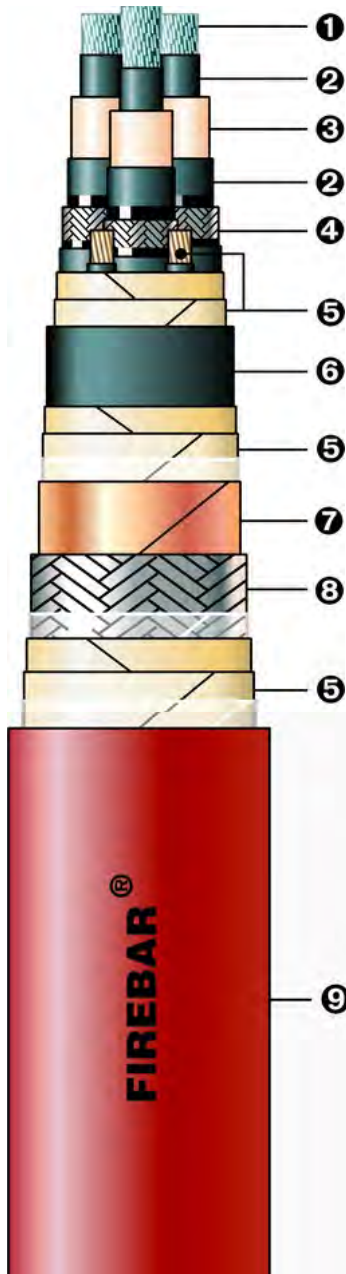
- FIRE: 830 (+40/-0)°C x 120 minutes @ 1 kV, while:
 - MECHANICAL SHOCKS every 5 minutes hitting the frame with sample mounted in bent formation at Min. Bending Radius
 - WATER SPRAY 1 l/m² s⁻¹ (2,4 l/min) during last 15 minutes
- Furthermore, not requested by any fire resistant standard:
 WATER IMMERSION (15 min) of burned sample still powered

0,6/1 kV

| CONSTRUCTION | | CONDUCTOR DIAMETER | INSULATION THICKNESS | DIAMETER UNDER ARMOUR | OVERALL DIAMETER | WEIGHT |
|--------------|--------------------|--------------------|----------------------|-----------------------|------------------|----------------|
| n | [mm ²] | nominal [mm] | nominal [mm] | nominal [mm] | approx [mm] | approx [kg/km] |
| 1 | x 16 | 5,2 | 1,0 | 10,9 | 15 | 470 |
| 1 | x 25 | 6,5 | 1,2 | 12,6 | 17 | 620 |
| 1 | x 35 | 7,5 | 1,2 | 13,6 | 18 | 745 |
| 1 | x 50 | 8,3 | 1,4 | 14,7 | 20 | 900 |
| 1 | x 70 | 10,0 | 1,4 | 16,4 | 21 | 1.140 |
| 1 | x 95 | 11,8 | 1,6 | 18,6 | 24 | 1.500 |
| 1 | x 120 | 13,2 | 1,6 | 20,4 | 26 | 1.800 |
| 1 | x 150 | 14,6 | 1,8 | 22,2 | 28 | 2.150 |
| 1 | x 185 | 16,5 | 2,0 | 24,5 | 30 | 2.630 |
| 1 | x 240 | 19,0 | 2,2 | 27,8 | 34 | 3.320 |
| 1 | x 300 | 21,8 | 2,4 | 31 | 38 | 4.030 |
| 2 | x 1,5 | 1,6 | 1,0 | 10,5 | 15 | 330 |
| 2 | x 2,5 | 2,0 | 1,0 | 11,7 | 16 | 390 |
| 2 | x 4 | 2,6 | 1,0 | 13,6 | 18 | 490 |
| 2 | x 6 | 3,2 | 1,0 | 14,9 | 20 | 605 |
| 2 | x 10 | 4,1 | 1,0 | 16,5 | 21 | 800 |
| 2 | x 16 | 5,2 | 1,0 | 18,9 | 24 | 1.060 |
| 3 | x 1,5 | 1,6 | 1,0 | 11,2 | 15 | 370 |
| 3 | x 2,5 | 2,0 | 1,0 | 12,4 | 17 | 450 |
| 3 | x 4 | 2,8 | 1,0 | 14,5 | 19 | 570 |
| 3 | x 6 | 3,3 | 1,0 | 15,8 | 21 | 700 |
| 3 | x 10 | 4,1 | 1,0 | 17,5 | 23 | 980 |
| 3 | x 16 | 5,2 | 1,0 | 20,5 | 26 | 1.350 |
| 3 | x 25 | 6,5 | 1,2 | 24,4 | 30 | 1.860 |
| 3 | x 35 | 7,5 | 1,2 | 26,4 | 32 | 2.140 |
| 3 | x 50 | 8,3 | 1,4 | 29 | 35 | 2.670 |
| 3 | x 70 | 10,0 | 1,4 | 32,7 | 40 | 3.540 |
| 3 | x 95 | 11,8 | 1,6 | 37,4 | 45 | 4.710 |
| 3 | x 120 | 13,2 | 1,6 | 40,8 | 49 | 5.640 |
| 3 | x 150 | 14,6 | 1,8 | 45,1 | 54 | 6.930 |
| 3 | x 185 | 16,5 | 2,0 | 50,1 | 59 | 8.550 |
| 3 | x 240 | 19,0 | 2,2 | 56,8 | 66 | 10.830 |
| 3 | x 300 | 21,8 | 2,4 | 63,7 | 74 | 12.980 |
| 4 | x 1,5 | 1,6 | 1,0 | 12,1 | 17 | 430 |
| 4 | x 2,5 | 2,0 | 1,0 | 13,5 | 18 | 510 |
| 4 | x 4 | 2,8 | 1,0 | 15,8 | 21 | 670 |
| 4 | x 6 | 3,3 | 1,0 | 17,3 | 22 | 840 |
| 4 | x 10 | 4,1 | 1,0 | 19,6 | 25 | 1.150 |
| 4 | x 16 | 5,2 | 1,0 | 22,5 | 28 | 1.560 |
| 4 | x 25 | 6,5 | 1,2 | 26,8 | 33 | 2.150 |
| 4 | x 35 | 7,5 | 1,2 | 29,1 | 35 | 2.930 |
| 4 | x 50 | 8,3 | 1,4 | 31,9 | 39 | 3.440 |
| 4 | x 70 | 10,0 | 1,4 | 36 | 43 | 4.460 |
| 4 | x 95 | 11,8 | 1,6 | 41,3 | 49 | 5.960 |
| 4 | x 120 | 13,2 | 1,6 | 45,1 | 53 | 7.180 |
| 4 | x 150 | 14,6 | 1,8 | 49,8 | 59 | 8.770 |
| 4 | x 185 | 16,5 | 2,0 | 55,8 | 65 | 10.850 |
| 4 | x 240 | 19,0 | 2,2 | 62,7 | 73 | 13.880 |
| 4 | x 300 | 21,8 | 2,4 | 70,5 | 81 | 16.650 |
| 5 | x 1,5 | 1,6 | 1,0 | 13,4 | 18 | 500 |
| 7 | x 1,5 | 1,6 | 1,0 | 14,6 | 19 | 590 |
| 12 | x 1,5 | 1,6 | 1,0 | 19,4 | 25 | 930 |
| 19 | x 1,5 | 1,6 | 1,0 | 22,7 | 28 | 1245 |
| 27 | x 1,5 | 1,6 | 1,0 | 27,3 | 33 | 1710 |
| 37 | x 1,5 | 1,6 | 1,0 | 30,8 | 37 | 2240 |
| 5 | x 2,5 | 2,0 | 1,0 | 14,8 | 19 | 600 |
| 7 | x 2,5 | 2,0 | 1,0 | 16,1 | 21 | 720 |
| 12 | x 2,5 | 2,0 | 1,0 | 21,5 | 27 | 1.150 |
| 19 | x 2,5 | 2,0 | 1,0 | 25,4 | 31 | 1.570 |
| 27 | x 2,5 | 2,0 | 1,0 | 30,6 | 37 | 2.270 |
| 37 | x 2,5 | 2,0 | 1,0 | 34,4 | 41 | 2.850 |

(3,6/6 - 6/10 - 8,7/15 - 12/20) kV radial field
 halogen free flame retardant
 armoured

fire + mechanical shocks + water jets + water immersion resistant
 mineral / hydraulic oils & muds resistant
 operating temperature over 100 °C
 (see page 7)



| | | |
|---|----------------------------------|----------------------|
| Design and construction | IEC 60092-354 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 3,6/6 - 6/10 - 8,7/15 - 12/20 kV | |
| Max operating voltage U _{max} | 7,2 12 17,5 24 kV | |
| Maximum rated temperature | 90 °C according to IEC 60092-360 | |
| Flame retardance | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Fire resistance | BS 8491 F120 (see NOTE) | |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092-360 | |
| Electromagnetic compatibility | IEC 60533 Annex B | IEC 62153-4-3 |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold bend and Impact test (-40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | | |
|------------------------------|---|------------------------------|
| Construction | | |
| 1 CONDUCTOR | tinned annealed copper flexible | Class 2 or Class 5 IEC 60228 |
| 2 SEMICONDUCTIVES | HF extruded compound | |
| 3 INSULATION | HEPR HF compound + HF heat resistant rubber compound IEC 60092-360 | |
| 4 PHASE SCREEN | tinned copper wire braid | |
| 5 FIREBAR® protection | FLAMEBAR® fiberglass tapes + fiberglass ropes HEPR sheathed when 3 cores | |
| 6 INNER SHEATH | SHF2 extruded compound | IEC 60092-360 |
| 7 ELECTROMAGNETIC SHIELD | plain copper tape IEC 60092.350 | |
| 8 ARMOUR | tinned copper wire braid (*) | |
| 9 OUTER SHEATH | SHF2 H-M compound | NEK 606:2016 |
| | see Generals section | |

| | | |
|-----------------------------|--|--|
| Cores identification | | |
| 1 core | off-white | |
| 3 cores | off-white (coloured or numbered tapes) | |

| | |
|---------------|-----|
| Sheath colour | red |
|---------------|-----|

| | | |
|------------------------------|----------------------|--|
| Sheath marking | | |
| CCI PXXX RFOU H-M FIREBAR® | U ₀ /U kV | n x sect mm ² IEC 60092-354 |
| NEK 606 IEC 60332-3-22 Cat A | BS 8491 F120 | meter marking year QA n° |

- Minimum Bending Radius: 4/5 D depending on Overall Diameter - see Generals section

FIRE & MECHANICAL SHOCKS

WATER JETS

WATER IMMERSION



NOTE BS 8491 F120 - test parameters

- > FIRE: 830 (+40/-0)°C x 120 minutes @ 3,6 kV, while:
- > MECHANICAL SHOCKS directly hitting the sample in bent formation at Min. Bending Radius every 10 min.
- > WATER JETS 5 bursts (5 sec. each) @ 12,5 l/min during last 5 min.
- Furthermore, not requested by any fire resistance standard:
- > WATER IMMERSION (15 min) of burned sample still powered

P120 3,6/6 kV

| CONSTRUCTION | | CONDUCTOR DIAMETER | INSULATION THICKNESS | DIAMETER UNDER ARMOUR | OVERALL DIAMETER | WEIGHT |
|--------------|---------------------|--------------------|----------------------|-----------------------|------------------|------------------|
| n | [mm ²] | nominal [mm] | nominal [mm] | nominal [mm] | approx [mm] | approx [kg/km] |
| 1 | x 50 | 8,3 | 2,5 | 31,8 | 42 | 2.500 |
| 1 | x 70 | 10,0 | 2,5 | 33,6 | 44 | 2.830 |
| 1 | x 95 | 11,8 | 2,5 | 35,4 | 46 | 3.240 |
| 1 | x 120 | 13,2 | 2,5 | 36,8 | 48 | 3.550 |
| 1 | x 150 | 14,6 | 2,5 | 38,2 | 49 | 3.940 |
| 1 | x 185 | 16,5 | 2,5 | 40,1 | 51 | 4.440 |
| 1 | x 240 | 19,0 | 2,5 | 42,8 | 54 | 5.230 |
| 1 | x 300 | 21,8 | 2,5 | 46,5 | 58 | 6.070 |
| 3 | x 50 | 8,3 | 2,5 | 58,9 | 72 | 6.580 |
| 3 | x 70 | 10,0 | 2,5 | 62,6 | 76 | 7.610 |
| 3 | x 95 | 11,8 | 2,5 | 66,5 | 80 | 8.815 |
| 3 | x 120 | 13,2 | 2,5 | 69,5 | 83 | 9.840 |
| 3 | x 150 | 14,6 | 2,5 | 72,5 | 86 | 11.010 |
| 3 | x 185 | 16,5 | 2,5 | 76,6 | 91 | 12.750 |
| 3 | x 240 | 19,0 | 2,5 | 82,4 | 97 | 15.030 |

P121 6/10 kV

| | | | | | | |
|---|-------|------|-----|------|----|--------|
| 1 | x 50 | 8,3 | 3,4 | 34,3 | 45 | 2.750 |
| 1 | x 70 | 10 | 3,4 | 36 | 47 | 3.090 |
| 1 | x 95 | 11,8 | 3,4 | 37,8 | 49 | 3.540 |
| 1 | x 120 | 13,2 | 3,4 | 39,2 | 50 | 3.830 |
| 1 | x 150 | 14,6 | 3,4 | 40,8 | 52 | 4.240 |
| 1 | x 185 | 16,5 | 3,4 | 42,7 | 54 | 4.790 |
| 1 | x 240 | 19 | 3,4 | 45 | 56 | 5.470 |
| 1 | x 300 | 21,8 | 3,4 | 48,3 | 60 | 6.320 |
| 3 | x 50 | 8,3 | 3,4 | 62,8 | 76 | 7.230 |
| 3 | x 70 | 10 | 3,4 | 66,5 | 80 | 8.170 |
| 3 | x 95 | 11,8 | 3,4 | 70,4 | 84 | 9.490 |
| 3 | x 120 | 13,2 | 3,4 | 73,4 | 87 | 10.540 |
| 3 | x 150 | 14,6 | 3,4 | 76,4 | 91 | 11.820 |
| 3 | x 185 | 16,5 | 3,4 | 80,5 | 95 | 13.340 |

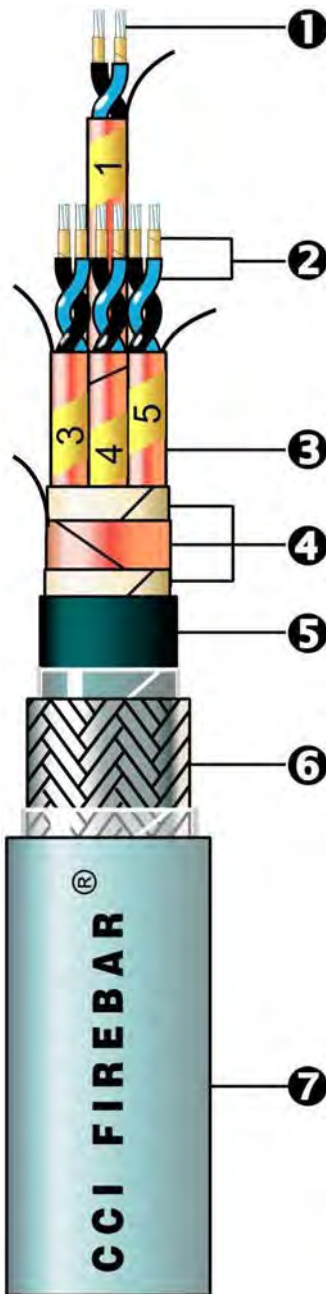
P122 8,7/15 kV

| | | | | | | |
|---|-------|------|-----|------|----|--------|
| 1 | x 50 | 8,3 | 4,5 | 35,9 | 47 | 2.930 |
| 1 | x 70 | 10 | 4,5 | 37,6 | 48 | 3.260 |
| 1 | x 95 | 11,8 | 4,5 | 39,4 | 50 | 3.690 |
| 1 | x 120 | 13,2 | 4,5 | 40,8 | 42 | 4.040 |
| 1 | x 150 | 14,6 | 4,5 | 42,2 | 53 | 4.400 |
| 1 | x 185 | 16,5 | 4,5 | 44,1 | 55 | 4.950 |
| 1 | x 240 | 19 | 4,5 | 46,6 | 58 | 5.700 |
| 1 | x 300 | 21,8 | 4,5 | 49,9 | 62 | 6.530 |
| 3 | x 50 | 8,3 | 4,5 | 67,5 | 81 | 7.940 |
| 3 | x 70 | 10 | 4,5 | 71,2 | 85 | 8.960 |
| 3 | x 95 | 11,8 | 4,5 | 75,1 | 89 | 10.450 |
| 3 | x 120 | 13,2 | 4,5 | 78,1 | 93 | 11.410 |
| 3 | x 150 | 14,6 | 4,5 | 81,2 | 96 | 12.540 |

P123 12/20 kV

| | | | | | | |
|---|-------|------|-----|------|-----|--------|
| 1 | x 50 | 8,3 | 5,5 | 37,9 | 49 | 3.160 |
| 1 | x 70 | 10 | 5,5 | 39,6 | 51 | 3.500 |
| 1 | x 95 | 11,8 | 5,5 | 41,4 | 53 | 3.940 |
| 1 | x 120 | 13,2 | 5,5 | 42,8 | 54 | 4.290 |
| 1 | x 150 | 14,6 | 5,5 | 44,2 | 56 | 4.670 |
| 1 | x 185 | 16,5 | 5,5 | 46,1 | 58 | 5.210 |
| 1 | x 240 | 19 | 5,5 | 48,6 | 60 | 5.980 |
| 1 | x 300 | 21,8 | 5,5 | 51,9 | 64 | 6.840 |
| 3 | x 50 | 8,3 | 5,5 | 71,9 | 86 | 8.600 |
| 3 | x 70 | 10 | 5,5 | 75,5 | 90 | 9.910 |
| 3 | x 95 | 11,8 | 5,5 | 79,4 | 94 | 11.090 |
| 3 | x 120 | 13,2 | 5,5 | 82,4 | 97 | 12.200 |
| 3 | x 150 | 14,6 | 5,5 | 85,5 | 101 | 13.410 |

instrumentation 150/250 V
 halogen free flame retardant
 individual screen armoured
fire + mechanical shocks + water spray + water immersion resistant
 mineral / hydraulic oils & muds resistant



| | | |
|---|--|----------------------|
| Design and construction | IEC 60092-376 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 150/250 V | |
| Maximum Voltage U _{max} | 300 V | |
| Maximum rated temperature | 95 °C according to | IEC 60092-360 |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Fire resistance | BS 7846 :2000 Cat F3 (see NOTE) | |
| | IEC 60331-1 or 2 (see page 35) | |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092-360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold Bend and Impact test (- 40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

Construction

| | |
|------------------------------|---|
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 IEC 60092-376 |
| 2 INSULATION | mica tape + S95 HF compound IEC 6092-360 |
| 3 INDIVIDUAL SCREEN | Cu/PE tape + tinned copper drain wire |
| 4 FIREBAR® protection | <ul style="list-style-type: none"> • FLAMEBAR® fiberglass tapes • Cu/PE tape + tinned copper drain wire |
| 5 INNER SHEATH | SHF2 extruded compound IEC 60092-360 |
| 6 ARMOUR | tinned copper wire braid IEC 60092-376 |
| 7 OUTER SHEATH | SHF2 H-M compound NEK 606:2016 |
| | see Generals section |

Cores identification

| | |
|---------------------|------------------------------|
| pair | black light blue |
| triple | black light blue brown |
| multi pairs triples | progressively numbered tapes |

Sheath colour

grey

Sheath marking

CCI S112 SFOU (i) H-M FIREBAR® 150/250 V n x (pair/triple) x sect mm² IEC 60092-376
 NEK 606 IEC 60332-3-22 Cat A BS 7846:2000 Cat F3 meter marking year QA n°

- Minimum Bending Radius: 4D (Overall Diameter) – see Generals section

FIRE & MECHANICAL SHOCKS



WATER SPRAY



WATER IMMERSION



NOTE BS 7846 Cat F3 : 2000 - test parameters

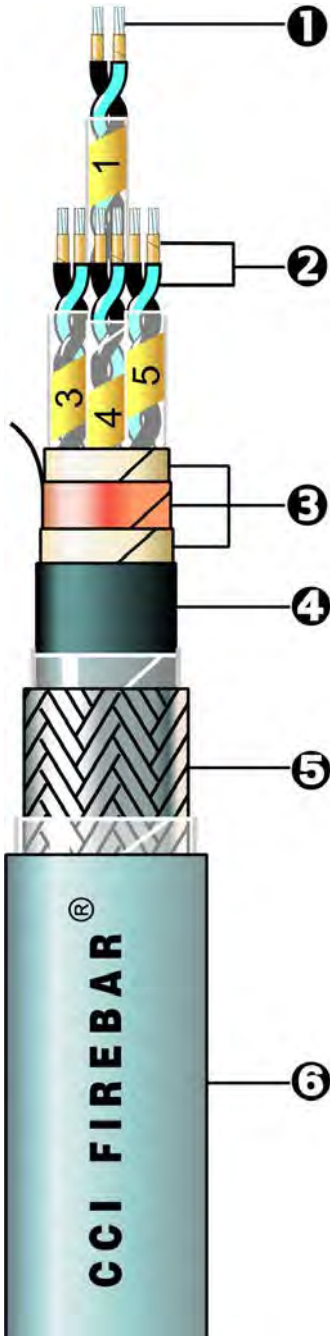
- FIRE: 830 (+40/-0)°C x 120 minutes @ 250 V, while:
 - MECHANICAL SHOCKS every 5 minutes hitting the frame with sample mounted in bent formation at Min. Bending Radius
 - WATER SPRAY 1 l/m² s⁻¹ (2,4 l/min) during last 15 minutes
- Furthermore, not requested by any fire resistant standard
 WATER IMMERSION (15 min) of burned sample still powered

150/250 V

| CONSTRUCTION | | | CONDUCTOR DIAMETER | INSULATION THICKNESS | DIAMETER UNDER ARMOUR | OVERALL DIAMETER | WEIGHT |
|--------------|-------------|---------------------|--------------------|----------------------|-----------------------|------------------|------------------|
| n | pair triple | [m m ²] | nominal [mm] | nominal [mm] | nominal [mm] | approx [mm] | approx [kg/km] |
| 2 | x 2 | x 0,75 | 1,1 | 0,9 | 14,6 | 19 | 570 |
| 4 | x 2 | x 0,75 | 1,1 | 0,9 | 17,1 | 22 | 750 |
| 7 | x 2 | x 0,75 | 1,1 | 0,9 | 20,6 | 26 | 1.020 |
| 8 | x 2 | x 0,75 | 1,1 | 0,9 | 22,1 | 28 | 1.150 |
| 12 | x 2 | x 0,75 | 1,1 | 0,9 | 26,4 | 33 | 1.640 |
| 16 | x 2 | x 0,75 | 1,1 | 0,9 | 30,2 | 37 | 2.060 |
| 19 | x 2 | x 0,75 | 1,1 | 0,9 | 32,5 | 40 | 2.330 |
| 27 | x 2 | x 0,75 | 1,1 | 0,9 | 38,2 | 46 | 3.080 |
| 37 | x 2 | x 0,75 | 1,1 | 0,9 | 44,3 | 52 | 3.990 |
| 2 | x 3 | x 0,75 | 1,1 | 0,9 | 16,2 | 21 | 660 |
| 4 | x 3 | x 0,75 | 1,1 | 0,9 | 18,9 | 24 | 890 |
| 7 | x 3 | x 0,75 | 1,1 | 0,9 | 23,7 | 29 | 1.270 |
| 12 | x 3 | x 0,75 | 1,1 | 0,9 | 30,1 | 37 | 2.040 |
| 2 | x 2 | x 1 | 1,4 | 0,9 | 15,3 | 20 | 610 |
| 4 | x 2 | x 1 | 1,4 | 0,9 | 18,1 | 23 | 830 |
| 7 | x 2 | x 1 | 1,4 | 0,9 | 21,8 | 27 | 1.150 |
| 8 | x 2 | x 1 | 1,4 | 0,9 | 23,2 | 29 | 1.260 |
| 12 | x 2 | x 1 | 1,4 | 0,9 | 27,9 | 35 | 1.850 |
| 16 | x 2 | x 1 | 1,4 | 0,9 | 31,8 | 39 | 2.310 |
| 19 | x 2 | x 1 | 1,4 | 0,9 | 34,4 | 42 | 2.600 |
| 27 | x 2 | x 1 | 1,4 | 0,9 | 40,4 | 48 | 3.500 |
| 37 | x 2 | x 1 | 1,4 | 0,9 | 46,8 | 55 | 4.530 |
| 2 | x 3 | x 1 | 1,4 | 0,9 | 16,9 | 22 | 730 |
| 4 | x 3 | x 1 | 1,4 | 0,9 | 19,8 | 25 | 970 |
| 7 | x 3 | x 1 | 1,4 | 0,9 | 25,1 | 31 | 1.420 |
| 12 | x 3 | x 1 | 1,4 | 0,9 | 31,7 | 39 | 2.290 |
| 2 | x 2 | x 1,5 | 1,6 | 1,0 | 14,7 | 22 | 790 |
| 4 | x 2 | x 1,5 | 1,6 | 1,0 | 17,6 | 25 | 1.080 |
| 7 | x 2 | x 1,5 | 1,6 | 1,0 | 21,6 | 29 | 1.510 |
| 8 | x 2 | x 1,5 | 1,6 | 1,0 | 23,2 | 31 | 1.690 |
| 12 | x 2 | x 1,5 | 1,6 | 1,0 | 28,3 | 38 | 2.450 |
| 16 | x 2 | x 1,5 | 1,6 | 1,0 | 32,5 | 42 | 3.080 |
| 19 | x 2 | x 1,5 | 1,6 | 1,0 | 35,3 | 45 | 3.530 |
| 24 | x 2 | x 1,5 | 1,6 | 1,0 | 41,9 | 53 | 4.790 |
| 32 | x 2 | x 1,5 | 1,6 | 1,0 | 48,8 | 57 | 5.880 |
| 2 | x 3 | x 1,5 | 1,6 | 1,0 | 16,4 | 24 | 950 |
| 4 | x 3 | x 1,5 | 1,6 | 1,0 | 19,5 | 27 | 1.280 |
| 7 | x 3 | x 1,5 | 1,6 | 1,0 | 25,2 | 33 | 1.930 |
| 12 | x 3 | x 1,5 | 1,6 | 1,0 | 32,4 | 42 | 3.090 |
| 19 | x 3 | x 1,5 | 1,6 | 1,0 | 40,5 | 50 | 4.450 |

instrumentation 150/250 V
 halogen free - flame retardant
 common screen - armoured

fire + mechanical shocks + water spray + water immersion resistant
 mineral / hydraulic oils & muds resistant



| | | |
|---|--|----------------------|
| Design and construction | IEC 60092-376 | NEK 606:2016 |
| Nominal voltage U ₀ /U | 150/250 V | |
| Maximum Voltage U _{max} | 300 V | |
| Maximum rated temperature | 95 °C according to | IEC 60092-360 |
| Flame retardancy | IEC 60332-1-2 | IEC 60332-3-22 Cat A |
| Fire resistance | BS 7846 :2000 Cat F3 (see NOTE) | |
| | IEC 60331-1 or 2 (see page 35) | |
| Halogen content & corrosivity | IEC 60754-1 & 2 | IEC 60684-2 |
| Smoke density | IEC 61034-1 & 2 | |
| UV resistance | UL 1581 § 1200 | |
| Ozone resistance | IEC 60092-360 | |
| Mineral / hydraulic oils & muds resist. | NEK 606:2016 Table 1 Category d | |
| Cold Bend and Impact test (- 40° C) | CSA C 22.2 N° 0.3-09 & N° 38-18 | |

| | |
|--|---|
| Construction | |
| 1 CONDUCTOR | tinned annealed copper flexible Class 2 or Class 5 IEC 60092-376 |
| 2 INSULATION | mica tape + S95 HF compound IEC 6092-360 |
| 3 FIREBAR® protection & COMMON SCREEN | FLAMEBAR® fiberglass tapes Cu/PE tape + tinned copper drain wire |
| 4 INNER SHEATH | SHF2 extruded compound IEC 60092-360 |
| 5 ARMOUR | tinned copper wire braid IEC 60092-376 |
| 6 OUTER SHEATH | SHF2 H-M compound NEK 606:2016 see Generals section |

| | |
|-----------------------------|------------------------------|
| Cores identification | |
| pair | black light blue |
| triple | black light blue brown |
| multi pairs triples | progressively numbered tapes |

| | |
|---------------|------|
| Sheath colour | grey |
|---------------|------|

Sheath marking
 CCI S113 SFOU (c) H-M FIREBAR® 150/250 V n x (pair/triple) x sect mm² IEC 60092-376
 NEK 606 IEC 60332-3-22 Cat A BS 7846:2000 Cat F3 meter marking year QA n°

• Minimum Bending Radius: 4D (Overall Diameter) – see Generals section

FIRE & MECHANICAL SHOCKS



WATER SPRAY



WATER IMMERSION



NOTE BS 7846 Cat F3 : 2000 - test parameters

- FIRE: 830 (+40/-0)°C x 120 minutes @ 250 V, while:
 - MECHANICAL SHOCKS every 5 minutes hitting the frame with sample mounted in bent formation at Min. Bending Radius
 - WATER SPRAY 1 l/m² s⁻¹ (2,4 l/min) during last 15 minutes
- Furthermore, not requested by any fire resistant standard
 WATER IMMERSION (15 min) of burned sample still powered

150/250 V

| CONSTRUCTION | | | CONDUCTOR DIAMETER | INSULATION THICKNESS | DIAMETER UNDER ARMOUR | OVERALL DIAMETER | WEIGHT |
|--------------|-------------|---------------------|--------------------|----------------------|-----------------------|------------------|----------------|
| n | pair triple | [m m ²] | nominal [mm] | nominal [mm] | nominal [mm] | approx [mm] | approx [kg/km] |
| 1 | x 2 | x 0,75 | 1,1 | 0,9 | 9,5 | 14 | 300 |
| 2 | x 2 | x 0,75 | 1,1 | 0,9 | 14,8 | 19 | 550 |
| 4 | x 2 | x 0,75 | 1,1 | 0,9 | 17,1 | 22 | 710 |
| 7 | x 2 | x 0,75 | 1,1 | 0,9 | 20,8 | 26 | 960 |
| 8 | x 2 | x 0,75 | 1,1 | 0,9 | 22,1 | 28 | 1.080 |
| 12 | x 2 | x 0,75 | 1,1 | 0,9 | 26,7 | 32 | 1.450 |
| 16 | x 2 | x 0,75 | 1,1 | 0,9 | 30,4 | 37 | 1.910 |
| 19 | x 2 | x 0,75 | 1,1 | 0,9 | 32,7 | 40 | 2.170 |
| 27 | x 2 | x 0,75 | 1,1 | 0,9 | 38,5 | 46 | 2.880 |
| 37 | x 2 | x 0,75 | 1,1 | 0,9 | 44,6 | 52 | 3.700 |
| 1 | x 3 | x 0,75 | 1,1 | 0,9 | 10,0 | 14 | 330 |
| 2 | x 3 | x 0,75 | 1,1 | 0,9 | 16,2 | 21 | 650 |
| 4 | x 3 | x 0,75 | 1,1 | 0,9 | 18,9 | 24 | 860 |
| 7 | x 3 | x 0,75 | 1,1 | 0,9 | 23,8 | 29 | 1.210 |
| 12 | x 3 | x 0,75 | 1,1 | 0,9 | 30,3 | 37 | 1.950 |
| 1 | x 2 | x 1 | 1,4 | 0,9 | 9,9 | 14 | 320 |
| 2 | x 2 | x 1 | 1,4 | 0,9 | 15,3 | 20 | 600 |
| 4 | x 2 | x 1 | 1,4 | 0,9 | 17,9 | 23 | 770 |
| 7 | x 2 | x 1 | 1,4 | 0,9 | 21,6 | 27 | 1.060 |
| 8 | x 2 | x 1 | 1,4 | 0,9 | 23,2 | 29 | 1.170 |
| 12 | x 2 | x 1 | 1,4 | 0,9 | 27,7 | 34 | 1.590 |
| 16 | x 2 | x 1 | 1,4 | 0,9 | 31,5 | 38 | 2.090 |
| 19 | x 2 | x 1 | 1,4 | 0,9 | 34,2 | 41 | 2.370 |
| 27 | x 2 | x 1 | 1,4 | 0,9 | 40,2 | 48 | 3.170 |
| 37 | x 2 | x 1 | 1,4 | 0,9 | 46,6 | 54 | 4.090 |
| 1 | x 3 | x 1 | 1,4 | 0,9 | 10,6 | 15 | 370 |
| 2 | x 3 | x 1 | 1,4 | 0,9 | 16,9 | 22 | 700 |
| 4 | x 3 | x 1 | 1,4 | 0,9 | 19,6 | 25 | 930 |
| 7 | x 3 | x 1 | 1,4 | 0,9 | 24,9 | 30 | 1.340 |
| 12 | x 3 | x 1 | 1,4 | 0,9 | 31,5 | 39 | 2.130 |
| 1 | x 2 | x 1,5 | 1,6 | 1,0 | 11,3 | 16 | 390 |
| 2 | x 2 | x 1,5 | 1,6 | 1,0 | 17,0 | 22 | 700 |
| 4 | x 2 | x 1,5 | 1,6 | 1,0 | 20,0 | 25 | 930 |
| 7 | x 2 | x 1,5 | 1,6 | 1,0 | 24,1 | 30 | 1.280 |
| 8 | x 2 | x 1,5 | 1,6 | 1,0 | 25,9 | 32 | 1.440 |
| 12 | x 2 | x 1,5 | 1,6 | 1,0 | 31,3 | 38 | 2.100 |
| 16 | x 2 | x 1,5 | 1,6 | 1,0 | 35,6 | 43 | 2.610 |
| 19 | x 2 | x 1,5 | 1,6 | 1,0 | 38,6 | 46 | 2.990 |
| 27 | x 2 | x 1,5 | 1,6 | 1,0 | 45,5 | 53 | 4.010 |
| 37 | x 2 | x 1,5 | 1,6 | 1,0 | 52,7 | 61 | 5.200 |
| 1 | x 3 | x 1,5 | 1,6 | 1,0 | 11,9 | 16 | 420 |
| 2 | x 3 | x 1,5 | 1,6 | 1,0 | 18,8 | 24 | 850 |
| 4 | x 3 | x 1,5 | 1,6 | 1,0 | 22,1 | 28 | 1.120 |
| 7 | x 3 | x 1,5 | 1,6 | 1,0 | 27,9 | 33 | 1.650 |
| 12 | x 3 | x 1,5 | 1,6 | 1,0 | 35,6 | 43 | 2.640 |



Electrical data



1 core

| CONSTRUCTION | MAX. CONDUCTOR RESISTANCE [Ω /km] | REACTANCE | | CAPACITANCE | | INDUCTANCE | | IMPEDANCE | | | | MAXIMUM CURRENT (*) in free air [A] | SHORT CIRCUIT 1 sec @ 90°C/250°C [kA] |
|--------------|---|------------------|-------|--------------------|-------|--------------------|---------|-----------|-------|-------|-------|---|--|
| | | [Ω /km] | | [μ Farad/km] | | [μ Henry/km] | | 20°C | | 90°C | | | |
| | | 20°C | 90°C | 50 Hz | 60 Hz | nominal | nominal | 50 Hz | 60 Hz | 50 Hz | 60 Hz | | |
| 1 x 16 | 1,16 | 1,48 | 0,105 | 0,126 | 0,247 | 335 | 1,16 | 1,17 | 1,48 | 1,48 | 92 | 2,29 | |
| 1 x 25 | 0,734 | 0,936 | 0,102 | 0,123 | 0,291 | 325 | 0,74 | 0,74 | 0,94 | 0,94 | 123 | 3,58 | |
| 1 x 35 | 0,529 | 0,675 | 0,098 | 0,118 | 0,328 | 313 | 0,54 | 0,54 | 0,68 | 0,68 | 153 | 5,01 | |
| 1 x 50 | 0,391 | 0,499 | 0,096 | 0,115 | 0,355 | 305 | 0,40 | 0,41 | 0,51 | 0,51 | 188 | 7,15 | |
| 1 x 70 | 0,27 | 0,344 | 0,091 | 0,109 | 0,413 | 290 | 0,28 | 0,29 | 0,36 | 0,36 | 243 | 10,0 | |
| 1 x 95 | 0,195 | 0,249 | 0,089 | 0,107 | 0,470 | 284 | 0,21 | 0,22 | 0,26 | 0,27 | 298 | 13,6 | |
| 1 x 120 | 0,154 | 0,196 | 0,086 | 0,104 | 0,514 | 275 | 0,18 | 0,18 | 0,21 | 0,22 | 348 | 17,2 | |
| 1 x 150 | 0,126 | 0,161 | 0,085 | 0,102 | 0,556 | 272 | 0,15 | 0,16 | 0,18 | 0,19 | 404 | 21,5 | |
| 1 x 185 | 0,100 | 0,128 | 0,084 | 0,101 | 0,610 | 269 | 0,13 | 0,14 | 0,15 | 0,16 | 464 | 26,5 | |
| 1 x 240 | 0,0762 | 0,0972 | 0,082 | 0,099 | 0,681 | 262 | 0,11 | 0,13 | 0,13 | 0,14 | 552 | 34,3 | |
| 1 x 300 | 0,0607 | 0,0774 | 0,080 | 0,096 | 0,762 | 256 | 0,10 | 0,11 | 0,11 | 0,12 | 640 | 42,9 | |

2 cores

| | | | | | | | | | | | | |
|---------|------|------|-------|-------|-------|-----|------|------|------|------|-----|------|
| 2 x 1,5 | 12,2 | 15,6 | 0,115 | 0,138 | 0,130 | 367 | 12,2 | 12,2 | 15,6 | 15,6 | 23 | 0,21 |
| 2 x 2,5 | 7,56 | 9,64 | 0,107 | 0,128 | 0,143 | 340 | 7,56 | 7,56 | 9,64 | 9,64 | 31 | 0,36 |
| 2 x 4 | 4,70 | 5,99 | 0,098 | 0,118 | 0,156 | 313 | 4,70 | 4,70 | 6,00 | 6,00 | 43 | 0,57 |
| 2 x 6 | 3,11 | 3,97 | 0,093 | 0,112 | 0,167 | 297 | 3,11 | 3,11 | 3,97 | 3,97 | 55 | 0,86 |
| 2 x 10 | 1,84 | 2,35 | 0,087 | 0,105 | 0,182 | 278 | 1,84 | 1,84 | 2,35 | 2,35 | 75 | 1,43 |
| 2 x 16 | 1,16 | 1,48 | 0,082 | 0,099 | 0,196 | 262 | 1,16 | 1,16 | 1,48 | 1,48 | 100 | 2,29 |

3 cores

| | | | | | | | | | | | | |
|---------|--------|--------|-------|-------|-------|-----|------|------|------|------|-----|------|
| 3 x 1,5 | 12,2 | 15,6 | 0,115 | 23 | 0,21 | 367 | 12,2 | 12,2 | 15,6 | 15,6 | 20 | 0,21 |
| 3 x 2,5 | 7,56 | 9,64 | 0,107 | 0,128 | 0,143 | 340 | 7,56 | 7,56 | 9,64 | 9,64 | 28 | 0,36 |
| 3 x 4 | 4,70 | 5,99 | 0,098 | 0,118 | 0,156 | 313 | 4,70 | 4,70 | 6,00 | 6,00 | 37 | 0,57 |
| 3 x 6 | 3,11 | 3,97 | 0,093 | 0,112 | 0,167 | 297 | 3,11 | 3,11 | 3,97 | 3,97 | 47 | 0,86 |
| 3 x 10 | 1,84 | 2,35 | 0,087 | 0,105 | 0,182 | 278 | 1,84 | 1,84 | 2,35 | 2,35 | 65 | 1,43 |
| 3 x 16 | 1,16 | 1,48 | 0,082 | 0,099 | 0,196 | 262 | 1,16 | 1,17 | 1,48 | 1,48 | 87 | 2,29 |
| 3 x 25 | 0,734 | 0,936 | 0,081 | 0,097 | 0,203 | 257 | 0,74 | 0,74 | 0,94 | 0,94 | 110 | 3,58 |
| 3 x 35 | 0,529 | 0,675 | 0,078 | 0,093 | 0,213 | 248 | 0,54 | 0,54 | 0,68 | 0,68 | 137 | 5,01 |
| 3 x 50 | 0,391 | 0,499 | 0,077 | 0,093 | 0,218 | 247 | 0,40 | 0,40 | 0,50 | 0,51 | 167 | 7,15 |
| 3 x 70 | 0,27 | 0,344 | 0,075 | 0,090 | 0,227 | 238 | 0,28 | 0,28 | 0,35 | 0,36 | 214 | 10,0 |
| 3 x 95 | 0,195 | 0,249 | 0,074 | 0,089 | 0,232 | 236 | 0,21 | 0,21 | 0,26 | 0,26 | 259 | 13,6 |
| 3 x 120 | 0,154 | 0,196 | 0,073 | 0,087 | 0,238 | 231 | 0,17 | 0,18 | 0,21 | 0,21 | 301 | 17,2 |
| 3 x 150 | 0,126 | 0,161 | 0,072 | 0,087 | 0,240 | 231 | 0,14 | 0,15 | 0,18 | 0,18 | 347 | 21,5 |
| 3 x 185 | 0,1 | 0,128 | 0,072 | 0,086 | 0,242 | 229 | 0,12 | 0,13 | 0,15 | 0,15 | 397 | 26,5 |
| 3 x 240 | 0,0762 | 0,0972 | 0,071 | 0,086 | 0,246 | 227 | 0,10 | 0,11 | 0,12 | 0,13 | 468 | 34,3 |
| 3 x 300 | 0,0607 | 0,0774 | 0,071 | 0,085 | 0,249 | 225 | 0,09 | 0,10 | 0,10 | 0,11 | 540 | 42,9 |

4 cores

| | | | | | | | | | | | | |
|---------|--------|--------|-------|-------|-------|-----|------|------|------|------|-----|------|
| 4 x 1,5 | 12,2 | 15,6 | 0,121 | 20 | 0,21 | 384 | 12,2 | 12,2 | 15,6 | 15,6 | 20 | 0,21 |
| 4 x 2,5 | 7,56 | 9,64 | 0,114 | 0,137 | 0,133 | 357 | 7,56 | 7,56 | 9,64 | 9,64 | 28 | 0,36 |
| 4 x 4 | 4,70 | 5,99 | 0,104 | 0,124 | 0,144 | 330 | 4,70 | 4,70 | 6,00 | 6,00 | 37 | 0,57 |
| 4 x 6 | 3,11 | 3,97 | 0,099 | 0,118 | 0,153 | 314 | 3,11 | 3,11 | 3,97 | 3,97 | 47 | 0,86 |
| 4 x 10 | 1,84 | 2,35 | 0,093 | 0,111 | 0,166 | 295 | 1,84 | 1,84 | 2,35 | 2,35 | 65 | 1,43 |
| 4 x 16 | 1,16 | 1,48 | 0,088 | 0,105 | 0,177 | 279 | 1,16 | 1,17 | 1,48 | 1,48 | 87 | 2,29 |
| 4 x 25 | 0,734 | 0,936 | 0,086 | 0,103 | 0,183 | 274 | 0,74 | 0,74 | 0,94 | 0,94 | 110 | 3,58 |
| 4 x 35 | 0,529 | 0,675 | 0,083 | 0,100 | 0,191 | 265 | 0,54 | 0,54 | 0,68 | 0,68 | 137 | 5,01 |
| 4 x 50 | 0,391 | 0,499 | 0,083 | 0,099 | 0,196 | 264 | 0,40 | 0,40 | 0,51 | 0,51 | 167 | 7,15 |
| 4 x 70 | 0,27 | 0,344 | 0,080 | 0,096 | 0,203 | 255 | 0,28 | 0,29 | 0,35 | 0,36 | 214 | 10,0 |
| 4 x 95 | 0,195 | 0,249 | 0,079 | 0,095 | 0,207 | 253 | 0,21 | 0,22 | 0,26 | 0,27 | 259 | 13,6 |
| 4 x 120 | 0,154 | 0,196 | 0,078 | 0,093 | 0,211 | 248 | 0,17 | 0,18 | 0,21 | 0,22 | 301 | 17,2 |
| 4 x 150 | 0,126 | 0,161 | 0,078 | 0,093 | 0,213 | 248 | 0,15 | 0,16 | 0,18 | 0,19 | 347 | 21,5 |
| 4 x 185 | 0,1 | 0,128 | 0,077 | 0,093 | 0,215 | 246 | 0,13 | 0,14 | 0,15 | 0,16 | 397 | 26,5 |
| 4 x 240 | 0,0762 | 0,0972 | 0,077 | 0,092 | 0,218 | 244 | 0,11 | 0,12 | 0,12 | 0,13 | 468 | 34,3 |
| 4 x 300 | 0,0607 | 0,0774 | 0,076 | 0,091 | 0,220 | 242 | 0,10 | 0,11 | 0,11 | 0,12 | 540 | 42,9 |

power & control 0,6/ 1 kV

multicore

| CONSTRUCTION | | MAX. CONDUCTOR RESISTANCE | | REACTANCE | | CAPACITANCE | INDUCTANCE | IMPEDANCE | | | | MAXIMUM CURRENT (*) | SHORT CIRCUIT |
|----------------------|--------------------|---------------------------|------|-----------|-------|-------------|-------------|-----------|-------|-------|-------|---------------------|--------------------|
| n [mm ²] | | [Ω/km] | | [Ω/km] | | [μFarad/km] | [μHenry/km] | 20°C | | 90°C | | in free air | 1 sec @ 90°C/250°C |
| n | [mm ²] | 20°C | 90°C | 50 Hz | [kA] | nominal | nominal | 50 Hz | 60 Hz | 50 Hz | 60 Hz | [A] | [kA] |
| 5 | x 1,5 | 12,2 | 15,6 | 0,125 | 20 | 0,21 | 399 | 12,2 | 12,2 | 15,6 | 15,6 | 12 | 0,21 |
| 7 | x 1,5 | 12,2 | 15,6 | 0,159 | 0,191 | 0,091 | 506 | 12,2 | 12,2 | 15,6 | 15,6 | 11 | 0,21 |
| 12 | x 1,5 | 12,2 | 15,6 | 0,188 | 0,225 | 0,076 | 597 | 12,2 | 12,2 | 15,6 | 15,6 | 9 | 0,21 |
| 19 | x 1,5 | 12,2 | 15,6 | 0,202 | 0,243 | 0,064 | 645 | 12,2 | 12,2 | 15,6 | 15,6 | 8 | 0,21 |
| 27 | x 1,5 | 12,2 | 15,6 | 0,221 | 0,265 | 0,065 | 695 | 12,2 | 12,2 | 15,6 | 15,6 | 7 | 0,21 |
| 37 | x 1,5 | 12,2 | 15,6 | 0,228 | 0,273 | 0,062 | 726 | 12,2 | 12,2 | 15,6 | 15,6 | 6 | 0,21 |
| 5 | x 2,5 | 7,56 | 9,64 | 0,117 | 0,140 | 0,129 | 372 | 7,56 | 7,56 | 9,64 | 9,64 | 17 | 0,36 |
| 7 | x 2,5 | 7,56 | 9,64 | 0,150 | 0,180 | 0,097 | 479 | 7,56 | 7,56 | 9,64 | 9,64 | 15 | 0,36 |
| 12 | x 2,5 | 7,56 | 9,64 | 0,179 | 0,215 | 0,081 | 571 | 7,56 | 7,56 | 9,64 | 9,64 | 12 | 0,36 |
| 19 | x 2,5 | 7,56 | 9,64 | 0,194 | 0,233 | 0,051 | 618 | 7,56 | 7,56 | 9,64 | 9,64 | 11 | 0,36 |
| 27 | x 2,5 | 7,56 | 9,64 | 0,210 | 0,252 | 0,054 | 668 | 7,56 | 7,56 | 9,64 | 9,64 | 10 | 0,36 |
| 37 | x 2,5 | 7,56 | 9,64 | 0,207 | 0,248 | 0,066 | 699 | 7,56 | 7,56 | 9,64 | 9,64 | 9 | 0,36 |

(*) Maximum current rate based on 90°C conductor temperature and 45°C ambient temperature IEC 60092-352 – see Generals section

RFOU H-M VFD EMC 1,8/3 kV

| CONSTRUCTION | | MAX. CONDUCTOR RESISTANCE | | REACTANCE | | CAPACITANCE | INDUCTANCE | IMPEDANCE | | | | MAXIMUM CURRENT (*) | SHORT CIRCUIT | | |
|--------------|--------------------|---------------------------|--------------------|-----------|-------|-------------|-------------|-----------|---------|-------|-------|---------------------|--------------------|-----|------|
| CONDUCTORS | | EARTHS | | [Ω/km] | | [μFarad/km] | [μHenry/km] | 20°C | | 90°C | | in free air | 1 sec @ 90°C/250°C | | |
| n | [mm ²] | n | [mm ²] | 20°C | 90°C | 50 Hz | 60 Hz | nominal | nominal | 50 Hz | 60 Hz | 50 Hz | 60 Hz | [A] | [kA] |
| 3 | x 10 | 3 | x 2,5 | 1,84 | 2,35 | 0,105 | 0,126 | 0,156 | 334 | 1,84 | 1,84 | 2,35 | 2,35 | 65 | 1,43 |
| 3 | x 16 | 3 | x 4 | 1,16 | 1,48 | 0,098 | 0,117 | 0,170 | 311 | 1,16 | 1,17 | 1,48 | 1,48 | 87 | 2,29 |
| 3 | x 25 | 3 | x 6 | 0,734 | 0,936 | 0,092 | 0,110 | 0,184 | 292 | 0,74 | 0,74 | 0,94 | 0,94 | 110 | 3,58 |
| 3 | x 35 | 3 | x 6 | 0,529 | 0,675 | 0,088 | 0,106 | 0,192 | 281 | 0,54 | 0,54 | 0,68 | 0,68 | 137 | 5,01 |
| 3 | x 50 | 3 | x 10 | 0,391 | 0,499 | 0,086 | 0,103 | 0,199 | 274 | 0,40 | 0,40 | 0,51 | 0,51 | 167 | 7,15 |
| 3 | x 70 | 3 | x 16 | 0,27 | 0,344 | 0,082 | 0,099 | 0,210 | 262 | 0,28 | 0,29 | 0,35 | 0,36 | 214 | 10,0 |
| 3 | x 95 | 3 | x 16 | 0,195 | 0,249 | 0,081 | 0,097 | 0,214 | 257 | 0,21 | 0,22 | 0,26 | 0,27 | 259 | 13,6 |
| 3 | x 120 | 3 | x 25 | 0,154 | 0,196 | 0,079 | 0,095 | 0,221 | 251 | 0,17 | 0,18 | 0,21 | 0,22 | 301 | 17,2 |
| 3 | x 150 | 3 | x 25 | 0,126 | 0,161 | 0,077 | 0,093 | 0,227 | 246 | 0,15 | 0,16 | 0,18 | 0,19 | 347 | 21,5 |
| 3 | x 185 | 3 | x 35 | 0,100 | 0,128 | 0,075 | 0,091 | 0,234 | 240 | 0,13 | 0,13 | 0,15 | 0,16 | 397 | 26,5 |

(*) Maximum current rate based on 90°C conductor temperature and 45°C ambient temperature IEC 60092-352 - see Generals section

medium voltage

P102 & VFD EMC 3,6/6 kV

| CONSTRUCTION | MAX. CONDUCTOR RESISTANCE | | REACTANCE | | CAPACITANCE | | INDUCTANCE | | | | IMPEDANCE | | MAXIMUM CURRENT (*) in free air [A] | SHORT CIRCUIT 1 sec @ 90°C/250°C [kA] | | |
|--------------|---------------------------|--------------------|-----------|-------|-------------|-------|-------------|---------|-------------|-------|-------------|-------|--|--|-------|-------|
| | n | [mm ²] | [Ω/km] | | [Ω/km] | | [μFarad/km] | | [μHenry/km] | | 20°C [Ω/km] | | | | 90°C | |
| | | | 20°C | 90°C | 50 Hz | 60 Hz | nominal | nominal | 50 Hz | 60 Hz | 50 Hz | 60 Hz | | | 50 Hz | 60 Hz |
| 1 x 25 | 0,734 | 0,936 | 0,131 | 0,157 | 0,289 | 416 | 0,75 | 0,75 | 0,95 | 0,95 | 117 | 3,58 | | | | |
| 1 x 35 | 0,529 | 0,675 | 0,124 | 0,149 | 0,317 | 395 | 0,54 | 0,55 | 0,69 | 0,69 | 145 | 5,01 | | | | |
| 1 x 50 | 0,391 | 0,499 | 0,120 | 0,144 | 0,340 | 382 | 0,41 | 0,42 | 0,51 | 0,52 | 179 | 7,15 | | | | |
| 1 x 70 | 0,270 | 0,344 | 0,113 | 0,135 | 0,388 | 358 | 0,29 | 0,30 | 0,36 | 0,37 | 231 | 10,0 | | | | |
| 1 x 95 | 0,195 | 0,249 | 0,106 | 0,127 | 0,438 | 338 | 0,22 | 0,23 | 0,27 | 0,28 | 283 | 13,6 | | | | |
| 1 x 120 | 0,154 | 0,196 | 0,103 | 0,124 | 0,477 | 328 | 0,19 | 0,20 | 0,22 | 0,23 | 331 | 17,2 | | | | |
| 1 x 150 | 0,126 | 0,161 | 0,098 | 0,118 | 0,516 | 313 | 0,16 | 0,17 | 0,19 | 0,20 | 384 | 21,5 | | | | |
| 1 x 185 | 0,100 | 0,128 | 0,096 | 0,115 | 0,569 | 305 | 0,14 | 0,15 | 0,16 | 0,17 | 441 | 26,5 | | | | |
| 1 x 240 | 0,0762 | 0,0972 | 0,092 | 0,110 | 0,617 | 292 | 0,12 | 0,13 | 0,13 | 0,15 | 524 | 34,3 | | | | |
| 1 x 300 | 0,0607 | 0,0774 | 0,089 | 0,107 | 0,647 | 284 | 0,11 | 0,12 | 0,12 | 0,13 | 608 | 42,9 | | | | |
| 3 x 25 | 0,734 | 0,936 | 0,111 | 0,134 | 0,289 | 355 | 0,74 | 0,75 | 0,94 | 0,95 | 105 | 3,58 | | | | |
| 3 x 35 | 0,529 | 0,675 | 0,106 | 0,128 | 0,317 | 339 | 0,54 | 0,54 | 0,68 | 0,69 | 130 | 5,01 | | | | |
| 3 x 50 | 0,391 | 0,499 | 0,103 | 0,124 | 0,340 | 328 | 0,40 | 0,41 | 0,51 | 0,51 | 159 | 7,15 | | | | |
| 3 x 70 | 0,270 | 0,344 | 0,098 | 0,117 | 0,388 | 311 | 0,29 | 0,29 | 0,36 | 0,36 | 203 | 10,0 | | | | |
| 3 x 95 | 0,195 | 0,249 | 0,093 | 0,112 | 0,438 | 296 | 0,22 | 0,22 | 0,27 | 0,27 | 246 | 13,6 | | | | |
| 3 x 120 | 0,154 | 0,196 | 0,090 | 0,108 | 0,477 | 287 | 0,18 | 0,19 | 0,22 | 0,22 | 286 | 17,2 | | | | |
| 3 x 150 | 0,126 | 0,161 | 0,088 | 0,105 | 0,516 | 280 | 0,15 | 0,16 | 0,18 | 0,19 | 330 | 21,5 | | | | |
| 3 x 185 | 0,100 | 0,128 | 0,085 | 0,102 | 0,569 | 271 | 0,13 | 0,14 | 0,15 | 0,16 | 377 | 26,5 | | | | |

P103 & VFD EMC 6/10 kV

| | | | | | | | | | | | | |
|---------|--------|--------|-------|-------|-------|-----|------|------|------|------|-----|------|
| 1 x 25 | 0,734 | 0,936 | 0,135 | 0,162 | 0,228 | 431 | 0,75 | 0,75 | 0,95 | 0,95 | 117 | 3,58 |
| 1 x 35 | 0,529 | 0,675 | 0,128 | 0,154 | 0,249 | 409 | 0,54 | 0,55 | 0,69 | 0,69 | 145 | 5,01 |
| 1 x 50 | 0,391 | 0,499 | 0,124 | 0,149 | 0,266 | 396 | 0,41 | 0,42 | 0,51 | 0,52 | 179 | 7,15 |
| 1 x 70 | 0,270 | 0,344 | 0,115 | 0,137 | 0,301 | 365 | 0,29 | 0,30 | 0,36 | 0,37 | 231 | 10,0 |
| 1 x 95 | 0,195 | 0,249 | 0,108 | 0,130 | 0,338 | 344 | 0,22 | 0,23 | 0,27 | 0,28 | 283 | 13,6 |
| 1 x 120 | 0,154 | 0,196 | 0,107 | 0,128 | 0,367 | 339 | 0,19 | 0,20 | 0,22 | 0,23 | 331 | 17,2 |
| 1 x 150 | 0,126 | 0,161 | 0,102 | 0,122 | 0,396 | 325 | 0,16 | 0,18 | 0,19 | 0,20 | 384 | 21,5 |
| 1 x 185 | 0,100 | 0,128 | 0,098 | 0,117 | 0,435 | 311 | 0,14 | 0,15 | 0,16 | 0,17 | 441 | 26,5 |
| 1 x 240 | 0,0762 | 0,0972 | 0,093 | 0,112 | 0,487 | 297 | 0,12 | 0,14 | 0,13 | 0,15 | 524 | 34,3 |
| 1 x 300 | 0,0607 | 0,0774 | 0,089 | 0,107 | 0,544 | 284 | 0,11 | 0,12 | 0,12 | 0,13 | 608 | 42,9 |
| 3 x 25 | 0,734 | 0,936 | 0,118 | 0,142 | 0,228 | 377 | 0,74 | 0,75 | 0,94 | 0,95 | 105 | 3,58 |
| 3 x 35 | 0,529 | 0,675 | 0,113 | 0,136 | 0,249 | 360 | 0,54 | 0,55 | 0,68 | 0,69 | 130 | 5,01 |
| 3 x 50 | 0,391 | 0,499 | 0,110 | 0,131 | 0,266 | 349 | 0,41 | 0,41 | 0,51 | 0,52 | 159 | 7,15 |
| 3 x 70 | 0,270 | 0,344 | 0,103 | 0,124 | 0,301 | 329 | 0,29 | 0,30 | 0,36 | 0,37 | 203 | 10,0 |
| 3 x 95 | 0,195 | 0,249 | 0,098 | 0,118 | 0,338 | 313 | 0,22 | 0,23 | 0,27 | 0,28 | 246 | 13,6 |
| 3 x 120 | 0,154 | 0,196 | 0,095 | 0,114 | 0,367 | 303 | 0,18 | 0,19 | 0,22 | 0,23 | 286 | 17,2 |
| 3 x 150 | 0,126 | 0,161 | 0,093 | 0,111 | 0,396 | 295 | 0,16 | 0,17 | 0,19 | 0,20 | 330 | 21,5 |
| 3 x 185 | 0,100 | 0,128 | 0,089 | 0,107 | 0,435 | 285 | 0,13 | 0,15 | 0,16 | 0,17 | 377 | 26,5 |

P104 & VFD EMC 8,7/15 kV

| | | | | | | | | | | | | |
|---------|--------|--------|-------|-------|-------|-----|------|------|------|------|-----|------|
| 1 x 25 | 0,734 | 0,936 | 0,142 | 0,170 | 0,186 | 451 | 0,75 | 0,75 | 0,95 | 0,95 | 117 | 3,58 |
| 1 x 35 | 0,529 | 0,675 | 0,135 | 0,162 | 0,202 | 429 | 0,55 | 0,55 | 0,69 | 0,69 | 145 | 5,01 |
| 1 x 50 | 0,391 | 0,499 | 0,130 | 0,156 | 0,215 | 415 | 0,41 | 0,42 | 0,52 | 0,52 | 179 | 7,15 |
| 1 x 70 | 0,270 | 0,344 | 0,122 | 0,147 | 0,242 | 389 | 0,30 | 0,31 | 0,37 | 0,37 | 231 | 10,0 |
| 1 x 95 | 0,195 | 0,249 | 0,115 | 0,138 | 0,270 | 367 | 0,23 | 0,24 | 0,27 | 0,28 | 283 | 13,6 |
| 1 x 120 | 0,154 | 0,196 | 0,112 | 0,134 | 0,292 | 355 | 0,19 | 0,20 | 0,23 | 0,24 | 331 | 17,2 |
| 1 x 150 | 0,126 | 0,161 | 0,107 | 0,128 | 0,314 | 340 | 0,17 | 0,18 | 0,19 | 0,21 | 384 | 21,5 |
| 1 x 185 | 0,100 | 0,128 | 0,102 | 0,123 | 0,344 | 325 | 0,14 | 0,16 | 0,16 | 0,18 | 441 | 26,5 |
| 1 x 240 | 0,0762 | 0,0972 | 0,098 | 0,117 | 0,383 | 311 | 0,12 | 0,14 | 0,14 | 0,15 | 524 | 34,3 |
| 1 x 300 | 0,0607 | 0,0774 | 0,093 | 0,112 | 0,427 | 296 | 0,11 | 0,13 | 0,12 | 0,14 | 608 | 42,9 |
| 3 x 25 | 0,734 | 0,936 | 0,126 | 0,152 | 0,186 | 402 | 0,74 | 0,75 | 0,94 | 0,95 | 105 | 3,58 |
| 3 x 35 | 0,529 | 0,675 | 0,121 | 0,145 | 0,202 | 384 | 0,54 | 0,55 | 0,69 | 0,69 | 130 | 5,01 |
| 3 x 50 | 0,391 | 0,499 | 0,117 | 0,140 | 0,215 | 371 | 0,41 | 0,42 | 0,51 | 0,52 | 159 | 7,15 |
| 3 x 70 | 0,270 | 0,344 | 0,110 | 0,132 | 0,242 | 350 | 0,29 | 0,30 | 0,36 | 0,37 | 203 | 10,0 |
| 3 x 95 | 0,195 | 0,249 | 0,104 | 0,125 | 0,270 | 332 | 0,22 | 0,23 | 0,27 | 0,28 | 246 | 13,6 |
| 3 x 120 | 0,154 | 0,196 | 0,101 | 0,121 | 0,292 | 321 | 0,18 | 0,20 | 0,22 | 0,23 | 286 | 17,2 |
| 3 x 150 | 0,126 | 0,161 | 0,098 | 0,117 | 0,314 | 312 | 0,16 | 0,17 | 0,19 | 0,20 | 330 | 21,5 |

medium voltage

P112 & VFD EMC 12/20 kV

| CONSTRUCTION | MAX. CONDUCTOR RESISTANCE | | REACTANCE | | CAPACITANCE | | INDUCTANCE | | IMPEDANCE | | | | MAXIMUM CURRENT (*) in free air [A] | SHORT CIRCUIT 1 sec @ 90°C/250°C [kA] |
|--------------|---------------------------|--------------------|-----------|-------|-------------|-------|-------------------------|---------|-----------|-------|-------|-------|---|--|
| | n | [mm ²] | [Ω/km] | | [Ω/km] | | [μFarad/km] [μHenry/km] | | 20°C | | 90°C | | | |
| | | | 20°C | 90°C | 50 Hz | 60 Hz | nominal | nominal | 50 Hz | 60 Hz | 50 Hz | 60 Hz | | |
| 1 x 35 | | 0,529 | 0,675 | 0,138 | 0,166 | 0,175 | 441 | 0,55 | 0,55 | 0,69 | 0,69 | 145 | 5,01 | |
| 1 x 50 | | 0,529 | 0,675 | 0,134 | 0,161 | 0,186 | 426 | 0,41 | 0,42 | 0,52 | 0,52 | 179 | 7,15 | |
| 1 x 70 | | 0,391 | 0,499 | 0,126 | 0,151 | 0,208 | 400 | 0,30 | 0,31 | 0,37 | 0,38 | 231 | 10,0 | |
| 1 x 95 | | 0,270 | 0,344 | 0,119 | 0,142 | 0,232 | 378 | 0,23 | 0,24 | 0,28 | 0,29 | 283 | 13,6 | |
| 1 x 120 | | 0,195 | 0,249 | 0,115 | 0,138 | 0,250 | 365 | 0,19 | 0,21 | 0,23 | 0,24 | 331 | 17,2 | |
| 1 x 150 | | 0,154 | 0,196 | 0,111 | 0,134 | 0,268 | 355 | 0,17 | 0,18 | 0,20 | 0,21 | 384 | 21,5 | |
| 1 x 185 | | 0,126 | 0,161 | 0,107 | 0,128 | 0,293 | 339 | 0,15 | 0,16 | 0,17 | 0,18 | 441 | 26,5 | |
| 1 x 240 | | 0,100 | 0,128 | 0,100 | 0,120 | 0,325 | 320 | 0,13 | 0,14 | 0,14 | 0,15 | 524 | 34,3 | |
| 1 x 300 | | 0,0762 | 0,0972 | 0,098 | 0,118 | 0,360 | 312 | 0,12 | 0,13 | 0,12 | 0,14 | 608 | 42,9 | |
| 3 x 35 | | 0,529 | 0,675 | 0,127 | 0,152 | 0,175 | 403 | 0,54 | 0,55 | 0,69 | 0,69 | 130 | 5,01 | |
| 3 x 50 | | 0,391 | 0,499 | 0,122 | 0,147 | 0,186 | 390 | 0,41 | 0,42 | 0,51 | 0,52 | 159 | 7,15 | |
| 3 x 70 | | 0,270 | 0,344 | 0,115 | 0,138 | 0,208 | 367 | 0,29 | 0,30 | 0,36 | 0,37 | 203 | 10,0 | |
| 3 x 95 | | 0,195 | 0,249 | 0,109 | 0,131 | 0,232 | 348 | 0,22 | 0,24 | 0,27 | 0,28 | 246 | 13,6 | |
| 3 x 120 | | 0,154 | 0,196 | 0,106 | 0,127 | 0,250 | 336 | 0,19 | 0,20 | 0,22 | 0,23 | 286 | 17,2 | |
| 3 x 150 | | 0,126 | 0,161 | 0,102 | 0,123 | 0,268 | 326 | 0,16 | 0,18 | 0,19 | 0,20 | 330 | 21,5 | |

P113 18/30 kV

| | | | | | | | | | | | | | |
|---------|--|--------|--------|-------|-------|-------|-----|------|------|------|------|-----|------|
| 1 x 50 | | 0,391 | 0,499 | 0,144 | 0,173 | 0,144 | 458 | 0,42 | 0,43 | 0,52 | 0,53 | 179 | 7,15 |
| 1 x 70 | | 0,270 | 0,344 | 0,135 | 0,162 | 0,160 | 430 | 0,30 | 0,31 | 0,37 | 0,38 | 231 | 10,0 |
| 1 x 95 | | 0,195 | 0,249 | 0,128 | 0,153 | 0,177 | 406 | 0,23 | 0,25 | 0,28 | 0,29 | 283 | 13,6 |
| 1 x 120 | | 0,154 | 0,196 | 0,122 | 0,146 | 0,190 | 388 | 0,20 | 0,21 | 0,23 | 0,24 | 331 | 17,2 |
| 1 x 150 | | 0,126 | 0,161 | 0,118 | 0,142 | 0,202 | 377 | 0,17 | 0,19 | 0,20 | 0,21 | 384 | 21,5 |
| 1 x 185 | | 0,100 | 0,128 | 0,113 | 0,136 | 0,219 | 360 | 0,15 | 0,17 | 0,17 | 0,19 | 441 | 26,5 |
| 1 x 240 | | 0,0762 | 0,0972 | 0,108 | 0,130 | 0,242 | 344 | 0,13 | 0,15 | 0,15 | 0,16 | 524 | 34,3 |
| 1 x 300 | | 0,0607 | 0,0774 | 0,104 | 0,125 | 0,267 | 331 | 0,12 | 0,14 | 0,13 | 0,15 | 608 | 42,9 |
| 3 x 50 | | 0,391 | 0,499 | 0,135 | 0,162 | 0,144 | 430 | 0,41 | 0,42 | 0,52 | 0,52 | 130 | 7,15 |
| 3 x 70 | | 0,270 | 0,344 | 0,127 | 0,152 | 0,160 | 404 | 0,30 | 0,31 | 0,37 | 0,38 | 159 | 10,0 |
| 3 x 95 | | 0,195 | 0,249 | 0,120 | 0,144 | 0,177 | 383 | 0,23 | 0,24 | 0,28 | 0,29 | 203 | 13,6 |
| 3 x 120 | | 0,154 | 0,196 | 0,116 | 0,139 | 0,190 | 369 | 0,19 | 0,21 | 0,23 | 0,24 | 246 | 17,2 |
| 3 x 150 | | 0,126 | 0,161 | 0,112 | 0,135 | 0,202 | 358 | 0,17 | 0,18 | 0,20 | 0,21 | 286 | 21,5 |

(*) Maximum current rate based on 90°C conductor temperature and 45°C ambient temperature IEC 60092-352 – see Generals section

| CONSTRUCTION | | | MAX. CONDUCTOR RESISTANCE | | REACTANCE | | CAPACITANCE | INDUCTANCE | IMPEDANCE @ 50 & 60 Hz | | L/R ratio @ 1 kHz |
|--------------|---|---------------------|---------------------------|------|------------------|-------|--------------------|--------------------|------------------------|------|---------------------------|
| | | | [Ω /km] | | [Ω /km] | | [μ Farad/km] | [μ Henry/km] | [Ω /km] | | [μ Henry/ Ω] |
| | n | [mm ²] | 20°C | 90°C | 50 Hz | 60 Hz | max. | nominal | 20°C | 90°C | max. |
| pair | 2 | x 0,75 | 26,3 | 33,5 | 0,106 | 0,127 | 0,090 | 336 | 26,3 | 33,5 | 12,8 |
| | 2 | x 1 | 19,3 | 24,6 | 0,098 | 0,118 | 0,095 | 312 | 19,3 | 24,6 | 16,2 |
| | 2 | x 1,5 | 12,9 | 16,5 | 0,099 | 0,118 | 0,100 | 314 | 12,9 | 16,5 | 24,3 |
| triple | 3 | x 0,75 | 26,0 | 33,5 | 0,106 | 0,127 | 0,090 | 336 | 26,3 | 33,5 | 12,8 |
| | 3 | x 1 | 19,3 | 24,6 | 0,098 | 0,118 | 0,095 | 312 | 19,3 | 24,6 | 16,2 |
| | 3 | x 1,5 | 12,9 | 16,5 | 0,099 | 0,118 | 0,100 | 314 | 12,9 | 16,5 | 24,3 |

1 core

| CONSTRUCTION | MAX. CONDUCTOR RESISTANCE | | REACTANCE | | CAPACITANCE | | INDUCTANCE | | IMPEDANCE | | | | MAXIMUM CURRENT (*) in free air | SHORT CIRCUIT 1 sec @ 95°C/350°C [kA] |
|--------------|---------------------------|--------|-----------|-------|---------------|---------------|------------|---------|-----------|-------|-------|-------|------------------------------------|--|
| | [Ω/km] | | [Ω/km] | | [μFarad/km] | [μHenry/km] | 20°C | | [Ω/km] | | 95°C | | | |
| | n | [mm²] | 20°C | 95°C | 50 Hz | [A] | nominal | nominal | 50 Hz | 60 Hz | 50 Hz | 60 Hz | | |
| 1 x 16 | | 1,16 | 1,50 | 0,126 | 104 | 2,29 | 401 | 1,17 | 1,17 | 1,51 | 1,51 | 97 | 2,74 | |
| 1 x 25 | | 0,734 | 0,951 | 0,123 | 0,148 | 0,179 | 392 | 0,74 | 0,75 | 0,96 | 0,96 | 128 | 4,28 | |
| 1 x 35 | | 0,529 | 0,685 | 0,121 | 0,145 | 0,194 | 385 | 0,54 | 0,55 | 0,70 | 0,70 | 160 | 5,99 | |
| 1 x 50 | | 0,391 | 0,506 | 0,115 | 0,137 | 0,212 | 365 | 0,41 | 0,41 | 0,52 | 0,52 | 197 | 8,55 | |
| 1 x 70 | | 0,270 | 0,350 | 0,109 | 0,130 | 0,219 | 346 | 0,29 | 0,30 | 0,37 | 0,37 | 254 | 12,0 | |
| 1 x 95 | | 0,195 | 0,253 | 0,104 | 0,125 | 0,233 | 331 | 0,22 | 0,23 | 0,27 | 0,28 | 311 | 16,2 | |
| 1 x 120 | | 0,154 | 0,199 | 0,102 | 0,122 | 0,245 | 324 | 0,18 | 0,20 | 0,22 | 0,23 | 364 | 20,5 | |
| 1 x 150 | | 0,126 | 0,163 | 0,100 | 0,120 | 0,251 | 319 | 0,16 | 0,17 | 0,19 | 0,20 | 422 | 25,7 | |
| 1 x 185 | | 0,100 | 0,130 | 0,097 | 0,116 | 0,260 | 308 | 0,14 | 0,15 | 0,16 | 0,17 | 485 | 31,6 | |
| 1 x 240 | | 0,0762 | 0,0987 | 0,096 | 0,115 | 0,266 | 305 | 0,12 | 0,14 | 0,14 | 0,15 | 577 | 41,0 | |
| 1 x 300 | | 0,0607 | 0,0786 | 0,094 | 0,113 | 0,280 | 300 | 0,11 | 0,13 | 0,12 | 0,14 | 670 | 51,3 | |

2 cores

| | | | | | | | | | | | | | |
|---------|--|------|------|-------|-------|-------|-----|------|------|------|------|-----|------|
| 2 x 1,5 | | 12,2 | 15,8 | 0,110 | 0,132 | 0,160 | 351 | 12,2 | 12,2 | 15,8 | 15,8 | 24 | 0,26 |
| 2 x 2,5 | | 7,56 | 9,79 | 0,103 | 0,123 | 0,180 | 327 | 7,56 | 7,56 | 9,79 | 9,79 | 33 | 0,43 |
| 2 x 4 | | 4,70 | 6,09 | 0,095 | 0,114 | 0,207 | 303 | 4,70 | 4,70 | 6,09 | 6,09 | 45 | 0,68 |
| 2 x 6 | | 3,11 | 4,03 | 0,090 | 0,108 | 0,230 | 286 | 3,11 | 3,11 | 4,03 | 4,03 | 57 | 1,03 |
| 2 x 10 | | 1,84 | 2,38 | 0,084 | 0,101 | 0,261 | 268 | 1,84 | 1,84 | 2,38 | 2,39 | 78 | 1,71 |
| 2 x 16 | | 1,16 | 1,50 | 0,080 | 0,096 | 0,293 | 254 | 1,16 | 1,16 | 1,50 | 1,51 | 105 | 2,74 |

3 cores

| | | | | | | | | | | | | | |
|---------|--|--------|--------|-------|-------|-------|-----|------|------|------|------|-----|------|
| 3 x 1,5 | | 12,2 | 15,8 | 0,110 | 0,132 | 0,160 | 351 | 12,2 | 12,2 | 15,8 | 15,8 | 21 | 0,26 |
| 3 x 2,5 | | 7,56 | 9,79 | 0,103 | 0,123 | 0,180 | 327 | 7,56 | 7,56 | 9,79 | 9,79 | 29 | 0,43 |
| 3 x 4 | | 4,70 | 6,09 | 0,095 | 0,114 | 0,207 | 303 | 4,70 | 4,70 | 6,09 | 6,09 | 38 | 0,68 |
| 3 x 6 | | 3,11 | 4,03 | 0,090 | 0,108 | 0,230 | 286 | 3,11 | 3,11 | 4,03 | 4,03 | 49 | 1,03 |
| 3 x 10 | | 1,84 | 2,38 | 0,084 | 0,101 | 0,261 | 268 | 1,84 | 1,84 | 2,38 | 2,39 | 68 | 1,71 |
| 3 x 16 | | 1,16 | 1,50 | 0,080 | 0,096 | 0,293 | 254 | 1,16 | 1,16 | 1,50 | 1,51 | 91 | 2,74 |
| 3 x 25 | | 0,734 | 0,951 | 0,079 | 0,095 | 0,299 | 251 | 0,74 | 0,74 | 0,95 | 0,96 | 116 | 4,28 |
| 3 x 35 | | 0,529 | 0,685 | 0,077 | 0,092 | 0,319 | 244 | 0,53 | 0,54 | 0,69 | 0,69 | 144 | 5,99 |
| 3 x 50 | | 0,391 | 0,506 | 0,077 | 0,092 | 0,318 | 244 | 0,40 | 0,40 | 0,51 | 0,51 | 175 | 8,55 |
| 3 x 70 | | 0,270 | 0,350 | 0,075 | 0,090 | 0,338 | 238 | 0,28 | 0,28 | 0,36 | 0,36 | 224 | 12,0 |
| 3 x 95 | | 0,195 | 0,253 | 0,074 | 0,089 | 0,343 | 237 | 0,21 | 0,21 | 0,26 | 0,27 | 271 | 16,2 |
| 3 x 120 | | 0,154 | 0,199 | 0,073 | 0,087 | 0,359 | 232 | 0,17 | 0,18 | 0,21 | 0,22 | 315 | 20,5 |
| 3 x 150 | | 0,126 | 0,163 | 0,073 | 0,088 | 0,357 | 233 | 0,15 | 0,15 | 0,18 | 0,19 | 363 | 25,7 |
| 3 x 185 | | 0,100 | 0,130 | 0,073 | 0,087 | 0,359 | 232 | 0,12 | 0,13 | 0,15 | 0,16 | 415 | 31,6 |
| 3 x 240 | | 0,0762 | 0,0987 | 0,072 | 0,087 | 0,366 | 230 | 0,11 | 0,12 | 0,12 | 0,13 | 490 | 41,0 |
| 3 x 300 | | 0,0607 | 0,0786 | 0,072 | 0,086 | 0,373 | 228 | 0,09 | 0,11 | 0,11 | 0,12 | 565 | 51,3 |

4 cores

| | | | | | | | | | | | | | |
|---------|--|--------|--------|-------|-------|-------|-----|------|------|------|------|-----|------|
| 4 x 1,5 | | 12,2 | 15,8 | 0,117 | 0,141 | 0,145 | 373 | 12,2 | 12,2 | 15,8 | 15,8 | 21 | 0,26 |
| 4 x 2,5 | | 7,56 | 9,79 | 0,110 | 0,132 | 0,161 | 350 | 7,56 | 7,56 | 9,79 | 9,79 | 29 | 0,43 |
| 4 x 4 | | 4,70 | 6,09 | 0,102 | 0,123 | 0,182 | 325 | 4,70 | 4,70 | 6,09 | 6,09 | 38 | 0,68 |
| 4 x 6 | | 3,11 | 4,03 | 0,097 | 0,116 | 0,200 | 308 | 3,11 | 3,11 | 4,03 | 4,03 | 49 | 1,03 |
| 4 x 10 | | 1,84 | 2,38 | 0,091 | 0,110 | 0,223 | 291 | 1,84 | 1,84 | 2,39 | 2,39 | 68 | 1,71 |
| 4 x 16 | | 1,16 | 1,50 | 0,087 | 0,104 | 0,246 | 276 | 1,16 | 1,16 | 1,51 | 1,51 | 91 | 2,74 |
| 4 x 25 | | 0,734 | 0,951 | 0,086 | 0,103 | 0,250 | 274 | 0,74 | 0,74 | 0,95 | 0,96 | 116 | 4,28 |
| 4 x 35 | | 0,529 | 0,685 | 0,084 | 0,101 | 0,264 | 267 | 0,54 | 0,54 | 0,69 | 0,69 | 144 | 5,99 |
| 4 x 50 | | 0,391 | 0,506 | 0,084 | 0,101 | 0,263 | 267 | 0,40 | 0,40 | 0,51 | 0,52 | 175 | 8,55 |
| 4 x 70 | | 0,270 | 0,350 | 0,082 | 0,098 | 0,277 | 261 | 0,28 | 0,29 | 0,36 | 0,36 | 224 | 12,0 |
| 4 x 95 | | 0,195 | 0,253 | 0,081 | 0,097 | 0,280 | 259 | 0,21 | 0,22 | 0,27 | 0,27 | 271 | 16,2 |
| 4 x 120 | | 0,154 | 0,199 | 0,080 | 0,096 | 0,291 | 255 | 0,17 | 0,18 | 0,21 | 0,22 | 315 | 20,5 |
| 4 x 150 | | 0,126 | 0,163 | 0,080 | 0,096 | 0,289 | 255 | 0,15 | 0,16 | 0,18 | 0,19 | 363 | 25,7 |
| 4 x 185 | | 0,100 | 0,130 | 0,080 | 0,096 | 0,291 | 255 | 0,13 | 0,14 | 0,15 | 0,16 | 415 | 31,6 |
| 4 x 240 | | 0,0762 | 0,0987 | 0,079 | 0,095 | 0,295 | 253 | 0,11 | 0,12 | 0,13 | 0,14 | 490 | 41,0 |
| 4 x 300 | | 0,0607 | 0,0786 | 0,079 | 0,095 | 0,300 | 251 | 0,10 | 0,11 | 0,11 | 0,12 | 565 | 51,3 |

multicore

| CONSTRUCTION | | MAX. CONDUCTOR RESISTANCE | | REACTANCE | | CAPACITANCE INDUCTANCE | | IMPEDANCE | | | | MAXIMUM CURRENT (*) | SHORT CIRCUIT |
|----------------------|-------|---------------------------|------|-----------|-------|-------------------------|---------|-----------|-------|-------|-------|---------------------|--------------------|
| n [mm ²] | | [Ω/km] | | [Ω/km] | | [μFarad/km] [μHenry/km] | | 20°C | | 95°C | | in free air | 1 sec @ 95°C/350°C |
| | | 20°C | 95°C | 50 Hz | 60 Hz | nominal | nominal | 50 Hz | 60 Hz | 50 Hz | 60 Hz | [A] | [kA] |
| 5 | x 1,5 | 12,2 | 15,8 | 0,120 | 0,144 | 0,140 | 382 | 12,2 | 12,2 | 15,8 | 15,8 | 13 | 0,26 |
| 7 | x 1,5 | 12,2 | 15,8 | 0,154 | 0,184 | 0,097 | 489 | 12,2 | 12,2 | 15,8 | 15,8 | 12 | 0,26 |
| 12 | x 1,5 | 12,2 | 15,8 | 0,182 | 0,219 | 0,077 | 581 | 12,2 | 12,2 | 15,8 | 15,8 | 10 | 0,26 |
| 19 | x 1,5 | 12,2 | 15,8 | 0,197 | 0,237 | 0,070 | 628 | 12,2 | 12,2 | 15,8 | 15,8 | 10 | 0,26 |
| 27 | x 1,5 | 12,2 | 15,8 | 0,213 | 0,256 | 0,063 | 679 | 12,2 | 12,2 | 15,8 | 15,8 | 9 | 0,26 |
| 37 | x 1,5 | 12,2 | 15,8 | 0,223 | 0,267 | 0,060 | 709 | 12,2 | 12,2 | 15,8 | 15,8 | 7 | 0,26 |
| 5 | x 2,5 | 7,56 | 9,79 | 0,113 | 0,135 | 0,155 | 359 | 7,56 | 7,56 | 9,79 | 9,79 | 18 | 0,43 |
| 7 | x 2,5 | 7,56 | 9,79 | 0,146 | 0,176 | 0,104 | 466 | 7,56 | 7,56 | 9,79 | 9,79 | 16 | 0,43 |
| 12 | x 2,5 | 7,56 | 9,79 | 0,175 | 0,210 | 0,082 | 557 | 7,56 | 7,56 | 9,79 | 9,79 | 13 | 0,43 |
| 19 | x 2,5 | 7,56 | 9,79 | 0,204 | 0,245 | 0,074 | 649 | 7,56 | 7,56 | 9,79 | 9,80 | 12 | 0,43 |
| 27 | x 2,5 | 7,56 | 9,79 | 0,206 | 0,247 | 0,066 | 655 | 7,56 | 7,56 | 9,79 | 9,80 | 11 | 0,43 |
| 37 | x 2,5 | 7,56 | 9,79 | 0,215 | 0,258 | 0,063 | 686 | 7,56 | 7,56 | 9,80 | 9,80 | 9 | 0,43 |

(*) Maximum current rate based on 90°C conductor temperature and 45°C ambient temperature IEC 60092-352 – see Generals section

P120 3,6/6 kV

| CONSTRUCTION | MAX. CONDUCTOR RESISTANCE | | REACTANCE | | CAPACITANCE | | INDUCTANCE | | IMPEDANCE | | | | MAXIMUM CURRENT (*) | SHORT CIRCUIT |
|--------------|---------------------------|--------|-----------|-------|-------------|-------|-------------|---------|-----------|-------|-------|-------|---------------------|--------------------|
| | [Ω/km] | | [Ω/km] | | [μFarad/km] | | [μHenry/km] | | 20°C | | 90°C | | in free air | 1 sec @ 90°C/250°C |
| | n | [mm²] | 20°C | 90°C | 50 Hz | [A] | nominal | nominal | 50 Hz | 60 Hz | 50 Hz | 60 Hz | [A] | [kA] |
| 1 x 50 | | 0,391 | 0,499 | 0,161 | 0,193 | 0,201 | 513 | 0,42 | 0,44 | 0,72 | 0,53 | 179 | 7,15 | |
| 1 x 70 | | 0,270 | 0,344 | 0,152 | 0,183 | 0,229 | 485 | 0,31 | 0,33 | 0,61 | 0,39 | 231 | 10,0 | |
| 1 x 95 | | 0,195 | 0,249 | 0,145 | 0,174 | 0,258 | 461 | 0,24 | 0,26 | 0,52 | 0,30 | 283 | 13,6 | |
| 1 x 120 | | 0,154 | 0,196 | 0,140 | 0,168 | 0,281 | 447 | 0,21 | 0,23 | 0,46 | 0,26 | 331 | 17,2 | |
| 1 x 150 | | 0,126 | 0,161 | 0,135 | 0,162 | 0,304 | 431 | 0,18 | 0,21 | 0,42 | 0,23 | 384 | 21,5 | |
| 1 x 185 | | 0,100 | 0,128 | 0,130 | 0,156 | 0,334 | 414 | 0,16 | 0,19 | 0,38 | 0,20 | 441 | 26,5 | |
| 1 x 240 | | 0,0762 | 0,0972 | 0,125 | 0,150 | 0,374 | 398 | 0,15 | 0,17 | 0,34 | 0,18 | 524 | 34,3 | |
| 1 x 300 | | 0,0607 | 0,0774 | 0,121 | 0,145 | 0,419 | 384 | 0,14 | 0,16 | 0,30 | 0,16 | 608 | 42,9 | |
| 3 x 50 | | 0,391 | 0,499 | 0,117 | 0,140 | 0,201 | 371 | 0,41 | 0,42 | 0,72 | 0,52 | 159 | 7,15 | |
| 3 x 70 | | 0,270 | 0,344 | 0,110 | 0,132 | 0,229 | 350 | 0,29 | 0,30 | 0,60 | 0,37 | 203 | 10,0 | |
| 3 x 95 | | 0,195 | 0,249 | 0,104 | 0,125 | 0,258 | 332 | 0,22 | 0,23 | 0,51 | 0,28 | 246 | 13,6 | |
| 3 x 120 | | 0,154 | 0,196 | 0,101 | 0,121 | 0,281 | 321 | 0,18 | 0,20 | 0,45 | 0,23 | 286 | 17,2 | |
| 3 x 150 | | 0,126 | 0,161 | 0,098 | 0,117 | 0,304 | 312 | 0,16 | 0,17 | 0,41 | 0,20 | 330 | 21,5 | |
| 3 x 185 | | 0,100 | 0,128 | 0,094 | 0,113 | 0,334 | 301 | 0,14 | 0,15 | 0,37 | 0,17 | 377 | 26,5 | |
| 3 x 240 | | 0,0762 | 0,0972 | 0,091 | 0,109 | 0,374 | 289 | 0,12 | 0,13 | 0,32 | 0,15 | 445 | 34,3 | |

P121 6/10 kV

| | | | | | | | | | | | | | |
|---------|--|--------|--------|-------|-------|-------|-----|------|------|------|------|-----|------|
| 1 x 50 | | 0,391 | 0,499 | 0,165 | 0,198 | 0,177 | 527 | 0,42 | 0,44 | 0,73 | 0,54 | 179 | 7,15 |
| 1 x 70 | | 0,270 | 0,344 | 0,156 | 0,188 | 0,200 | 498 | 0,31 | 0,33 | 0,61 | 0,39 | 231 | 10,0 |
| 1 x 95 | | 0,195 | 0,249 | 0,149 | 0,178 | 0,225 | 473 | 0,25 | 0,26 | 0,52 | 0,31 | 283 | 13,6 |
| 1 x 120 | | 0,154 | 0,196 | 0,143 | 0,171 | 0,244 | 455 | 0,21 | 0,23 | 0,47 | 0,26 | 331 | 17,2 |
| 1 x 150 | | 0,126 | 0,161 | 0,139 | 0,167 | 0,263 | 443 | 0,19 | 0,21 | 0,42 | 0,23 | 384 | 21,5 |
| 1 x 185 | | 0,100 | 0,128 | 0,134 | 0,160 | 0,288 | 426 | 0,17 | 0,19 | 0,38 | 0,20 | 441 | 26,5 |
| 1 x 240 | | 0,0762 | 0,0972 | 0,127 | 0,153 | 0,321 | 405 | 0,15 | 0,17 | 0,34 | 0,18 | 524 | 34,3 |
| 1 x 300 | | 0,0607 | 0,0774 | 0,123 | 0,147 | 0,359 | 391 | 0,14 | 0,16 | 0,30 | 0,17 | 608 | 42,9 |
| 3 x 50 | | 0,391 | 0,499 | 0,122 | 0,146 | 0,177 | 388 | 0,41 | 0,42 | 0,72 | 0,52 | 159 | 7,15 |
| 3 x 70 | | 0,270 | 0,344 | 0,115 | 0,138 | 0,200 | 365 | 0,29 | 0,30 | 0,60 | 0,37 | 203 | 10,0 |
| 3 x 95 | | 0,195 | 0,249 | 0,109 | 0,131 | 0,225 | 347 | 0,22 | 0,23 | 0,51 | 0,28 | 246 | 13,6 |
| 3 x 120 | | 0,154 | 0,196 | 0,105 | 0,126 | 0,244 | 335 | 0,19 | 0,20 | 0,46 | 0,23 | 286 | 17,2 |
| 3 x 150 | | 0,126 | 0,161 | 0,102 | 0,122 | 0,263 | 325 | 0,16 | 0,18 | 0,41 | 0,20 | 330 | 21,5 |
| 3 x 185 | | 0,100 | 0,128 | 0,098 | 0,118 | 0,288 | 313 | 0,14 | 0,15 | 0,37 | 0,17 | 377 | 26,5 |

P122 8,7/15 kV

| | | | | | | | | | | | | | |
|---------|--|--------|--------|-------|-------|-------|-----|------|------|------|------|-----|------|
| 1 x 50 | | 0,391 | 0,499 | 0,168 | 0,202 | 0,156 | 535 | 0,43 | 0,44 | 0,73 | 0,54 | 179 | 7,15 |
| 1 x 70 | | 0,270 | 0,344 | 0,158 | 0,189 | 0,175 | 502 | 0,31 | 0,33 | 0,61 | 0,39 | 231 | 10,0 |
| 1 x 95 | | 0,195 | 0,249 | 0,150 | 0,180 | 0,196 | 477 | 0,25 | 0,27 | 0,52 | 0,31 | 283 | 13,6 |
| 1 x 120 | | 0,154 | 0,196 | 0,132 | 0,158 | 0,212 | 420 | 0,20 | 0,22 | 0,46 | 0,25 | 331 | 17,2 |
| 1 x 150 | | 0,126 | 0,161 | 0,140 | 0,168 | 0,228 | 446 | 0,19 | 0,21 | 0,42 | 0,23 | 384 | 21,5 |
| 1 x 185 | | 0,100 | 0,128 | 0,135 | 0,162 | 0,249 | 429 | 0,17 | 0,19 | 0,38 | 0,21 | 441 | 26,5 |
| 1 x 240 | | 0,0762 | 0,0972 | 0,129 | 0,155 | 0,277 | 412 | 0,15 | 0,17 | 0,34 | 0,18 | 524 | 34,3 |
| 1 x 300 | | 0,0607 | 0,0774 | 0,125 | 0,150 | 0,308 | 398 | 0,14 | 0,16 | 0,30 | 0,17 | 608 | 42,9 |
| 3 x 50 | | 0,391 | 0,499 | 0,128 | 0,153 | 0,156 | 407 | 0,41 | 0,42 | 0,72 | 0,52 | 159 | 7,15 |
| 3 x 70 | | 0,270 | 0,344 | 0,120 | 0,144 | 0,175 | 383 | 0,30 | 0,31 | 0,60 | 0,37 | 203 | 10,0 |
| 3 x 95 | | 0,195 | 0,249 | 0,114 | 0,137 | 0,196 | 363 | 0,23 | 0,24 | 0,51 | 0,28 | 246 | 13,6 |
| 3 x 120 | | 0,154 | 0,196 | 0,110 | 0,132 | 0,212 | 350 | 0,19 | 0,20 | 0,46 | 0,24 | 286 | 17,2 |
| 3 x 150 | | 0,126 | 0,161 | 0,107 | 0,128 | 0,228 | 339 | 0,16 | 0,18 | 0,41 | 0,21 | 330 | 21,5 |

P123 12/20 kV

| | | | | | | | | | | | | | |
|---------|--|--------|--------|-------|-------|-------|-----|------|------|------|------|-----|------|
| 1 x 70 | | 0,391 | 0,499 | 0,171 | 0,205 | 0,142 | 544 | 0,43 | 0,44 | 0,73 | 0,54 | 231 | 10,0 |
| 1 x 95 | | 0,270 | 0,344 | 0,162 | 0,194 | 0,159 | 514 | 0,31 | 0,33 | 0,61 | 0,40 | 283 | 13,6 |
| 1 x 120 | | 0,195 | 0,249 | 0,154 | 0,184 | 0,177 | 489 | 0,25 | 0,27 | 0,52 | 0,31 | 331 | 17,2 |
| 1 x 150 | | 0,154 | 0,196 | 0,148 | 0,177 | 0,191 | 470 | 0,21 | 0,23 | 0,47 | 0,26 | 384 | 21,5 |
| 1 x 185 | | 0,126 | 0,161 | 0,144 | 0,172 | 0,205 | 457 | 0,19 | 0,21 | 0,43 | 0,24 | 441 | 26,5 |
| 1 x 240 | | 0,100 | 0,128 | 0,138 | 0,166 | 0,223 | 440 | 0,17 | 0,19 | 0,38 | 0,21 | 524 | 34,3 |
| 1 x 300 | | 0,0762 | 0,0972 | 0,131 | 0,158 | 0,248 | 419 | 0,15 | 0,18 | 0,34 | 0,19 | 608 | 42,9 |
| 3 x 50 | | 0,391 | 0,499 | 0,133 | 0,162 | 0,142 | 422 | 0,41 | 0,42 | 0,72 | 0,52 | 159 | 7,15 |
| 3 x 70 | | 0,270 | 0,344 | 0,125 | 0,155 | 0,159 | 397 | 0,30 | 0,31 | 0,60 | 0,38 | 203 | 10,0 |
| 3 x 95 | | 0,195 | 0,249 | 0,118 | 0,147 | 0,177 | 377 | 0,23 | 0,24 | 0,51 | 0,29 | 246 | 13,6 |
| 3 x 120 | | 0,154 | 0,196 | 0,114 | 0,141 | 0,191 | 363 | 0,19 | 0,21 | 0,46 | 0,24 | 286 | 17,2 |
| 3 x 150 | | 0,126 | 0,161 | 0,110 | 0,137 | 0,205 | 352 | 0,17 | 0,18 | 0,42 | 0,21 | 330 | 21,5 |

(*) Maximum current rate based on 90°C conductor temperature and 45°C ambient temperature IEC 60092-352 – see Generals section

| | CONSTRUCTION | | MAX. CONDUCTOR RESISTANCE | | REACTANCE | | CAPACITANCE | INDUCTANCE | IMPEDANCE @ 50 & 60 Hz | | L/R ratio @ 1 kHz |
|--------|--------------|---------------------|---------------------------|------|-----------|-------|---------------|---------------|------------------------|------|-------------------|
| | n | [mm ²] | [Ω/km] | | [Ω/km] | | [μFarad/km] | [μHenry/km] | [Ω/km] | | [μHenry/Ω] |
| | | | 20°C | 95°C | 50 Hz | 60 Hz | max. | nominal | 20°C | 95°C | max. |
| pair | 2 | x 0,75 | 26,3 | 34,1 | 0,120 | 0,144 | 0,120 | 383 | 26,3 | 34,1 | 14,6 |
| | 2 | x 1 | 19,3 | 25,0 | 0,111 | 0,133 | 0,125 | 354 | 19,3 | 25,0 | 18,3 |
| | 2 | x 1,5 | 12,9 | 16,7 | 0,110 | 0,132 | 0,135 | 351 | 12,9 | 16,7 | 27,2 |
| triple | 3 | x 0,75 | 26,3 | 34,1 | 0,120 | 0,144 | 0,120 | 383 | 26,3 | 34,0 | 14,6 |
| | 3 | x 1 | 19,3 | 25,0 | 0,111 | 0,133 | 0,125 | 354 | 19,3 | 25,0 | 18,3 |
| | 3 | x 1,5 | 12,9 | 16,7 | 0,110 | 0,132 | 0,135 | 351 | 12,9 | 16,7 | 27,2 |



Generals



General information

PRELIMINARY

SHF2 H-M outer sheath

This code recognizes the highest level of oils and muds (drilling fluids) resistance of elastomeric outer sheath referred to NEK 606:2016. The compound is based on SHF2 according to IEC 60092-360 and shall satisfies the requests in Table 1 Category d of the a.m. NEK, reported below:

| FLUID & TEST PARAMETERS | UNIT | REQUESTED |
|--|------|-----------|
| <ul style="list-style-type: none"> • IRM 902 mineral oil • IRM 903 mineral oil • Hydraulic/gear oil | | |
| Temperature | °C | 100 ±2 |
| Duration | days | 7 |
| Tensile strength | % | ± 30 max |
| Elongation | % | |
| Volume | % | |
| Weight | % | |
| <ul style="list-style-type: none"> • CALCIUM BROMIDE drilling fluid | | |
| Temperature | °C | 70 ±2 |
| Duration | days | 56 |
| Tensile strength | % | ± 25 max |
| Elongation | % | |
| Volume | % | ± 20 max |
| Weight | % | ± 15 max |
| <ul style="list-style-type: none"> • EDC 95-11 drilling fluid | | |
| Temperature | °C | 70 ±2 |
| Duration | days | 56 |
| Tensile strength | % | ± 30 max |
| Elongation | % | |
| Volume | % | ± 25 max |
| Weight | % | |

NOTE : % = parameter variation from natural (before immersion)

BRAID

Copper braid, when used as earthing conductor with 2, 3, 4 cores of power cables, should have, in accordance with IEC 60092.350 par 4.2.4., a value of conductance at least equal to:

- the value of phase conductors for cross-sections up to and including 16 mm²
- 50 % of the value for phase conductors with cross-sections greater than 16 mm²

ELECTRICALS

CONDUCTOR ELECTRICAL RESISTANCE

It's the most important parameter of the conductor sizing, related to:

| | | |
|--------|-----------------------|--------------------------------|
| ρ | conductor resistivity | [Ω mm ² /m] |
| l | conductor length | [km] |
| A | cross sectional area | [mm ²] |

For low frequencies, conductor resistance is equal to DC condition.

$$R = \rho \times l / A \quad [\Omega]$$

For copper conductors:

$$\rho = 17,241 \times 10^{-6} \Omega \times \text{mm}^2/\text{m} @ 20^\circ\text{C} \text{ plain copper}$$

$$\rho = 17,931 \times 10^{-6} \Omega \times \text{mm}^2/\text{m} @ 20^\circ\text{C} \text{ tinned copper}$$

Temperature influence is calculated as:

$$R_t = R_{20} \times (234,5 + t) / 254,5 \quad [\Omega]$$

R_t conductor resistance [Ω]

R_{20} conductor resistance @ 20°C [Ω]

t conductor temperature [°C]

Conductor resistance increases with frequency.

INSULATION RESISTANCE

It's the resistance to the flow of direct current between a conductor and the earthed core screen, armour and adjacent conductors.

A higher value of insulation resistance means better insulating capacity.

The measurement values, shall be corrected to the reference temperature of 20°C by mean a correction factor

$$R_t = K_i \times (\log_{10} D/d) \times L/1000 \times C_t \quad [M\Omega \times km]$$

R_t = measured insulation resistance referred to 1 km @ 20°C

K_i = insulation constant of insulation compound

for EPR and HEPR = 3670 [$M\Omega \times km$]

d = diameter over conductor [mm].

D = diameter over insulation [mm]

L = cable length [m]

C_t = temperature correction factor

Correction factor C_t

| | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|
| 10°C | 11°C | 12°C | 13°C | 14°C | 15°C | 16°C | 17°C | 18°C | 19°C | 20°C |
| 0.50 | 0.54 | 0.57 | 0.2 | 0.66 | 0.71 | 0.76 | 0.81 | 0.87 | 0.93 | 1.00 |
| 20°C | 21°C | 22°C | 23°C | 24°C | 25°C | 26°C | 27°C | 28°C | 29°C | 30°C |
| 1.00 | 1.07 | 1.15 | 1.23 | 1.32 | 1.42 | 1.52 | 1.62 | 1.74 | 1.87 | 2.00 |

VOLTAGE RATING

The voltage designation of cables has three characteristic parameters:

- U_0 the rated power voltage between conductor and any earth or metallic screen.
- U the rated power frequency voltage between conductors
- U_m the maximum value of the highest system voltage which may be sustained under normal operating conditions at any time and at any point.

CURRENT RATING

Current carrying capacity, whatever is the type of covering (e.g. both unarmoured and armoured cables), depends from the cable installation method.

IEC 60092-352 standard reports the reference methods for which the current carrying capacity has been determined by test or calculation

The ELECTRICAL DATA reported in this catalogue are in accordance with:

- Table A.4 insulation rated temperature of 90°C
- Table A.5 insulation rated temperature of 95°C

They refer to:

- installation in free air @ 45°C
- continuous service @ max rated temperature
- single core cables with 3 of them in touch (method F)
- 2, 3 & 4 cores (method E)
- multicore cables (5 cores and over) subjected to correction factors
- current ratings, based on Class 2 conductors, refer to nominal dimensions of 0,6/1 kV cables.
- current rating for higher voltages 5 % lower than the tabulated values for LV cables

■ **Continuous service**

It's considered a duration longer than three times the Time Constant [T] of the cable (with constant load)

$$T = 0,245 d^{1,35}$$

d = cable overall diameter [mm]

■ **Correction factor for half-hour and one-hour service**

When cables operate for intermittent periods of half an hour or one hour, the maximum current rating allowed can be increased multiplying the tabulated current rating by the following correction factor:

$$\sqrt{\frac{1,12}{1 - \exp(-t_s/T)}}$$

where:

t_s = 30 or 60 [min]

T = Time Constant of cable (see above Continuous Service)

■ **Correction factor for intermittent service**

For cables supplying a single motor or other equipment, operating in an intermittent service, the maximum current rating may be increased multiplying by a correction factor.

IEC 60092-352 standard reports a calculation example of such correction factor over a period of 10 min. with 4 min. at maximum current rating and 6 min unloaded

$$F_i = \sqrt{\frac{1 - \exp(-4/T)}{1 - \exp(-4/T)}}$$

Intermittence period = 10 [min]

Intermittence ratio (duty cycle) = 40 [%]

T = Time Constant of cable (see above Continuous Service)

■ **Temperature correction factor**

For different operating ambient temperature than 45°C and conductor at a max. rated temperature, the maximum permissible cable current rating has to be multiplied by the following correction factor:

| Max. rated conductor temp [°C] | Correction factors for ambient air temperature [°C] of | | | | | | | | | | |
|--------------------------------|--|------|------|------|------|------|------|------|------|------|------|
| | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 |
| 90 | 1.10 | 1,05 | 1,00 | 0,94 | 0,88 | 0,82 | 0,74 | 0,67 | 0,58 | 0,47 | - |
| 95 | 1.10 | 1,05 | 1,00 | 0,95 | 0,89 | 0,84 | 0,77 | 0,71 | 0,63 | 0,55 | 0,45 |

SHORT CIRCUIT RATING

Short Circuit current is calculated as:

$$I_{sc} = k \times \frac{A}{\sqrt{t}} \quad [kA]$$

where:

| k factor | Insulation compound | Max. rated conductor temperature | |
|----------|---------------------|----------------------------------|------------------|
| | | Normal operation °C | Short-circuit °C |
| 1,43 | XLPE- EPR - HEPR | 90 | 250 |
| 1,71 | Silicone S95 | 95 | 350 |

A = conductor cross section [mm²]

t = short circuit duration [sec]

CURRENT to power and voltage

In case of three-phase systems, the determination of the current relationship between power and voltage is:

$$I = 722 \text{ kW/V} \quad I = 578 \text{ kVA/V} \quad I = 531 \text{ HP/V}$$

| | |
|--------------------------|-------|
| I = current intensity | [A] |
| V = rated voltage | [V] |
| kW = power (cos φ = 0.8) | [kW] |
| kVA = power | [kVA] |
| HP = horse power | [HP] |

REACTANCE

When the cable operates in A.C., reactance is related mainly to axial distance between conductors.

For 2 - 3 - 4 conductors the Reactance per phase can be calculated as:

$$X = 2 \times \pi \times f \times L \times l \quad [\Omega]$$

| | |
|---------------|-------|
| f frequency | [Hz] |
| L Inductance | [H/m] |
| l core length | [m] |

INDUCTANCE

$$L = 0,2 \times (\ln 2a/d + 0.25) \times 10^{-6} \quad [\text{H/m}]$$

| | |
|--------------------------|------|
| a distance between cores | [mm] |
| d core diameter | [mm] |

IMPEDANCE

$$Z = \sqrt{ (R^2 + X^2) } \quad [\Omega]$$

| | |
|--------------------------------|-----|
| Z Impedance per phase | [Ω] |
| R Electrical resistance @ 20°C | [Ω] |
| X Reactance per phase | [Ω] |

CAPACITANCE

■ Single core cable

$$C = \epsilon_r / 18 \log_e (D/d) \quad [\mu\text{F/km}]$$

| | |
|--|-----|
| ε _r relative permittivity of insulation | |
| D diameter over insulation | [m] |
| d diameter over conductor | [m] |

■ Multicore belted cable

In the above equation:

D = diameter of one conductor + insulation between conductors + thickness of belt between any core and the metal screen or armour

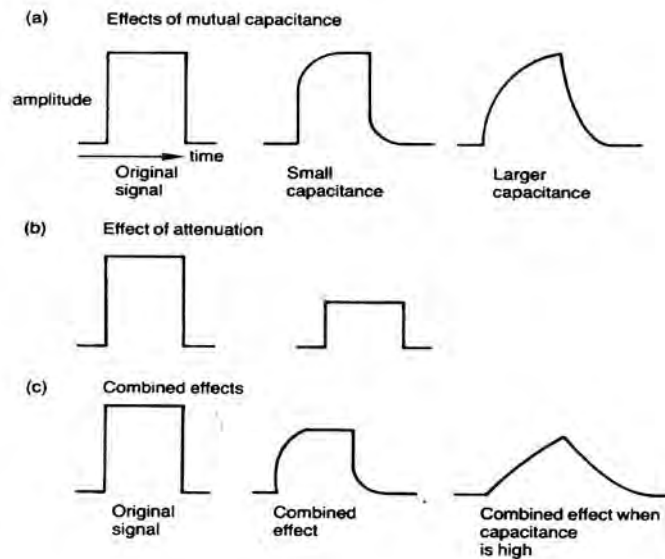
■ Digital signals

Small and larger capacitance causes distortion of digital signals

It depends by:

- conductor construction (increasing of conductor size means larger capacitance)
- insulation thickness (inversely proportional)
- insulation permittivity

In high frequency transmission capacitance rounds or distorts the pulse shape as shown hereafter:



VOLTAGE DROP (up to 1 kV)

$$\Delta V = K \times I \times L / 1000 \quad [V]$$

I rated current [A]

L cable length [km]

K correction factor (see table)

| conductor section [mm ²] | K (correction factor) | | | | | |
|---|-----------------------|------------|----------|------------|----------------------|------------|
| | 2 cores | | 3 cores | | 3 cores (three foil) | |
| | cosφ = 1 | cosφ = 0,8 | cosφ = 1 | cosφ = 0,8 | cosφ = 1 | cosφ = 0,8 |
| 1 | 45,0 | 36,1 | 39,0 | 31,3 | 38,3 | 30,8 |
| 1,5 | 30,2 | 24,3 | 26,1 | 21,0 | 25,7 | 20,7 |
| 2,5 | 18,2 | 14,7 | 15,7 | 12,7 | 15,4 | 12,5 |
| 4 | 11,4 | 9,21 | 9,85 | 7,98 | 9,65 | 7,87 |
| 6 | 7,56 | 6,16 | 6,54 | 5,34 | 6,42 | 5,28 |
| 10 | 4,55 | 3,73 | 3,94 | 3,24 | 3,87 | 3,22 |
| 16 | 2,87 | 2,39 | 2,48 | 2,07 | 2,44 | 2,07 |
| 25 | 1,81 | 1,55 | 1,57 | 1,34 | 1,54 | 1,34 |
| 35 | 1,31 | 1,14 | 1,13 | 0,988 | 1,11 | 0,993 |
| 50 | 0,967 | 0,866 | 0,838 | 0,750 | 0,820 | 0,760 |
| 70 | 0,669 | 0,624 | 0,579 | 0,541 | 0,568 | 0,555 |
| 95 | 0,484 | 0,476 | 0,419 | 0,412 | 0,410 | 0,428 |
| 120 | 0,383 | 0,394 | 0,332 | 0,342 | 0,325 | 0,358 |
| 150 | 0,314 | 0,341 | 0,272 | 0,295 | 0,265 | 0,308 |
| 185 | 0,251 | 0,289 | 0,217 | 0,250 | 0,213 | 0,265 |
| 240 | 0,193 | 0,245 | 0,167 | 0,212 | 0,163 | 0,224 |
| 300 | 0,156 | 0,215 | 0,135 | 0,186 | 0,132 | 0,198 |

VFD - EMC characteristics

Variable Frequency Drive (VFD) devices control AC motors speed and torque by varying their input frequency and voltage.

EMC (Electro Magnetic Compatibility) is the ability of the equipment components to minimize the electrical interferences (radio frequency disturbance and electrical surges) produced by such a device.

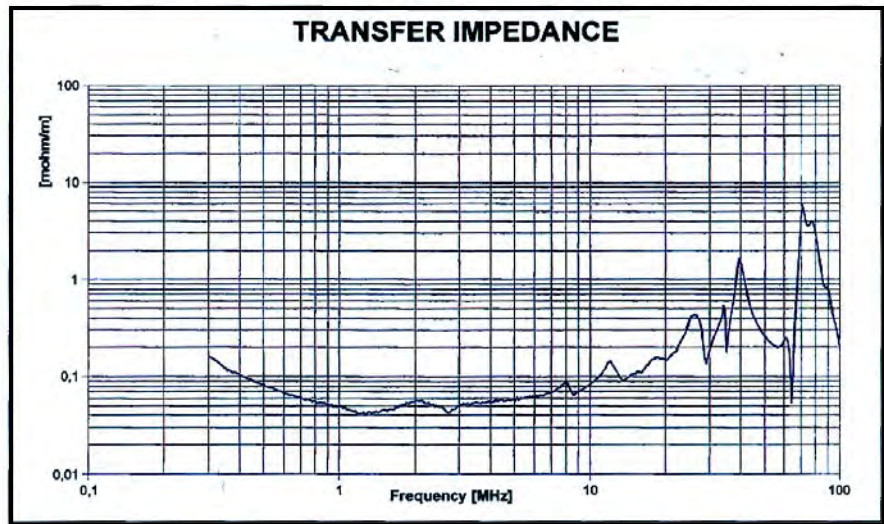
To face electrical surges safely, a working voltage rate of 0,6/1 kV implies to adopt 1,8/3 kV (3,6 kV peak) cable construction.

Furthermore, to minimize EM interferences, cables shall be copper tape shielded as protective hearing.

The parameter of surface Transfer Impedance describes the shielding effectiveness.

Its value shall be lower than 100 mΩ/m in the frequency range up to 100 MHz.

The diagram shows the typical Transfer Impedance (< 6 mΩ/m) measured on CCI VFD EMC cables.



Fixed installations in hazardous area

The cables mentioned in this catalogue are appropriate to operate in hazardous area. Their construction includes:

- circular and compacted conductors
- extruded bedding and sheaths
- non-hygroscopic fillers, when adopted and prevents gas or vapour migration in accordance to the requirements of IEC 60079-14 Annex E

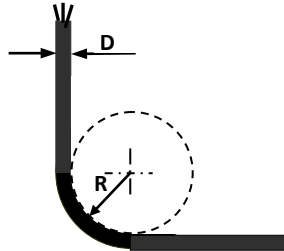
MECHANICALS

PULLING TENSION DURING INSTALLATION

- unarmoured cables
 $P = 25 \times Sc$ [N]
 - armoured cables
 $P = 50 \times Sc$ [N]
- Sc = total cross section of pulled conductors [mm²]

BENDING RADIUS

The recommended minimum internal Bending Radius of cables in this catalogue is related to the their outer diameter (D).



D = cable outer diameter [mm]
 R = Bending Radius [mm]

Good practice is to reach progressively the minimum bending radius, with suitable round tools to help the correct bending, in particular when cable installation is performed at low temperature.

- Minimum installation temperature - 20°C
- Minimum operating temperature - 40°C

CONVERSION TABLE U.S. to METRIC cross sections

| AWG (U.S.) | Metric cross-section [mm ²] | Standard metric cross-section [mm ²] |
|---------------|---|---|
| 20 | 0.519 | 0.75 |
| 18 | 0.823 | 1,0 |
| 16 | 1.31 | 1.5 |
| 14 | 2.08 | 2.5 |
| 12 | 3.31 | 4,0 |
| 10 | 5.26 | 6,0 |
| 8 | 8.37 | 10 |
| 6 | 13.30 | 16 |
| 4 | 21.15 | 25 |
| 2 | 33.62 | 35 |
| 1 | 42.41 | 50 |
| 1/0 | 53.49 | 70 |
| 2/0 | 67.23 | 70 |
| 3/0 | 85.01 | 95 |
| 4/0 | 107.2 | 120 |
| -- | -- | -- |

| MCM (U.S.) | Metric cross-section [mm ²] | Standard metric cross-section [mm ²] |
|---------------|---|---|
| 250 | 126.7 | 150 |
| 300 | 152.0 | 150 |
| 350 | 177.3 | 185 |
| 400 | 202.7 | 185 |
| 450 | 228.0 | 240 |
| 500 | 253.4 | 300 |
| 550 | 278.7 | 300 |
| 600 | 304.0 | 300 |
| 650 | 329.4 | 300 |
| 700 | 354.7 | 400 |
| 750 | 380,0 | 400 |
| 800 | 405.4 | 400 |
| 850 | 430.7 | 400 |
| 900 | 456.0 | 500 |
| 950 | 481.4 | 500 |
| 1000 | 506.7 | 500 |



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OFFSHORE CABLES NEK 606:2016 CATALOG - 2021

All data mentioned in this catalog may be subject to revision and improved at any time