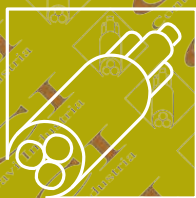


2021



CCI

ControlCavi Industria

SHIPS & OFFSHORE CABLES BS 6883 – BS 7917

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



CCI Quality

DNV-GL

MANAGEMENT SYSTEM CERTIFICATE

Certificate No: CERT 021319-06-AQ-ECM-ISO9001 Initial certification date: 03 December 1996 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: 117918-2014-AE-ITA-ACCREDIA Data prima emissione/First Issue: 29 giugno 2012 Validità/Valid: 29 giugno 2018 - 31 giugno 2021

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)

Place and Date/Place and date:
 Vimercate (MB), 25 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 Sistema 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: 111929-2012-AHSO-ITA-ACCREDIA Initial certification date: 12 September 2012 Valid: 12 September 2018 - 12 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

CISQ is a member of

RINA

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

FABBRICAZIONE, MISURAZIONE, CONFEZIONAMENTO E COMMERCIALIZZAZIONE DI CAVI ELETTRICI IAF 20 IAF 19

CUTTING, MEASURING, PACKAGING AND TRADE OF ELECTRICAL CABLES

La validità del presente certificato è subordinata al rispetto delle condizioni contrattuali del sistema di gestione che permette l'emissione.
 The validity of this certificate is dependent on an initial/ on renewal/ on complete review/ on any other phase of the management system.
 Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid.
 The use and validity of this certificate are subject to compliance with the terms of the agreement. Rules for the certification of Quality Management Systems.

Prima emissione/First Issue:	09.05.1994	Data decisione di rinnovo/Renewal decision date:	18.05.2018
Data scadenza/Expiry Date:	27.05.2021	Data revisione/Review date:	03.04.2019

Fabrizio Fressi
 Main Management System Certification Head

ACCREDIA

IAF

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

CISQ

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

Ships & offshore cables

BS 6883 - BS 7917

Halogen free Low smoke

Flame retardant

Fire resistant

FIREBAR® Fire & water resistant

Low temperature -40 °C





CCI ships and offshore cables according to BS 6883 and BS 7917

Are designed and manufactured to be installed in ships and oil & gas platforms where saline atmosphere, UV radiation, extremes of temperature, hydrocarbons, oils, drilling fluids and muds are the usual working conditions. Type approved 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) type GP4 and Hard grade Ethylene Propylene Rubber (HEPR) type GP6 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 allows a very good heat barrier and further enhance non propagation of the flame of all our cables.

■ **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.

on request

■ **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).



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.

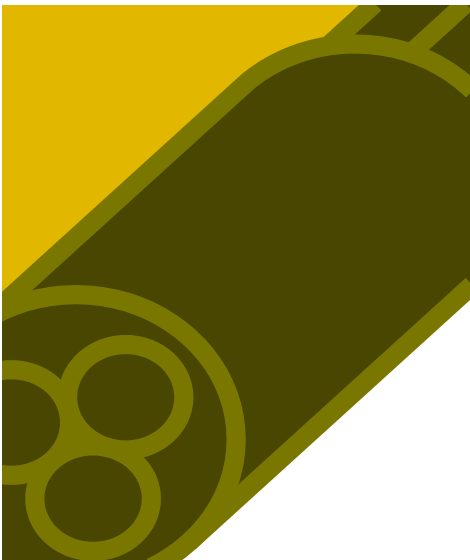
FIREBAR® constructions, when manufactured to BS standards, cover the range from 150/250 Volt (Instrument types) up to 8,7/15 kV (Medium Voltage), and all in between.

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 international fire resistance 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

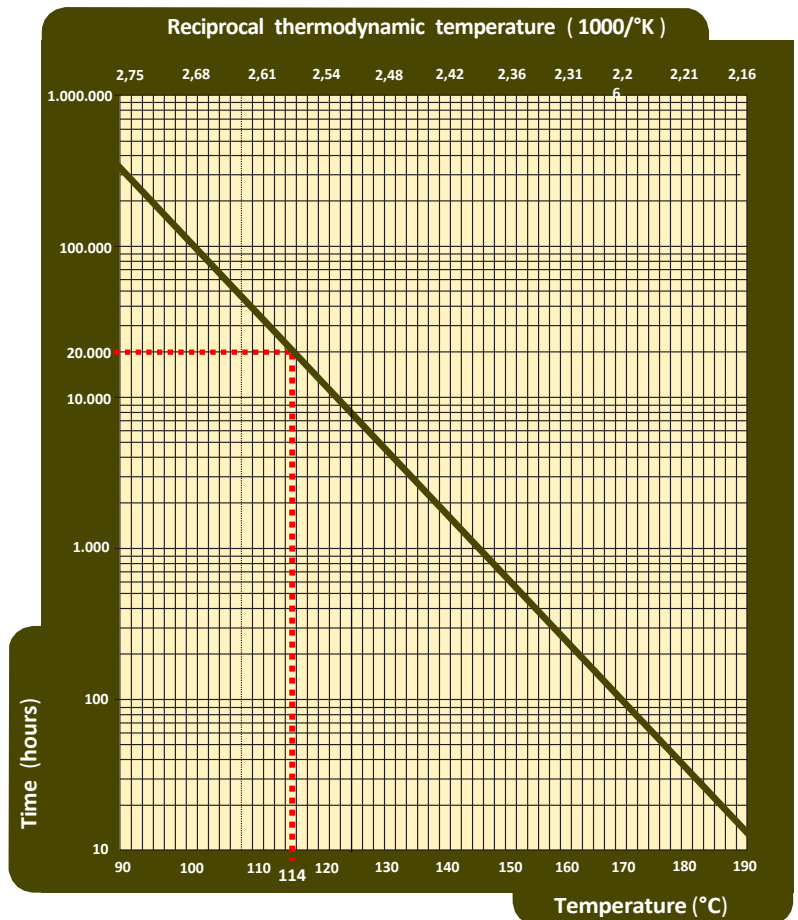
The maximum operating temperature allowed in an electrical cable depends on the insulating material.

CCI developed improved (H)EPR 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 T_i (*) 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 (T_i) is the the maximum continuous working temperature at which full insulation characteristics are still maintained.





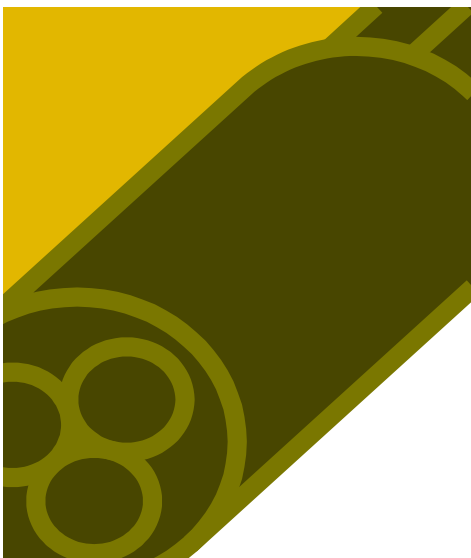
Product type approvals



American Bureau of Shipping (USA)



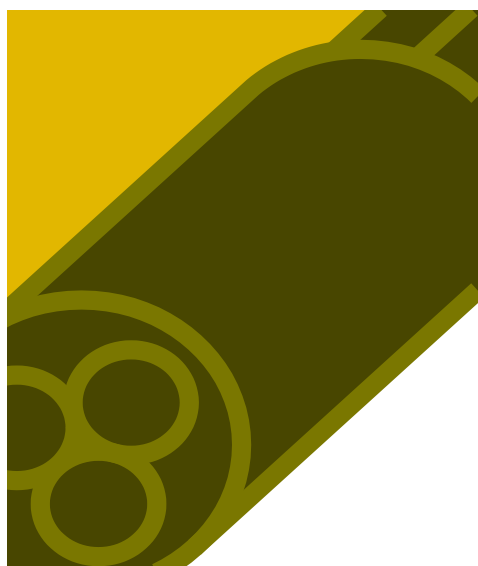
Lloyd's Register (UK)



Reference standards

BS 6883	Elastomer insulated cables for fixed wiring in ships on mobile and fixed offshore units - Requirements and test methods
BS 7917	Elastomer insulated and fire resistant (limited circuit integrity) cables for fixed wiring in ships on mobile and fixed offshore units - Requirements and test methods
BS 7655-1-2	Insulating and sheathing materials for cables. Part 1. Cross-linked elastomeric insulating compounds Section 1.2 - General 90 °C application
BS 7655-2-6	Insulating and sheathing materials for cables Part 2: Cross-linked elastomeric sheathing compounds Section 2.6: Sheathing compounds for ships' wiring and offshore applications
BS EN 60228	Conductors of insulated cables
BS EN 60332-1-2	Tests on electric and optical fibre cables under fire conditions - Part 1-2: Test for vertical flame propagation for a single insulated wire or cable.
BS EN 60332-3-22	Tests on electric cables under fire conditions. Tests for vertical flame spread of vertically-mounted bunched wires of cables - Category A.
BS EN 60684-2	Flexible insulating sleeving Part 2: Methods of test – Level of fluorine
BS EN 60754-1 & 2	Test on gases evolved during combustion of electric cables. Part 1: Determination of the halogen acid gas Part 2: Determination of acidity (by pH measurement) and conductivity.
BS EN 61034-1 & 2	Measurement of smoke density of cables burning under defined conditions. Part 1: Test apparatus Part 2: Test procedure and requirements
BS EN IEC 60331-1	Tests for electric cables under fire conditions – Circuit 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
BS EN 50200	Method of test for resistance to fire of unprotected small Cables for use in emergency circuits Annex E: Guidance for using optional water spray protocol
BS 7846:2000	Electric cables - 600/1 000 V armoured fire-resistant cables having thermosetting insulation and low emission of smoke and corrosive gases when affected by fire Annex L – Fire resistance test Cat F3
BS 8434-2	Methods of test for assessment of the fire integrity of electric cables Part 2: Test for unprotected small cables for use in emergency circuits - BS EN 50200 with a 930 °C flame and with water spray

BS 8491	Method for assessment of fire integrity of large diameter power cables for use as components for smoke and heat control systems and certain other active fire safety systems
IEC 60092-352	Electrical installations in ships – Choice and installation of electrical cables
IEC 60092-360	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables
IEC 60331-2	Tests for electric cables under fire conditions – Circuit integrity - 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 60533	Electrical and electronic installations in ships. Electromagnetic compatibility (EMC). Ships with a metallic hull
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
NEK 606: 2016	Cables for offshore installations



Cable code designation

COMPONENT	CODE	DESCRIPTION
CONDUCTOR	FCu	Flexible Class 2 tinned annealed copper (CCI original construction)
SEMICONDUCTIVE	SC	Semi Conductive Screen (<i>MV only</i>)
FIRE RESITANCE	MGT	Mica Glass Tape
INSULATION	EPR (GP4 - GP5)	EPR Ethylene Propylene Rubber compound 600/1000 V - 1900/3300 V
	HEPR (GP6)	HEPR (High grade EPR) compound (<i>MV only</i>)
SCREEN	IS	Al/PE tape individual screen
	OS	Al/PE tape overall screen
	IOS	Al/PE tape individual & overall screen
	CS	Core Screen (copper tape) (<i>MV only</i>)
INNER SHEATH	SW4 or LSF	HF elastomeric sheathing compound Low Smoke Fumes
	or SB1	<i>LV fire resistant only</i>
BRAID/ARMOUR	GSWB ^(*)	Galvanized Steel Wire Braid
	TCWB ^(*)	Tinned Copper Wire Braid
	TPBWB ^(*)	Tinned Phosphor Bronze Wire Braid
OUTER SHEATH	SW4	HF thermoset sheathing compound
	SHF2 H-M	HF oils & MUDs resistant sheathing compound (<i>optional</i>)

(*) braid /armour:

TPBWB Tinned Phosphor Bronze Wire Braid with:
power Low and Medium voltage rate - one core constructions only

GSWB Galvanized Steel Wire Braid with:

- instrumentation - any construction
- power Low and Medium voltage rate - multi core constructions only

alternatively

TCWB Tinned Copper Wire Braid for any voltage rate and construction

Index

Flame Retardant BS 6883

FCu/EPR/SW4/braid(*)/SW4 Power & Control	600/1000 V	page 15
FCu/SC/HEPR/SC/CS/SW4/braid(*)/SW4 Medium Voltage	3800/6600 V - 6350/11000 V - 8700/15000 V	page 17
FCu/EPR/IS/SW4/braid(*)/SW4 Instrumentation Individual Screen	150/250 V	page 19
FCu/EPR/OS/SW4/braid(*)/SW4 Instrumentation Overall Screen	150/250 V	page 21
FCu/EPR/IOS/SW4/braid(*)/SW4 Instrumentation Ind. & Overall Screen	150/250 V	page 23

Flame Retardant - Fire Resistant BS 7917

FCu/MGT/EPR/SB1/braid(*)/SW4 Power and Control	600/1000 V	page 27
FCu/MGT/EPR/IS/SB1/braid(*)/SW4 Instrumentation Individual Screen	150/250 V	page 29
FCu/MGT/EPR/OS/SB1/braid(*)/SW4 Instrumentation Overall Screen	150/250 V	page 31
FCu/MGT/EPR/IOS/SB1/braid(*)/SW4 Instrumentation Ind & Overall Screen	150/250 V	page 33

(*) see page 11 braid/armour

FIREBAR®

Flame Retardant - Fire & Water Resistant

FIREBAR® BS Power & Control	BS 7917 a.a. 600/1000 V	page 37
FIREBAR® MV BS Medium voltage	BS 6883 a.a. 3800/6600 V - 6350/11000 V - 8700/15000 V	page 39
FIREBAR® BS (c) Instrumentation, Overall Screen	BS 7917 a.a. 250 V	page 41
FIREBAR® BS (ic) Instrumentation, Ind. & Overall Screen	BS 7917 a.a. 250 V	page 43

a.a. = as applicable

Electrical data

Flame retardant - Fire resistant	
LV power and control	page 46
Medium voltage	page 48
Instrumentation	page 49
FIREBAR Fire & Water resistant	
LV power and control	page 50
Medium voltage	page 52
Instrumentation	page 53

Generals

page 54

Flame retardant



Flame retardant tests

BS EN 60332-1-2
on single cable



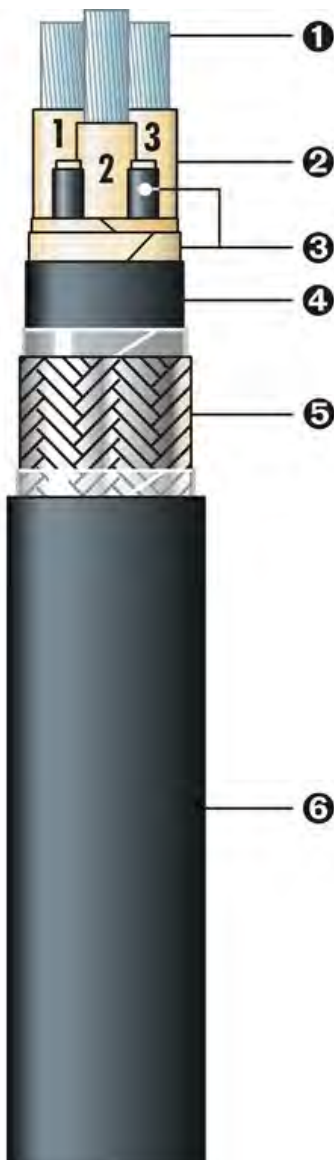
BS EN 60332-3-22 Category A
on bunched cables



power & control 600/1000 V
 halogen free flame retardant
armoured

cable code designation (see page 11)
 FCu/EPR/SW4/braid/SW4

operating temperature over 100 °C
 (see page 7)



Design and construction	BS 6883
Nominal voltage U_0/U	600/1000 V
Max operating voltage U_{max}	1100 V
Maximum rated temperature	90 °C according to BS 7655-1-2
Flame retardancy	BS EN 60332-1-2 BS EN 60332-3-22 Cat A
Halogen content & corrosivity	BS EN 60754-1 & 2 BS EN 60684-2
Smoke density	BS EN 61034-1 & 2
UV resistance	UL 1581 § 1200
Ozone resistance	IEC 60092-360
Cold Bend and Impact test (-40 °C)	CSA C 22.2 N° 0.3-09 & N° 38-18
on request:	
Oils & muds resistant outer sheath	NEK 606:2016 Table 1 Category d

Construction	
1 CONDUCTOR	tinned annealed copper flexible Class 2 BS EN 60228
2 INSULATION	EPR (GP4) HF compound BS 7655-1-2
3 BEDDING & FILLERS	FLAMEBAR® fiberglass tape + fiberglass ropes GP4 sheathed when 3 cores (sect. > 16 mm ²)
4 INNER SHEATH	SW4 (SHF2) compound BS 7655-2-6
5 BRAID / ARMOUR	galvanized steel or tinned copper wire braid tinned phosphor bronze wire braid (single core)
6 OUTER SHEATH	SW4 (SHF2) compound BS 7655-2-6 or SHF2 H-M compound NEK 606:2016
	see Generals section

Cores identification	
1 core	off white
multicores	off white (progressively numbered)

Sheath colour black

Sheath marking
 CCI BS 6883 (outer sheath) n x sect mm² ELECTRIC CABLE 600/1000
 V BS EN 60332-3-22 Cat A meter marking year QA n°

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

For 1900/3300 V and 3300/3300 V constructions apply to CABLE SERVICE

600/1000 V

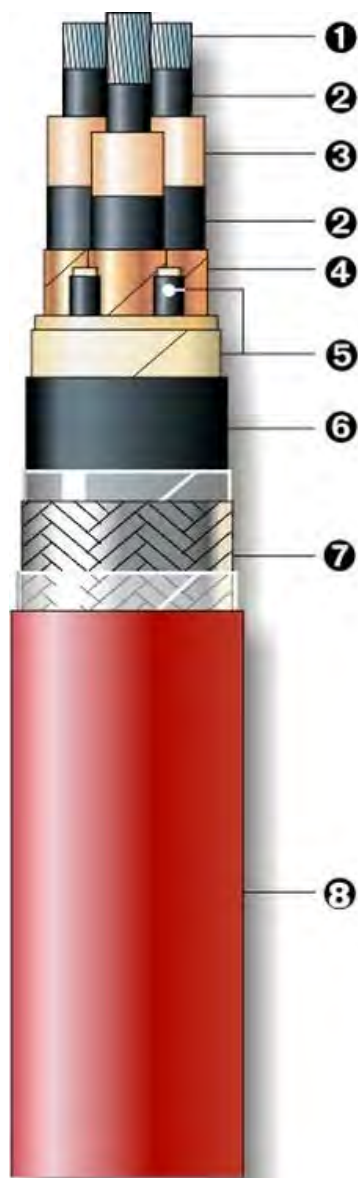
CONSTRUCTION		CONDUCTOR DIAMETER	INSULATION THICKNESS	DIAMETER UNDER ARMOUR	OVERALL DIAMETER	WEIGHT
n	[mm ²]	nominal [mm]	nominal [mm]	nominal [mm]	approx [mm]	approx. [kg/km]
1	x 10	4,1	1,0	8,1	12	290
1	x 16	5,2	1,0	9,4	14	380
1	x 25	6,5	1,2	11,3	16	520
1	x 35	7,5	1,2	12,3	17	650
1	x 50	8,3	1,4	13,7	18	830
1	x 70	10,0	1,4	15,4	21	1.080
1	x 95	11,8	1,6	17,8	23	1.400
1	x 120	13,2	1,6	19,4	25	1.700
1	x 150	14,6	1,8	21,4	27	2.070
1	x 185	16,5	2,0	23,9	31	2.610
1	x 240	19,0	2,2	27,1	34	3.270
1	x 300	21,8	2,4	30,5	38	4.000
2	x 1,5	1,6	0,8	8,6	13	250
2	x 2,5	2,0	0,8	9,5	14	300
2	x 4	2,8	1,0	12,0	16	430
2	x 6	3,3	1,0	13,1	17	510
2	x 10	4,1	1,0	15,2	20	710
2	x 16	5,2	1,0	17,6	23	930
3	x 1,5	1,6	0,8	9,1	13	280
3	x 2,5	2,0	0,8	10,0	14	340
3	x 4	2,8	1,0	12,8	17	490
3	x 6	3,3	1,0	13,9	18	590
3	x 10	4,1	1,0	16,2	21	840
3	x 16	5,2	1,0	18,8	24	1.120
3	x 25	6,5	1,2	22,9	29	1.610
3	x 35	7,5	1,2	25,1	32	2.100
3	x 50	8,3	1,4	28,0	35	2.720
3	x 70	10,0	1,4	32,1	39	3.550
3	x 95	11,8	1,6	37,3	45	4.700
3	x 120	13,2	1,6	40,5	49	5.650
3	x 150	14,6	1,8	44,8	53	6.970
3	x 185	16,5	2,0	50,2	59	8.520
3	x 240	19,0	2,2	56,8	66	10.790
3	x 300	21,8	2,4	64,3	74	13.370
4	x 1,5	1,6	0,8	9,9	14	330
4	x 2,5	2,0	0,8	10,9	15	400
4	x 4	2,8	1,0	14,0	18	580
4	x 6	3,3	1,0	15,4	21	740
4	x 10	4,1	1,0	17,9	23	1.030
4	x 16	5,2	1,0	20,8	26	1.400
4	x 25	6,5	1,2	25,3	32	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	49,7	59	8.840
4	x 185	16,5	2,0	55,7	65	10.990
4	x 240	19,0	2,2	63,3	73	14.150
4	x 300	21,8	2,4	71,6	82	17.200
5	x 1,5	1,6	0,8	10,9	15	380
7	x 1,5	1,6	0,8	12,1	16	450
12	x 1,5	1,6	0,8	16,0	21	730
19	x 1,5	1,6	0,8	18,9	24	980
27	x 1,5	1,6	0,8	23,0	29	1.380
37	x 1,5	1,6	0,8	25,9	33	1.820
5	x 2,5	2,0	0,8	12,2	16	480
7	x 2,5	2,0	0,8	13,3	18	560
12	x 2,5	2,0	0,8	17,9	23	940
19	x 2,5	2,0	0,8	21,2	27	1.280
27	x 2,5	2,0	0,8	25,8	32	1.900
37	x 2,5	2,0	0,8	29,0	36	2.380

radial field
 3800/6600 V - 6350/11000 V - 8700/15000 V

halogen free flame retardant
 armoured

cable code designation (see page 11)
 FCu/SC/HEPR/SC/CS/SW4/braid/SW4

operating temperature over 100 °C
 (see page 7)



Design and construction	BS 6883
Nominal voltage U_0/U	3800/6600 V - 6350/11000 V - 8700/15000 V
Max operating voltage U_{max}	7200 V 12000 V 17500 V
Maximum rated temperature	90 °C according to BS 7655-1-2
Flame retardance	BS EN 60332-1-2 BS EN 60332-3-22 Cat A
Halogen content & corrosivity	BS EN 60754-1 & 2 BS EN 60684-2
Smoke density	BS EN 61034-1 & 2
UV resistance	UL 1581 § 1200
Ozone resistance	IEC 60092-360
Cold Bend and Impact test (-40 °C)	CSA C 22.2 N° 0.3-09 & N° 38-18
on request:	
Oils & muds resistant outer sheath	NEK 606:2016 Table 1 Category d

Construction	
1 CONDUCTOR	tinned annealed copper flexible Class 2 BS EN 60228
2 SEMICONDUCTIVE LAYERS	LSOH extruded compound
3 INSULATION	HEPR (GP6) HF compound BS 7655-1-2
4 CORE SCREEN	plain copper tape
5 BEDDING & FILLERS	FLAMEBAR® fiberglass tape + fiberglass ropes HEPR sheathed when 3 cores
6 INNER SHEATH	SW4 (SHF2) compound BS 7655-2-6
7 BRAID / ARMOUR	galvanized steel or tinned copper wire braid tinned phosphor bronze wire braid (single core)
8 OUTER SHEATH	SW4 (SHF2) compound BS 7655-2-6 or 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
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Sheath marking	
CCI BS 6883 (outer sheath)	n x sect mm ² ELECTRIC CABLE U_0/U V
BS EN 60332-3-22 Cat A	meter marking year QA n°

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

For non-radial field constructions 3800/6600 V - 6600/6600 – 6350/11000 V apply to Cable Service

3800/6600 V

CONSTRUCTION			CONDUCTOR DIAMETER	INSULATION THICKNESS	DIAMETER UNDER ARMOUR	OVERALL DIAMETER	WEIGHT
n	x	[mm ²]	nominal [mm]	nominal [mm]	nominal [mm]	approx [mm]	approx [kg/km]
1	x	25	6,5	3,0	19,7	25	1.020
1	x	35	7,5	3,0	20,9	26	1.170
1	x	50	8,3	3,0	21,7	27	1.330
1	x	70	10,0	3,0	23,6	29	1.620
1	x	95	11,8	3,0	25,6	31	2.000
1	x	120	13,2	3,0	27,0	32	2.270
1	x	150	14,6	3,0	28,6	35	2.750
1	x	185	16,5	3,0	30,7	37	3.250
1	x	240	19,0	3,0	33,4	40	3.950
1	x	300	21,8	3,0	36,4	43	4.600
3	x	25	6,5	3,0	39,8	47	3.080
3	x	35	7,5	3,0	41,8	49	3.520
3	x	50	8,3	3,0	44,1	51	4.100
3	x	70	10,0	3,0	47,9	56	5.010
3	x	95	11,8	3,0	52,2	60	6.280
3	x	120	13,2	3,0	55,4	64	7.280
3	x	150	14,6	3,0	58,7	67	8.360
3	x	185	16,5	3,0	63,2	72	9.860
3	x	240	19,0	3,0	69,0	79	12.370

6350 / 11000 V

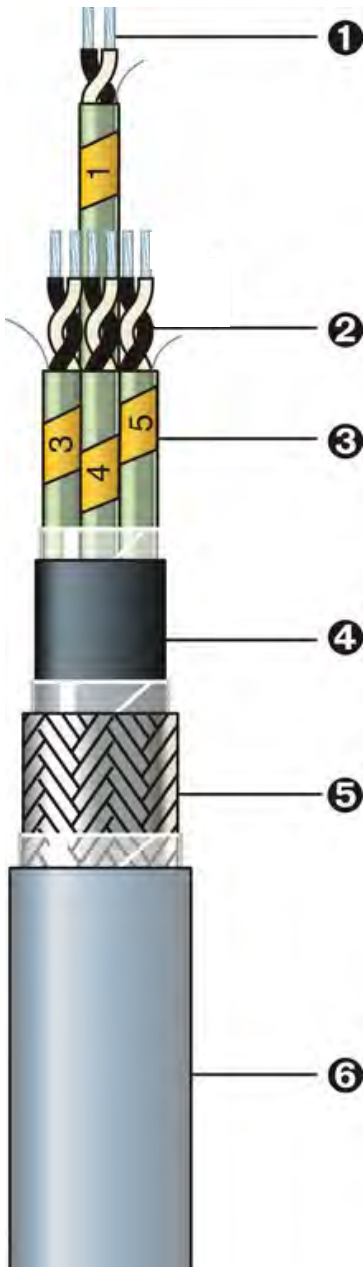
1	x	25	6,5	3,4	20,7	26	1.090
1	x	35	7,5	3,4	21,7	26	1.240
1	x	50	8,3	3,4	22,7	28	1.400
1	x	70	10,0	3,4	24,4	30	1.680
1	x	95	11,8	3,4	26,4	32	2.060
1	x	120	13,2	3,4	28,0	34	2.490
1	x	150	14,6	3,4	29,4	36	2.840
1	x	185	16,5	3,4	31,5	38	3.230
1	x	240	19,0	3,4	34,2	41	4.060
1	x	300	21,8	3,4	37,2	44	4.710
3	x	25	6,5	3,4	41,5	49	3.260
3	x	35	7,5	3,4	43,8	51	3.800
3	x	50	8,3	3,4	45,8	53	4.320
3	x	70	10,0	3,4	49,9	58	5.260
3	x	95	11,8	3,4	54,0	62	6.470
3	x	120	13,2	3,4	57,4	66	7.550
3	x	150	14,6	3,4	60,6	69	8.600
3	x	185	16,5	3,4	65,1	74	10.160
3	x	240	19,0	3,4	70,9	81	12.700

8700 / 15000 V

1	x	25	6,5	4,5	23,1	28	1.260
1	x	35	7,5	4,5	24,1	29	1.420
1	x	50	8,3	4,5	24,9	30	1.570
1	x	70	10,0	4,5	26,8	32	1.880
1	x	95	11,8	4,5	28,8	35	2.390
1	x	120	13,2	4,5	30,4	37	2.720
1	x	150	14,6	4,5	31,8	39	3.080
1	x	185	16,5	4,5	33,9	41	3.580
1	x	240	19,0	4,5	36,6	44	4.310
1	x	300	21,8	4,5	39,6	47	5.000
3	x	25	6,5	4,5	46,7	54	3.910
3	x	35	7,5	4,5	48,9	57	4.420
3	x	50	8,3	4,5	50,9	59	4.940
3	x	70	10,0	4,5	55,0	63	6.110
3	x	95	11,8	4,5	59,1	68	7.260
3	x	120	13,2	4,5	62,5	71	8.270
3	x	150	14,6	4,5	65,8	75	9.360
3	x	185	16,5	4,5	70,3	80	11.300

cable code designation (see page 11)
 FCu/EPR/IS/SW4/braid/SW4

instrumentation 150/250 V
 halogen free flame retardant
 individual screen armoured
 operating temperature over 100 °C
 (see page 7)



Design and construction	BS 6883
Nominal voltage U ₀ /U	150/250 V
Max operating voltage U _{max}	280 V
Maximum rated temperature	90 °C according to BS 7655-1-2
Flame retardance	BS EN 60332-1-2 BS EN 60332-3-22 Cat A
Halogen content & corrosivity	BS EN 60754-1 & 2 BS EN 60684-2
Smoke density	BS EN 61034-1 & 2
UV resistance	UL 1581 § 1200
Ozone resistance	IEC 60092-360
Cold bend and Impact test (- 40 °C)	CSA C 22.2 N° 0.3-09 & N° 38-18
on request:	
Oils & muds resistant outer sheath	NEK 606:2016 Table 1 Category d

Construction	
1 CONDUCTOR	tinned copper flexible Class 2 or Class 5 BS EN 60228
2 INSULATION	EPR (GP4) HF compound BS 7655-1-2
CORES TWISTING in pairs / triples	
3 INDIVIDUAL SCREEN	Al/PE tape + tinned copper drain wire
4 INNER SHEATH	SW4 (SHF2) compound BS 7655-2-6
5 BRAID / ARMOUR	galvanized steel or tinned copper wire braid
6 OUTER SHEATH	SW4 (SHF2) compound BS 7655-2-6 or SHF2 H-M compound NEK 606:2016
see Generals section	

Cores identification	
pair	black white
triple	black white red
multi pairs/triples	progressively numbered tapes

Sheath colour	grey
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Sheath marking	
CCI BS 6883 (outer sheath)	n x (pair/triple) x sect mm ² (i) ELECTRIC CABLE
150/250 V BS EN 60332-3-22 Cat A	meter marking year QA n°

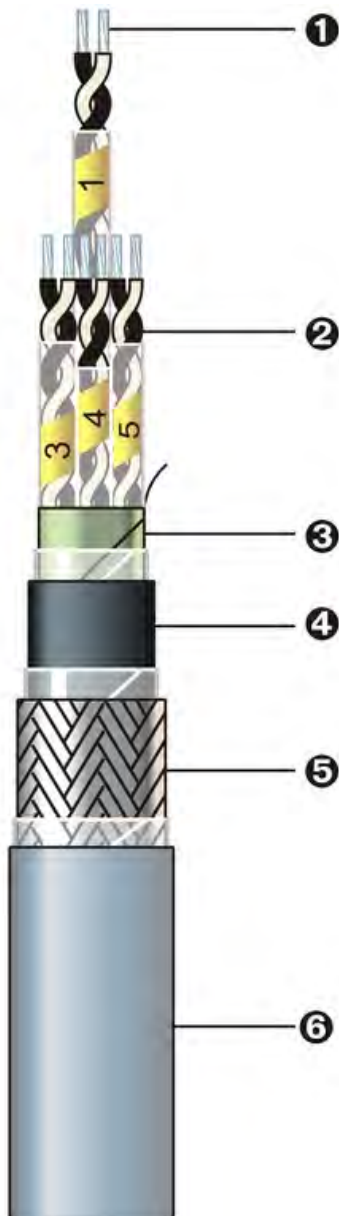
- Minimum Bending Radius: 4D (Overall Diameter) see Generals section

150/250 V

CONSTRUCTION			CONDUCTOR DIAMETER	INSULATION THICKNESS	DIAMETER UNDER ARMOUR	OVERALL DIAMETER	WEIGHT
n	pair triple	[m m ²]	nominal	nominal	nominal	approx	approx
			[mm]	[mm]	[mm]	[mm]	[kg/km]
1	x 2	x 0,75	1,1	0,8	7,6	12	220
2	x 2	x 0,75	1,1	0,8	12,0	16	410
4	x 2	x 0,75	1,1	0,8	14,2	19	520
7	x 2	x 0,75	1,1	0,8	17,2	23	740
8	x 2	x 0,75	1,1	0,8	18,5	24	820
12	x 2	x 0,75	1,1	0,8	22,2	28	1.120
16	x 2	x 0,75	1,1	0,8	25,4	32	1.520
19	x 2	x 0,75	1,1	0,8	27,5	34	1.720
27	x 2	x 0,75	1,1	0,8	32,5	40	2.310
37	x 2	x 0,75	1,1	0,8	37,8	46	3.000
1	x 3	x 0,75	1,1	0,8	8,1	12	240
2	x 3	x 0,75	1,1	0,8	13,4	18	480
4	x 3	x 0,75	1,1	0,8	15,6	21	620
7	x 3	x 0,75	1,1	0,8	19,9	25	920
8	x 3	x 0,75	1,1	0,8	21,5	27	1.030
12	x 3	x 0,75	1,1	0,8	25,3	32	1.480
1	x 2	x 1	1,3	0,8	7,9	12	230
2	x 2	x 1	1,3	0,8	12,5	17	440
4	x 2	x 1	1,3	0,8	14,8	20	580
7	x 2	x 1	1,3	0,8	18,0	23	780
8	x 2	x 1	1,3	0,8	19,3	25	890
12	x 2	x 1	1,3	0,8	23,4	30	1.310
16	x 2	x 1	1,3	0,8	26,7	34	1.630
19	x 2	x 1	1,3	0,8	29,0	36	1.870
27	x 2	x 1	1,3	0,8	34,2	42	2.500
37	x 2	x 1	1,3	0,8	39,7	48	3.240
1	x 3	x 1	1,3	0,8	8,6	13	260
2	x 3	x 1	1,3	0,8	13,9	19	520
4	x 3	x 1	1,3	0,8	16,5	22	680
7	x 3	x 1	1,3	0,8	20,8	26	980
8	x 3	x 1	1,3	0,8	22,5	28	1.110
12	x 3	x 1	1,3	0,8	26,7	34	1.590
1	x 2	x 1,5	1,6	0,8	8,7	13	270
2	x 2	x 1,5	1,6	0,8	13,7	18	500
4	x 2	x 1,5	1,6	0,8	16,2	21	670
7	x 2	x 1,5	1,6	0,8	19,7	25	920
8	x 2	x 1,5	1,6	0,8	21,2	27	1.040
12	x 2	x 1,5	1,6	0,8	25,7	33	1.530
16	x 2	x 1,5	1,6	0,8	29,3	36	1.900
19	x 2	x 1,5	1,6	0,8	31,8	39	2.170
27	x 2	x 1,5	1,6	0,8	37,5	45	2.910
37	x 2	x 1,5	1,6	0,8	43,5	52	3.770
1	x 3	x 1,5	1,6	0,8	9,3	13	300
2	x 3	x 1,5	1,6	0,8	15,1	20	600
4	x 3	x 1,5	1,6	0,8	17,8	23	780
7	x 3	x 1,5	1,6	0,8	22,8	29	1.150
8	x 3	x 1,5	1,6	0,8	24,6	31	1.400
12	x 3	x 1,5	1,6	0,8	29,2	36	1.850

cable code designation (see page 11)
 FCu/EPR/OS/SW4/braid/SW4

instrumentation 150/250 V
 halogen free - flame retardant
 overall screen armoured
 operating temperature over 100 °C
 (see page 7)



Design and construction	BS 6883
Nominal voltage U ₀ /U	150/250 V
Max operating voltage U _{max}	280 V
Maximum rated temperature	90 °C according to BS 7655-1-2
Flame retardance	BS EN 60332-1-2 BS EN 60332-3-22 Cat A
Halogen content & corrosivity	BS EN 60754-1 & 2 BS EN 60684-2
Smoke density	BS EN 61034-1 & 2
UV resistance	UL 1581 § 1200
Ozone resistance	IEC 60092-360
Cold bend and Impact test (- 40 °C)	CSA C 22.2 N° 0.3-09 & N° 38-18
on request:	
Oils & muds resistant outer sheath	NEK 606:2016 Table 1 Category d

Construction	
1 CONDUCTOR	tinned copper flexible Class 2 or Class 5 BS EN 60228
2 INSULATION	EPR (GP4) HF compound BS 7655-1-2
CORES TWISTING in pairs / triples	
3 OVERALL SCREEN	Al/PE tape + tinned copper drain wire
4 INNER SHEATH	SW4 (SHF2) compound BS 7655-2-6
5 BRAID / ARMOUR	galvanized steel or tinned copper wire braid
6 OUTER SHEATH	SW4 (SHF2) compound BS 7655-2-6 or SHF2 H-M compound NEK 606:2016
see Generals section	

Cores identification	
pair	black white
triple	black white red
multi pairs/triples	progressively numbered tapes

Sheath colour	grey
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Sheath marking	
CCI BS 6883 (outer sheath)	n x (pair/triple) x sect mm ² (c) ELECTRIC CABLE
150/250 V BS EN 60332-3-22 Cat A	meter marking year QA n°

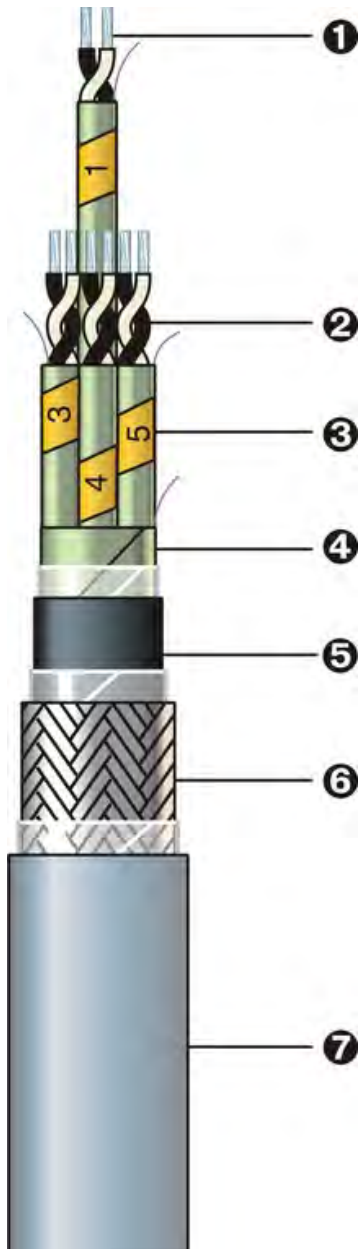
- Minimum Bending Radius: 4D (Overall Diameter) see Generals section

150/250 V

CONSTRUCTION			CONDUCTOR DIAMETER	INSULATION THICKNESS	DIAMETER UNDER ARMOUR	OVERALL DIAMETER	WEIGHT
n	pair	[m m ²]	nominal	nominal	nominal	approx	approx
	triple		[mm]	[mm]	[mm]	[mm]	[kg/km]
2	x 2	x 0,75	1,1	0,8	12,0	16	390
4	x 2	x 0,75	1,1	0,8	13,9	18	490
7	x 2	x 0,75	1,1	0,8	17,1	22	680
8	x 2	x 0,75	1,1	0,8	18,2	24	750
12	x 2	x 0,75	1,1	0,8	22,0	28	1.020
16	x 2	x 0,75	1,1	0,8	25,1	32	1.360
19	x 2	x 0,75	1,1	0,8	27,1	34	1.540
27	x 2	x 0,75	1,1	0,8	32,0	39	2.070
37	x 2	x 0,75	1,1	0,8	37,2	45	2.640
2	x 3	x 0,75	1,1	0,8	13,1	17	460
4	x 3	x 0,75	1,1	0,8	15,5	21	590
7	x 3	x 0,75	1,1	0,8	19,5	25	840
8	x 3	x 0,75	1,1	0,8	21,1	27	960
12	x 3	x 0,75	1,1	0,8	25,1	32	1.370
2	x 2	x 1	1,3	0,8	12,5	17	430
4	x 2	x 1	1,3	0,8	14,7	20	540
7	x 2	x 1	1,3	0,8	17,8	23	730
8	x 2	x 1	1,3	0,8	19,2	25	820
12	x 2	x 1	1,3	0,8	23,0	29	1.100
16	x 2	x 1	1,3	0,8	26,3	33	1.470
19	x 2	x 1	1,3	0,8	28,5	35	1.680
27	x 2	x 1	1,3	0,8	33,7	41	2.230
37	x 2	x 1	1,3	0,8	39,1	47	2.880
2	x 3	x 1	1,3	0,8	13,9	18	500
4	x 3	x 1	1,3	0,8	16,2	21	630
7	x 3	x 1	1,3	0,8	20,6	26	930
8	x 3	x 1	1,3	0,8	22,1	28	1.020
12	x 3	x 1	1,3	0,8	26,3	33	1.480
2	x 2	x 1,5	1,6	0,8	13,5	18	480
4	x 2	x 1,5	1,6	0,8	15,9	21	620
7	x 2	x 1,5	1,6	0,8	19,3	25	830
8	x 2	x 1,5	1,6	0,8	20,8	26	940
12	x 2	x 1,5	1,6	0,8	25,3	32	1.380
16	x 2	x 1,5	1,6	0,8	28,8	36	1.700
19	x 2	x 1,5	1,6	0,8	31,3	38	1.940
27	x 2	x 1,5	1,6	0,8	36,9	45	2.600
37	x 2	x 1,5	1,6	0,8	42,9	51	3.350
2	x 3	x 1,5	1,6	0,8	15,0	20	590
4	x 3	x 1,5	1,6	0,8	17,7	23	740
7	x 3	x 1,5	1,6	0,8	22,4	28	1.050
8	x 3	x 1,5	1,6	0,8	24,2	30	1.190
12	x 3	x 1,5	1,6	0,8	28,8	36	1.690

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

cable code designation (see page 11)
 FCu/EPR/IOS/SW4/braid/SW4



Design and construction	BS 6883
Nominal voltage U ₀ /U	150/250 V
Max operating voltage U _{max}	280 V
Maximum rated temperature	90 °C according to BS 7655-1-2
Flame retardance	BS EN 60332-1-2 BS EN 60332-3-22 Cat A
Halogen content & corrosivity	BS EN 60754-1 & 2 BS EN 60684-2
Smoke density	BS EN 61034-1 & 2
UV resistance	UL 1581 § 1200
Ozone resistance	IEC 60092-360
Cold bend and Impact test (- 40 °C)	CSA C 22.2 N° 0.3-09 & N° 38-18
on request:	
Oils & muds resistant outer sheath	NEK 606:2016 Table 1 Category d

Construction	
1 CONDUCTOR	tinned copper flexible Class 2 or Class 5 BS EN 60228
2 INSULATION	EPR (GP4) HF compound BS 7655-1-2
CORES TWISTING in pairs / triples	
3 INDIVIDUAL SCREEN	Al/PE tape + tinned copper drain wire
4 OVERALL SCREEN	Al/PE tape + tinned copper drain wire
5 INNER SHEATH	SW4 (SHF2) compound BS 7655-2-6
6 BRAID / ARMOUR	galvanized steel or tinned copper wire braid
7 OUTER SHEATH	SW4 (SHF2) compound BS 7655-2-6 or SHF2 H-M compound NEK 606:2016
see Generals section	

Cores identification	
pair	black white
triple	black white red
multi pairs/triples	progressively numbered tapes

Sheath colour	grey
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Sheath marking	
CCI BS 6883 (outer sheath)	n x (pair/triple) x sect mm ² (ic) ELECTRIC CABLE
150/250 V BS EN 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]
2	x 2	x 0,75	1,1	0,8	12,1	16	420
4	x 2	x 0,75	1,1	0,8	14,3	19	540
7	x 2	x 0,75	1,1	0,8	17,3	23	750
8	x 2	x 0,75	1,1	0,8	18,6	24	850
12	x 2	x 0,75	1,1	0,8	22,3	29	1.220
16	x 2	x 0,75	1,1	0,8	25,7	33	1.560
19	x 2	x 0,75	1,1	0,8	27,6	34,8	1.760
27	x 2	x 0,75	1,1	0,8	32,6	40	2.340
37	x 2	x 0,75	1,1	0,8	37,9	46	3.040
2	x 3	x 0,75	1,1	0,8	13,5	18	490
4	x 3	x 0,75	1,1	0,8	15,8	21	640
7	x 3	x 0,75	1,1	0,8	20,0	26	930
8	x 3	x 0,75	1,1	0,8	21,6	27	1.060
12	x 3	x 0,75	1,1	0,8	25,6	33	1.520
2	x 2	x 1	1,3	0,8	12,6	17	450
4	x 2	x 1	1,3	0,8	15,1	20	600
7	x 2	x 1	1,3	0,8	18,2	24	820
8	x 2	x 1	1,3	0,8	19,4	25	900
12	x 2	x 1	1,3	0,8	23,5	30	1.330
16	x 2	x 1	1,3	0,8	26,9	34	1.670
19	x 2	x 1	1,3	0,8	29,1	36	1.890
27	x 2	x 1	1,3	0,8	34,3	42	2.530
37	x 2	x 1	1,3	0,8	39,9	48	3.280
2	x 3	x 1	1,3	0,8	14,0	19	530
4	x 3	x 1	1,3	0,8	16,5	22	690
7	x 3	x 1	1,3	0,8	21,1	27	1.000
8	x 3	x 1	1,3	0,8	22,5	28	1.130
12	x 3	x 1	1,3	0,8	26,8	34	1.630
2	x 2	x 1,5	1,6	0,8	13,8	18	520
4	x 2	x 1,5	1,6	0,8	16,3	22	690
7	x 2	x 1,5	1,6	0,8	19,8	25	930
8	x 2	x 1,5	1,6	0,8	21,3	27	1.050
12	x 2	x 1,5	1,6	0,8	25,8	33	1.550
16	x 2	x 1,5	1,6	0,8	29,4	37	1.940
19	x 2	x 1,5	1,6	0,8	31,9	39	2.190
27	x 2	x 1,5	1,6	0,8	37,8	46	2.970
37	x 2	x 1,5	1,6	0,8	43,8	52	3.840
2	x 3	x 1,5	1,6	0,8	15,4	21	630
4	x 3	x 1,5	1,6	0,8	18,1	23	800
7	x 3	x 1,5	1,6	0,8	22,9	29	1.160
8	x 3	x 1,5	1,6	0,8	24,7	31	1.410
12	x 3	x 1,5	1,6	0,8	29,3	37	1.890



Fire resistant



Fire resistance tests

BS EN 50200 (IEC 60331-2)

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

BS EN 50200 Annex E

BS EN 50200 with water spray protocol
 flame for 30 minutes with water spray
 during last 15 min

BS EN 8434-2

BS EN 50200 with flame @ 930 °C
 for 120 minutes and water spray
 during last 60 minutes



BS EN IEC 60331-1

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



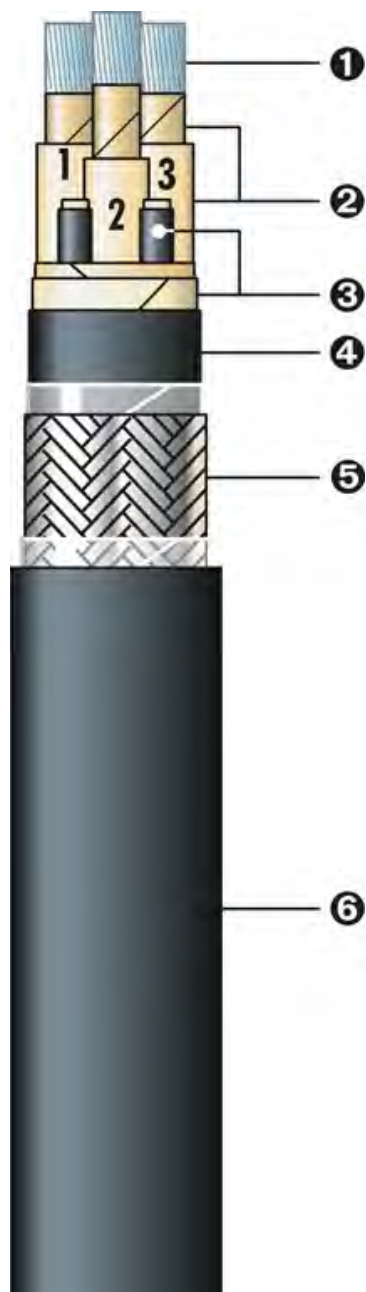
Shock-producing device



cable code designation (see page 11)

FCu/MGT/EPR/SB1/braid/SW4

power & control 600/1000 V
 halogen free flame retardant
armoured
fire resistant
 operating temperature over 100 °C
 (see page 7)



Design and construction	BS 7917
Nominal voltage U ₀ /U	600/1000 V
Max operating voltage U _{max}	1100 V
Maximum rated temperature	90 °C according to BS 7655-1-2
Flame retardance	BS EN 60332-1-2 BS EN 60332-3-22 Cat A
Fire resistance (see page 26)	BS EN IEC 60331-1 or IEC 60331-2 BS EN 50200 Annex E
Halogen content & corrosivity	BS EN 60754-1 & 2 BS EN 60684-2
Smoke density	BS EN 61034-1 & 2
UV resistance	UL 1581 § 1200
Ozone resistance	IEC 60092-360
Cold Bend and Impact test (-40 °C)	CSA C 22.2 N° 0.3-09 & N° 38-18
on request:	
Oils & muds resistant outer sheath	NEK 606:2016 table 1 Category d

Construction	
1 CONDUCTOR	tinned annealed copper flexible Class 2 BS EN 60228
2 INSULATION	mica tape + EPR (GP4) HF comp. BS 7655-1-2
3 BEDDING + FILLERS	FLAMEBAR® fiberglass tape + fiberglass ropes GP4 sheathed when 3 cores (sect. > 16 mm ²)
4 INNER SHEATH	SW4 (SHF2) compound BS 7655-2-6: or SB1 HF compound BS 7917 Tab 1
5 BRAID / ARMOUR	galvanized steel or tinned copper wire braid tinned phosphor bronze wire braid (single core)
6 OUTER SHEATH	SW4 (SHF2) compound BS 7655-2-6 or SHF2 H-M compound NEK 606:2016
	see Generals section

Cores identification	
1 core	off white
multicore	off white (progressively numbered)

Sheath colour black

Sheath marking
 CCI BS 7917 (outer sheath) n x sect mm² ELECTRIC CABLE 600/1000 V
 BS EN 60332-3-22 Cat A IEC 60331-1 or 2 meter marking year QA n°

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

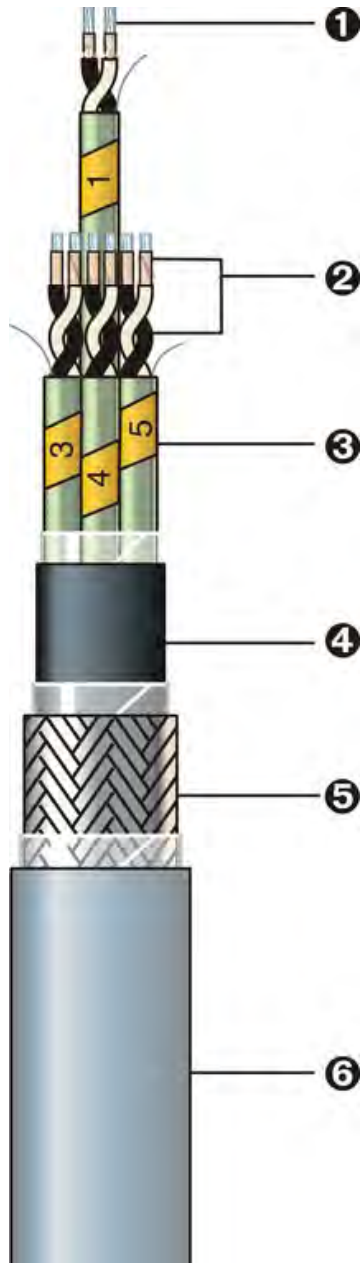
For 1900/3300 V and 3300/3300 V constructions apply to CABLE SERVICE

600/1000 V

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 10	4,1	1,0	8,7	13	320
1	x 16	5,2	1,0	10,1	14	410
1	x 25	6,5	1,2	12,0	16	550
1	x 35	7,5	1,2	13,0	17	680
1	x 50	8,3	1,4	14,3	19	860
1	x 70	10,0	1,4	16,0	21	1.110
1	x 95	11,8	1,6	18,4	24	1.440
1	x 120	13,2	1,6	20,0	26	1.730
1	x 150	14,6	1,8	22,0	28	2.100
1	x 185	16,5	2,0	24,5	31	2.650
1	x 240	19,0	2,2	27,6	35	3.320
1	x 300	21,8	2,4	31,0	38	4.050
2	x 1,5	1,6	0,8	9,4	13	280
2	x 2,5	2,0	0,8	10,2	14	330
2	x 4	2,8	1,0	13,0	17	470
2	x 6	3,3	1,0	14,3	19	570
2	x 10	4,1	1,0	16,4	21	770
2	x 16	5,2	1,0	19,0	24	1.010
3	x 1,5	1,6	0,8	10,0	14	320
3	x 2,5	2,0	0,8	10,9	15	380
3	x 4	2,8	1,0	13,9	18	540
3	x 6	3,3	1,0	15,2	20	670
3	x 10	4,1	1,0	17,5	23	910
3	x 16	5,2	1,0	20,3	26	1.230
3	x 25	6,5	1,2	24,4	30	1.720
3	x 35	7,5	1,2	26,7	33	2.220
3	x 50	8,3	1,4	29,2	36	2.820
3	x 70	10,0	1,4	33,3	41	3.710
3	x 95	11,8	1,6	38,5	46	4.840
3	x 120	13,2	1,6	41,7	50	5.780
3	x 150	14,6	1,8	46,0	55	7.120
3	x 185	16,5	2,0	51,3	60	8.710
3	x 240	19,0	2,2	58,0	67	10.970
3	x 300	21,8	2,4	65,5	76	13.730
4	x 1,5	1,6	0,8	10,9	15	370
4	x 2,5	2,0	0,8	11,9	16	440
4	x 4	2,8	1,0	15,2	20	660
4	x 6	3,3	1,0	16,9	22	820
4	x 10	4,1	1,0	19,4	25	1.120
4	x 16	5,2	1,0	22,5	28	1.520
4	x 25	6,5	1,2	27,0	34	2.260
4	x 35	7,5	1,2	29,5	36	2.790
4	x 50	8,3	1,4	32,3	40	3.590
4	x 70	10,0	1,4	36,8	45	4.660
4	x 95	11,8	1,6	42,5	51	6.110
4	x 120	13,2	1,6	46,3	55	7.440
4	x 150	14,6	1,8	51,0	60	9.130
4	x 185	16,5	2,0	57,0	66	11.280
4	x 240	19,0	2,2	64,6	75	14.530
4	x 300	21,8	2,4	72,9	84	17.560
5	x 1,5	1,6	0,8	12,0	16	430
7	x 1,5	1,6	0,8	13,3	18	500
12	x 1,5	1,6	0,8	17,7	23	830
19	x 1,5	1,6	0,8	20,9	26	1.120
27	x 1,5	1,6	0,8	25,5	31	1.580
37	x 1,5	1,6	0,8	28,7	36	2.080
5	x 2,5	2,0	0,8	13,2	17	530
7	x 2,5	2,0	0,8	14,5	20	640
12	x 2,5	2,0	0,8	19,6	25	1.040
19	x 2,5	2,0	0,8	23,1	29	1.420
27	x 2,5	2,0	0,8	28,2	35	2.110
37	x 2,5	2,0	0,8	31,7	39	2.640

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

cable code designation (see page 11)
 FCu/MGT/EPR/IS/SB1/braid/SW4



Design and construction	BS 7917
Nominal voltage U ₀ /U	150/250 V
Ma operating voltage U _{max}	280 V
Maximum rated temperature	90 °C according to BS 7655-1-2
Flame retardancy	BS EN 60332-1-2 BS EN 60332-3-22 Cat A
Fire resistance (see page 26)	BS EN IEC 60331-1 or IEC 60331-2 BS EN 50200 Annex E
Halogen content & corrosivity	BS EN 60754-1 & 2 BS EN 60684-2
Smoke density	BS EN 61034-1 & 2
UV resistance	UL 1581 § 1200
Ozone resistance	IEC 60092-360
Cold bend and Impact test (- 40 °C)	CSA C 22.2 N° 0.3-09 & N° 38-18
on request:	
Oils & muds resistant outer sheath	NEK 606:2016 Table 1 category d

Construction	
1 CONDUCTOR	tinned copper flexible Class 2 or Class 5 BS EN 60228
2 INSULATION	mica tape + EPR (GP4) HF compound BS 7655-1-2
CORES TWISTING	in pairs / triples
3 INDIVIDUAL SCREEN	Al/PE tape + tinned copper drain wire
4 INNER SHEATH	SW4 (SHF2) HF compound BS 7655-2-6 or SB1 HF compound BS 7917 Tab 1
5 BRAID / ARMOUR	galvanized steel or tinned copper wire braid
6 OUTER SHEATH	SW4 (SHF2) compound BS 7655-2-6 or SHF2 H-M compound NEK 606:2016
	see Generals section

Cores identification	
pair	black white
triple	black white red
multi pairs/triples	progressively numbered tapes

Sheath colour	grey
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Sheath marking	
CCI BS 7917 (outer sheath)	n x (pair/triple) x sect mm ² (i) ELECTRIC CABLE
150/250 V	BS EN 60332-3-22 Cat A IEC 60331-1 or 2 meter marking year QA n°

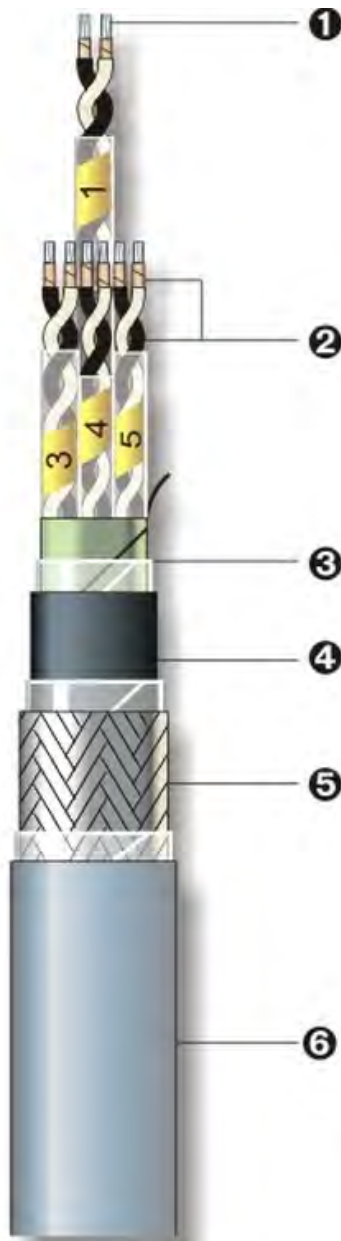
- Minimum Bending Radius: 4D (Overall Diameter) see Generals section

150/250 V

CONSTRUCTION				CONDUCTOR DIAMETER	INSULATION THICKNESS	DIAMETER UNDER ARMOUR	OVERALL DIAMETER	WEIGHT	
n	pair	triple	[m ²]	nominal	nominal	nominal	approx	approx	
				[mm]	[mm]	[mm]	[mm]	[kg/km]	
1	x	2	x	0,75	1,1	0,8	8,3	12	240
2	x	2	x	0,75	1,1	0,8	13,2	18	470
4	x	2	x	0,75	1,1	0,8	15,6	21	610
7	x	2	x	0,75	1,1	0,8	19,0	24	850
8	x	2	x	0,75	1,1	0,8	20,4	26	950
12	x	2	x	0,75	1,1	0,8	24,6	30	1.300
16	x	2	x	0,75	1,1	0,8	28,1	35	1.770
19	x	2	x	0,75	1,1	0,8	30,5	37	2.010
27	x	2	x	0,75	1,1	0,8	36,1	44	2.700
37	x	2	x	0,75	1,1	0,8	41,9	50	3.520
1	x	3	x	0,75	1,1	0,8	8,8	13	260
2	x	3	x	0,75	1,1	0,8	14,7	20	560
4	x	3	x	0,75	1,1	0,8	17,2	22	710
7	x	3	x	0,75	1,1	0,8	22,0	28	1.060
8	x	3	x	0,75	1,1	0,8	23,8	29	1.200
12	x	3	x	0,75	1,1	0,8	28,0	35	1.720
1	x	2	x	1	1,3	0,8	8,6	13	250
2	x	2	x	1	1,3	0,8	13,7	18	490
4	x	2	x	1	1,3	0,8	16,2	21	660
7	x	2	x	1	1,3	0,8	19,7	25	900
8	x	2	x	1	1,3	0,8	21,3	27	1.020
12	x	2	x	1	1,3	0,8	25,8	33	1.510
16	x	2	x	1	1,3	0,8	29,5	36	1.890
19	x	2	x	1	1,3	0,8	32,0	39	2.160
27	x	2	x	1	1,3	0,8	37,8	45	2.910
37	x	2	x	1	1,3	0,8	43,9	52	3.780
1	x	3	x	1	1,3	0,8	9,4	13	290
2	x	3	x	1	1,3	0,8	15,3	20	600
4	x	3	x	1	1,3	0,8	18,1	23	780
7	x	3	x	1	1,3	0,8	22,9	28	1.130
8	x	3	x	1	1,3	0,8	24,7	31	1.290
12	x	3	x	1	1,3	0,8	29,4	36	1.840
1	x	2	x	1,5	1,6	0,8	9,4	13	290
2	x	2	x	1,5	1,6	0,8	14,9	20	580
4	x	2	x	1,5	1,6	0,8	17,7	23	750
7	x	2	x	1,5	1,6	0,8	21,5	27	1.040
8	x	2	x	1,5	1,6	0,8	23,1	29	1.180
12	x	2	x	1,5	1,6	0,8	28,0	35	1.740
16	x	2	x	1,5	1,6	0,8	32,0	39	2.170
19	x	2	x	1,5	1,6	0,8	34,7	42	2.490
27	x	2	x	1,5	1,6	0,8	41,0	49	3.350
37	x	2	x	1,5	1,6	0,8	47,7	56	4.350
1	x	3	x	1,5	1,6	0,8	10,0	14	320
2	x	3	x	1,5	1,6	0,8	16,4	22	680
4	x	3	x	1,5	1,6	0,8	19,4	25	880
7	x	3	x	1,5	1,6	0,8	24,9	31	1.310
8	x	3	x	1,5	1,6	0,8	26,9	34	1.590
12	x	3	x	1,5	1,6	0,8	31,9	39	2.120

cable code designation (see page 11)
 FCu/MGT/EPR/OS/SB1/braid/SW4

instrumentation 150/250 V
 halogen free flame retardant
 overall screen armoured
fire resistant
 operating temperature over 100 °C
 (see page 7)



Design and construction	BS 7917
Nominal voltage U _o U	150/250 V
Max operating voltage U _{max}	280 V
Maximum rated temperature	90 °C according to BS 7655-1-2
Flame retardance	BS EN 60332-1-2 BS EN 60332-3-22 Cat A
Fire resistance (see page 26)	BS EN IEC 60331-1 or IEC 60331-2 BS EN 60200 Annex E
Halogen content & corrosivity	BS EN 60754-1 & 2 BS EN 60684-2
Smoke density	BS EN 61034-1 & 2
UV resistance	UL 1581 § 1200
Ozone resistance	IEC 60092-360
Cold bend and Impact test (- 40 °C)	CSA C 22.2 N° 0.3-09 & N° 38-18
on request:	
Oils & muds resistant outer sheath	NEK 606:2016 Table 1 Category d

Construction

1 CONDUCTOR	tinned copper flexible Class 2 or Class 5 BS EN 60228
2 INSULATION	mica tape + EPR (GP4) HF compound BS 7655-1-2
CORES TWISTING	in pairs / triples
3 OVERALL SCREEN	Al/PE tape + tinned copper drain wire
4 INNER SHEATH	SW4 (SHF2) compound BS 7655-2-6 or SB1 HF compound BS 7917 Tab 1
5 BRAID / ARMOUR	galvanized steel or tinned copper wire braid
6 OUTER SHEATH	SW4 (SHF2) compound BS 7655-2-6 or SHF2 H-M compound NEK 606:2016
	see Generals section

Cores identification

pair	black white
triple	black white red
multi pairs/triples	progressively numbered tapes

Sheath colour grey

Sheath marking

CCI BS 7917 (outer sheath) n x (pair/triple) x sect mm² (c) ELECTRIC CABLE
 150/250 V BS EN 60332-3-22 Cat A IEC 60331-1-or-2 meter marking year QA n°

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

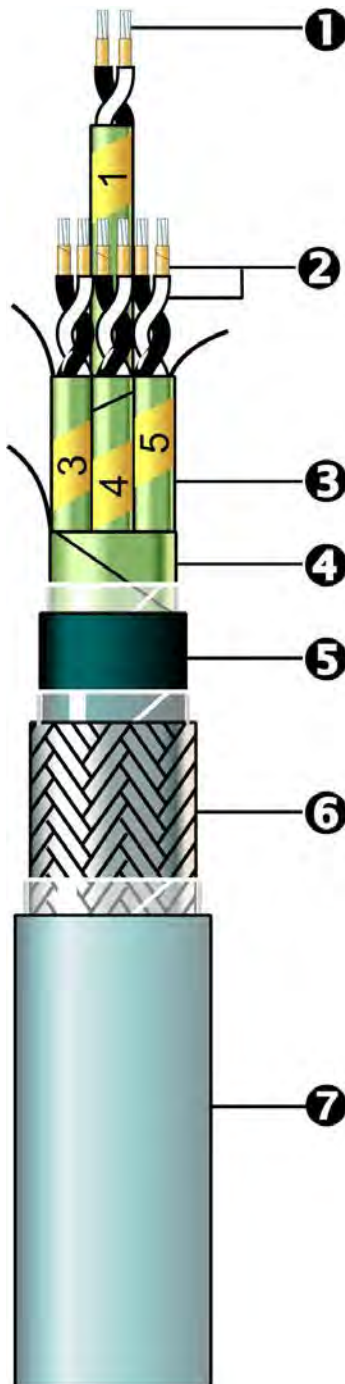
150/250 V

CONSTRUCTION			CONDUCTOR DIAMETER	INSULATION THICKNESS	DIAMETER UNDER ARMOUR	OVERALL DIAMETER	WEIGHT
n	pair triple	[m m ²]	nominal	nominal	nominal	approx	approx
			[mm]	[mm]	[mm]	[mm]	[kg/km]
2	x 2	x 0,75	1,1	0,8	13,1	17	450
4	x 2	x 0,75	1,1	0,8	15,3	20	570
7	x 2	x 0,75	1,1	0,8	18,8	24	790
8	x 2	x 0,75	1,1	0,8	20,1	25	880
12	x 2	x 0,75	1,1	0,8	24,4	30	1.200
16	x 2	x 0,75	1,1	0,8	27,9	34	1.610
19	x 2	x 0,75	1,1	0,8	30,0	37	1.820
27	x 2	x 0,75	1,1	0,8	35,5	43	2.450
37	x 2	x 0,75	1,1	0,8	41,3	49	3.160
2	x 3	x 0,75	1,1	0,8	14,4	19	520
4	x 3	x 0,75	1,1	0,8	17,1	22	680
7	x 3	x 0,75	1,1	0,8	21,6	27	980
8	x 3	x 0,75	1,1	0,8	23,4	29	1.120
12	x 3	x 0,75	1,1	0,8	27,8	35	1.610
2	x 2	x 1	1,3	0,8	13,7	18	480
4	x 2	x 1	1,3	0,8	16,1	21	620
7	x 2	x 1	1,3	0,8	19,6	25	850
8	x 2	x 1	1,3	0,8	21,1	27	950
12	x 2	x 1	1,3	0,8	25,4	31	1.290
16	x 2	x 1	1,3	0,8	29,0	36	1.720
19	x 2	x 1	1,3	0,8	31,5	38	1.970
27	x 2	x 1	1,3	0,8	37,2	45	2.630
37	x 2	x 1	1,3	0,8	43,3	51	3.410
2	x 3	x 1	1,3	0,8	15,2	20	580
4	x 3	x 1	1,3	0,8	17,8	23	730
7	x 3	x 1	1,3	0,8	22,7	28	1.080
8	x 3	x 1	1,3	0,8	24,4	30	1.190
12	x 3	x 1	1,3	0,8	29,0	36	1.730
2	x 2	x 1,5	1,6	0,8	14,7	20	560
4	x 2	x 1,5	1,6	0,8	17,4	23	710
7	x 2	x 1,5	1,6	0,8	21,1	27	950
8	x 2	x 1,5	1,6	0,8	22,8	28	1.070
12	x 2	x 1,5	1,6	0,8	27,7	34	1.590
16	x 2	x 1,5	1,6	0,8	31,6	39	1.970
19	x 2	x 1,5	1,6	0,8	34,3	41	2.270
27	x 2	x 1,5	1,6	0,8	40,5	48	3.030
32	x 2	x 1,5	1,6	0,8	47,1	55	3.930
2	x 3	x 1,5	1,6	0,8	16,4	22	670
4	x 3	x 1,5	1,6	0,8	19,3	25	840
7	x 3	x 1,5	1,6	0,8	24,5	30	1.210
8	x 3	x 1,5	1,6	0,8	26,5	32	1.380
12	x 3	x 1,5	1,6	0,8	31,5	39	1.960

instrumentation 150/250 V
 halogen free - flame retardant
 individual & overall screen armoured
fire resistant

cable code designation (see page 11)
 FCU/MGT/EPR/IOS/SB1/braid/ SW4

operating temperature over 100 °C (see page 7)



Design and construction	BS 7917
Nominal voltage U ₀ /U	150/250 V
Max operating voltage U _{max}	280 V
Maximum rated temperature	90 °C according to BS 7655-1-2
Flame retardance	BS EN 60332-1-2 BS EN 60332-3-22 Cat A
Fire resistance (see page 26)	BS EN IEC 60331-1 or IEC 60331-2 BS EN 50200 Annex E
Halogen content & corrosivity	BS EN 60754-1 & 2 BS EN 60684-2
Smoke density	BS EN 61034-1 & 2
Ozone resistance	UL 1581 § 1200
UV resistance	IEC 60092-360
Cold bend and Impact test (- 40 °C)	CSA C 22.2 N° 0.3-09 & N° 38-18
on request:	
Oils & muds resistant outer sheath	NEK 606:2016 Table 1 Category d

Construction	
1 CONDUCTOR	tinned copper flexible Class 2 or Class 5 BS EN 60228
2 INSULATION	mica tape + EPR (GP4) HF compound BS 7655-1-2
CORES TWISTING in pairs / triples	
3 INDIVIDUAL SCREEN	Al/PE tape + tinned copper drain wire
4 OVERALL SCREEN	Al/PE tape + tinned copper drain wire
5 INNER SHEATH	SW4 (SHF2) HF compound BS 7655-2-6 or SB1 HF compound BS 7917 Tab 1
6 BRAID / ARMOUR	galvanized steel or tinned copper wire braid
7 OUTER SHEATH	SW4 (SHF2) compound BS 7655-2-6 or SHF2 H-M compound NEK 606:2016
	see Generals section

Cores identification	
pair	black white
triple	black white red
multi pairs/triples	progressively numbered tapes

Sheath colour	grey
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Sheath marking	
CCI BS 7917 (outer sheath) n x (pair/triple) x sect mm ² (ic) ELECTRIC CABLE	
150/250 V BS EN 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	DIAMETER UNDER ARMOUR	OVERALL DIAMETER	WEIGHT	
n	pair	triple	[m m ²]	nominal	nominal	nominal	approx	approx	
				[mm]	[mm]	[mm]	[mm]	[kg/km]	
2	x	2	x	0,75	1,1	0,8	13,3	18	480
4	x	2	x	0,75	1,1	0,8	15,7	21	630
7	x	2	x	0,75	1,1	0,8	19,1	24	860
8	x	2	x	0,75	1,1	0,8	20,5	26	980
12	x	2	x	0,75	1,1	0,8	24,7	31	1.410
16	x	2	x	0,75	1,1	0,8	28,4	35	1.805
19	x	2	x	0,75	1,1	0,8	30,6	38	2.050
27	x	2	x	0,75	1,1	0,8	36,2	44	2.730
37	x	2	x	0,75	1,1	0,8	42,0	50	3.560
2	x	3	x	0,75	1,1	0,8	14,8	20	570
4	x	3	x	0,75	1,1	0,8	17,5	23	730
7	x	3	x	0,75	1,1	0,8	22,1	28	1.080
8	x	3	x	0,75	1,1	0,8	23,8	30	1.230
12	x	3	x	0,75	1,1	0,8	28,4	35	1.760
2	x	2	x	1	1,3	0,8	13,8	18	500
4	x	2	x	1	1,3	0,8	16,5	22	680
7	x	2	x	1	1,3	0,8	20,0	26	940
8	x	2	x	1	1,3	0,8	21,3	27	1.030
12	x	2	x	1	1,3	0,8	25,9	33	1.530
16	x	2	x	1	1,3	0,8	29,6	37	1.930
19	x	2	x	1	1,3	0,8	32,1	39	2.180
27	x	2	x	1	1,3	0,8	37,9	46	2.950
37	x	2	x	1	1,3	0,8	44,0	52	3.820
2	x	3	x	1	1,3	0,8	15,4	21	610
4	x	3	x	1	1,3	0,8	18,1	24	790
7	x	3	x	1	1,3	0,8	23,2	29	1.160
8	x	3	x	1	1,3	0,8	24,8	31	1.300
12	x	3	x	1	1,3	0,8	29,5	37	1.880
2	x	2	x	1,5	1,6	0,8	15,0	20	590
4	x	2	x	1,5	1,6	0,8	17,7	23	780
7	x	2	x	1,5	1,6	0,8	21,6	27	1.060
8	x	2	x	1,5	1,6	0,8	23,2	29	1.200
12	x	2	x	1,5	1,6	0,8	28,2	35	1.760
16	x	2	x	1,5	1,6	0,8	32,1	39	2.220
19	x	2	x	1,5	1,6	0,8	34,8	42	2.520
27	x	2	x	1,5	1,6	0,8	41,3	49	3.420
37	x	2	x	1,5	1,6	0,8	48,0	56	4.440
2	x	3	x	1,5	1,6	0,8	16,7	22	710
4	x	3	x	1,5	1,6	0,8	19,7	25	910
7	x	3	x	1,5	1,6	0,8	25,0	31	1.330
8	x	3	x	1,5	1,6	0,8	27,0	34	1.610
12	x	3	x	1,5	1,6	0,8	32,1	39	2.170



FIREBAR®

Fire & Water resistant





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

in accordance with

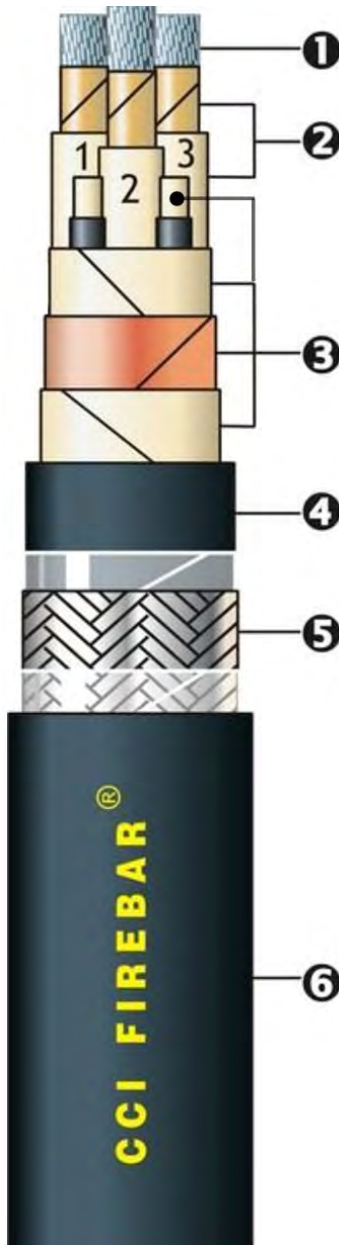
instrumentation
power low voltage
medium voltage

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 600/1000 V
 halogen free flame retardant
 armoured

fire + mechanical shocks + water spray + water immersion resistant



Design and construction	BS 7917 as applicable
Nominal voltage U_0/U	600/1000 V
Max operating voltage U_{max}	1100 V
Maximum rated temperature	95 °C according to IEC 60092-360
Flame retardancy	BS EN 60332-1-2 BS EN 60332-3-22 Cat A
Fire resistance	BS 7846 : 2000 Cat F3 (see NOTE) BS 8434-2 (see page 26)
Halogen content & corrosivity	BS EN 60754-1 & 2 BS EN 60684-2
Smoke density	BS EN 61034-1 & 2
UV resistance	UL 1581 § 1200
Ozone resistance	IEC 60092-360
Cold Bend and Impact test (- 40° C)	CSA C 22.2 N° 0.3-09 & N° 38-18
on request:	
Oils & MUDs outer sheath resistant	NEK 606:2016 Table 1 Category d

Construction	
1 CONDUCTOR	tinned annealed copper flexible Class 2 IEC 60228
2 INSULATION	mica tape + S95 HF comp. IEC 60092-360
3 FIREBAR® protection	<ul style="list-style-type: none"> FIREBAR® fiberglass tapes + fiberglass ropes S95 sheathed when 3 cores (sect. > 16 mm²) Cu/PE tape
4 INNER SHEATH	SW4 (SHF2) extruded compound
5 ARMOUR	galvanized steel or tinned copper wire braid tinned phosphor bronze wire braid (single core)
6 OUTER SHEATH	SW4 (SHF2) compound BS 7655-2-6 or SHF2 H-M compound NEK 606:2016
	see Generals section

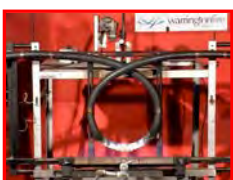
Cores identification	off white numbered
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Sheath colour	black
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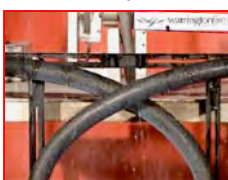
Sheath marking	
CCI FIREBAR® BS 7917 (outer sheath)	n x sect mm ² ELECTRIC CABLE 600/1000 V
BS EN 60332-3- 22 Cat A	BS 7846:2000 Cat F3 meter marking year QA n°

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

FIRE & MECHANICAL SHOCKS



WATER SPRAY



WATER IMMERSION



NOTE BS 7846 Cat F3 : 2000 - test parameters

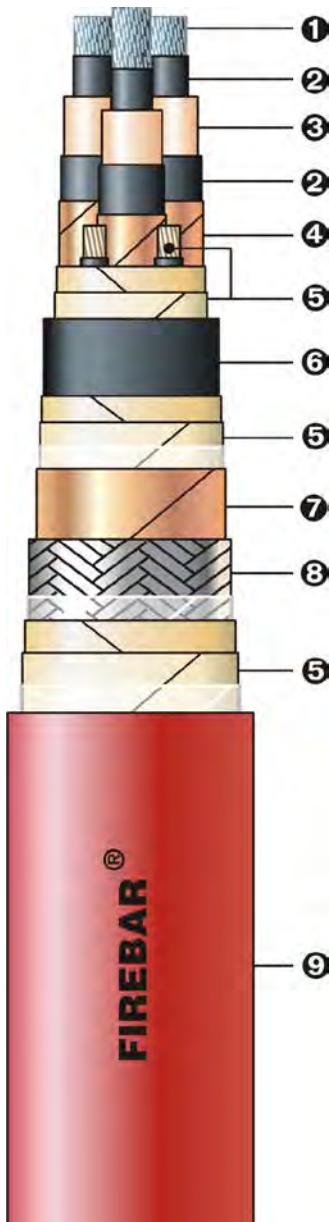
> FIRE: 950 (+0/-50)°C x 120 minutes @ 1000 V, while:
 > MECHANICAL SHOCKS: every 5 minutes hitting the frame with sample mounted in bent formation at Minim. Bending Radius
 > WATER SPRAY : 1 l/m² s⁻¹ (2,4 l/min) during last 15 minutes
Furthermore, not requested by any fire resistant standard:
 WATER IMMERSION (15 min) of burned sample still powered

600/1000 V

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 10	4,1	1,0	9,7	13	340
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	740
1	x 50	8,3	1,4	14,7	19	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	320
2	x 2,5	2,0	1,0	11,7	16	380
2	x 4	2,8	1,0	13,6	18	480
2	x 6	3,3	1,0	14,9	20	590
2	x 10	4,1	1,0	16,5	21	760
2	x 16	5,2	1,0	18,9	24	1.020
3	x 1,5	1,6	1,0	11,2	15	360
3	x 2,5	2,0	1,0	12,4	17	440
3	x 4	2,8	1,0	14,5	19	560
3	x 6	3,3	1,0	15,8	21	680
3	x 10	4,1	1,0	17,5	23	900
3	x 16	5,2	1,0	20,5	26	1.250
3	x 25	6,5	1,2	24,4	30	1.720
3	x 35	7,5	1,2	26,4	32	2.100
3	x 50	8,3	1,4	29,0	35	2.620
3	x 70	10,0	1,4	32,7	40	3.480
3	x 95	11,8	1,6	37,4	45	4.640
3	x 120	13,2	1,6	40,8	49	5.570
3	x 150	14,6	1,8	45,1	54	6.850
3	x 185	16,5	2,0	50,1	59	8.460
3	x 240	19,0	2,2	56,8	66	10.730
3	x 300	21,8	2,4	63,7	74	12.960
4	x 1,5	1,6	1,0	12,1	17	420
4	x 2,5	2,0	1,0	13,5	18	500
4	x 4	2,8	1,0	15,8	21	660
4	x 6	3,3	1,0	17,3	22	820
4	x 10	4,1	1,0	19,6	25	1.120
4	x 16	5,2	1,0	22,5	28	1.520
4	x 25	6,5	1,2	26,8	33	2.110
4	x 35	7,5	1,2	29,1	35	2.650
4	x 50	8,3	1,4	31,9	39	3.380
4	x 70	10,0	1,4	36,0	43	4.400
4	x 95	11,8	1,6	41,3	49	5.890
4	x 120	13,2	1,6	45,1	53	7.100
4	x 150	14,6	1,8	49,8	59	8.680
4	x 185	16,5	2,0	55,8	65	10.740
4	x 240	19,0	2,2	62,7	73	13.760
4	x 300	21,8	2,4	70,5	81	16.520
5	x 1,5	1,6	1,0	13,4	18	490
7	x 1,5	1,6	1,0	14,6	19	570
12	x 1,5	1,6	1,0	19,4	25	910
19	x 1,5	1,6	1,0	22,7	28	1.220
27	x 1,5	1,6	1,0	27,3	33	1.690
37	x 1,5	1,6	1,0	30,8	37	2.200
5	x 2,5	2,0	1,0	14,8	19	590
7	x 2,5	2,0	1,0	16,1	21	700
12	x 2,5	2,0	1,0	21,5	27	1.130
19	x 2,5	2,0	1,0	25,4	31	1.550
27	x 2,5	2,0	1,0	30,6	37	2.240
37	x 2,5	2,0	1,0	34,4	41	2.810

radial field
 3800/6600 V - 6350/11000 V - 8700/15000 V
 halogen free flame retardant
 armoured

fire + mechanical shocks + water jets + water immersion resistant
 operating temperature over 100 °C
 (see page 7)



Design and construction	BS 6883 as applicable
Nominal voltage U ₀ /U	3800/6600 V - 6350/11000 V - 8700/15000 V
Max operating voltage U _{max}	7200 V 12000 V 17500 V
Maximum rated temperature	90 °C according to BS 7655-1-2
Flame retardance	BSEN 60332-1-2 BS EN 60332-3-22 Cat A
Fire resistance	BS 8491 F120 (see NOTE)
Halogen content & corrosivity	BS EN 60754-1 & 2 BS EN 60684-2
Smoke density	BS EN 61034-1 & 2
UV resistance	UL 1581 § 1200
Ozone resistance	IEC 60092-360
Electromagnetic Compatibility	IEC 60533 Annex B IEC 62153-4-3
Cold bend and Impact test (-40 °C)	CSA C 22.2 N° 0.3-09 & N° 38-18 on request:
Oils & muds resistant outer sheath	NEK 606:2016 Table 1 Category d

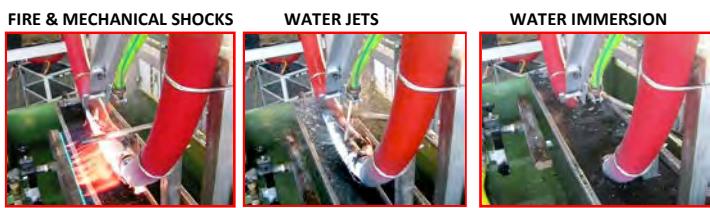
Construction	
1 CONDUCTOR	tinned copper Flexible Class 2 BS EN 60228
2 SEMICONDUCTIVES	LSOH extruded compound
3 INSULATION	HEPR (GP6) HF compound BS 7655-1-2 + HF heat resistant rubber compound
4 PHASE SCREEN	plain copper tape
5 FIREBAR® protection	FLAMEBAR® fiberglass tapes + fiberglass ropes HF heat resistant comp. sheathed when 3 cores
6 INNER SHEATH	HF heat resistant compound
7 ELECTROMAGNETIC SHIELD	plain copper tape
8 ARMOUR	tinned copper wire braid
9 OUTER SHEATH	SW4 (SHF2) compound BS 7655-2-6 or 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
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Sheath marking	
CCI FIREBAR® BS 6883 (outer sheath)	n x sect mm ² ELECTRIC CABLE U ₀ /U V
BS EN 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



NOTE BS 8491 F120 - test parameters
 > FIRE: 830 (+40/-0)°C x 120 minutes @ U₀ 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

3800/6600 V

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	3,0	31,7	42	2.580
1	x 70	10,0	3,0	33,4	44	2.890
1	x 95	11,8	3,0	35,2	46	3.280
1	x 120	13,2	3,0	36,6	47	3.640
1	x 150	14,6	3,0	38,0	49	4.060
1	x 185	16,5	3,0	39,9	51	4.750
1	x 240	19,0	3,0	42,4	54	5.520
1	x 300	21,8	3,0	45,2	57	6.370
3	x 50	8,3	3,0	57,1	71	6.160
3	x 70	10,0	3,0	60,8	75	7.210
3	x 95	11,8	3,0	64,7	79	8.380
3	x 120	13,2	3,0	67,7	82	9.400
3	x 150	14,6	3,0	70,7	85	10.490
3	x 185	16,5	3,0	74,8	90	12.280

6350/11000 V

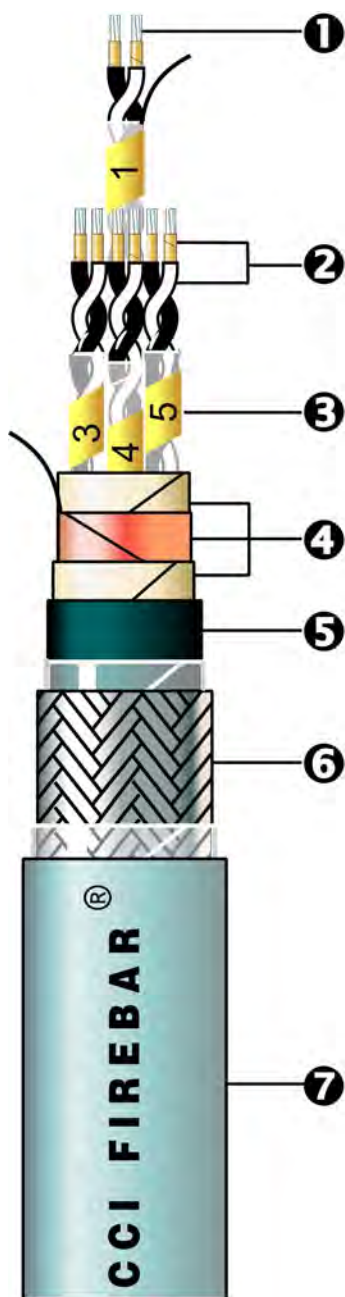
1	x 50	8,3	3,4	32,5	43	2.650
1	x 70	10,0	3,4	34,2	45	2.970
1	x 95	11,8	3,4	36,0	46	3.370
1	x 120	13,2	3,4	37,4	48	3.740
1	x 150	14,6	3,4	38,8	49	4.150
1	x 185	16,5	3,4	40,7	52	4.850
1	x 240	19,0	3,4	43,2	55	5.620
1	x 300	21,8	3,4	46,0	58	6.480
3	x 50	8,3	3,4	58,8	73	6.410
3	x 70	10,0	3,4	62,5	77	7.450
3	x 95	11,8	3,4	66,4	81	8.630
3	x 120	13,2	3,4	69,4	84	9.660
3	x 150	14,6	3,4	72,4	87	10.840
3	x 185	16,5	3,4	76,5	91	12.480

8700/15000 V

1	x 50	8,3	4,5	34,7	45	2.860
1	x 70	10,0	4,5	36,4	47	3.210
1	x 95	11,8	4,5	38,2	49	3.620
1	x 120	13,2	4,5	39,6	50	4.000
1	x 150	14,6	4,5	41,0	52	4.220
1	x 185	16,5	4,5	42,9	55	5.130
1	x 240	19,0	4,5	45,4	57	5.920
1	x 300	21,8	4,5	48,2	60	6.790
3	x 50	8,3	4,5	63,6	79	7.140
3	x 70	10,0	4,5	67,3	82	8.200
3	x 95	11,8	4,5	71,1	86	9.420
3	x 120	13,2	4,5	74,2	89	10.650
3	x 150	14,6	4,5	77,2	92	11.690
3	x 185	16,5	4,5	81,3	97	13.370

instrumentation 150/250 V
 halogen free flame retardant
 overall screen armoured

fire + mechanical shocks + water spray + water immersion resistant



Design and construction	BS 7917 as applicable
Nominal voltage U_0/U	150/250 V
Max operating voltage U_{max}	280 V
Maximum rated temperature	95 °C according to IEC 60092-360
Flame retardancy	BS EN 60332-1-2 BS EN 60332-3-22 Cat A
Fire resistance	BS 7846 : 2000 Cat F3 (see NOTE) BS 8434-2 (see page 26)
Halogen content & corrosivity	BS EN 60754-1 & 2 BS EN 60684-2
Smoke density	BS EN 61034-1 & 2
UV resistance	UL 1581 § 1200
Ozone resistance	IEC 60092-360
Cold Bend and Impact test (- 40° C)	CSA C 22.2 N° 0.3-09 & N° 38-18
on request:	
Oils & MUDs outer sheath resistant	NEK 606:2016 Table 1 Category d

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 CORES TWISTING	in pairs / triples
4 FIREBAR® protection & OVERALL SCREEN	<ul style="list-style-type: none"> • FLAMEBAR® fiberglass tapes • Cu/PE tape + tinned copper drain wire
4 INNER SHEATH	HF extruded compound
5 ARMOUR	tinned copper wire braid
6 OUTER SHEATH	SW4 (SHF2) compound BS 7655-2-6 or SHF2 H-M compound NEK 606:2016
	see Generals section

Cores identification	
pair	black white
triple	black white red
multi pairs/triples	progressively numbered tapes

Sheath colour	grey
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Sheath marking	CCI FIREBAR® BS 7917 (outer sheath) n x (pair/triple) x sect mm ² (c) ELECTRIC CABLE 150/250 V BS EN 60332-3-22 Cat A BS 7846:2000 Cat F3 meter marking year QA n°
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• Minimum Bending Radius: 4D (Overall Diameter) – see Generals section

FIRE & MECHANICAL SHOCKS



WATER SPRAY



WATER IMMERSION



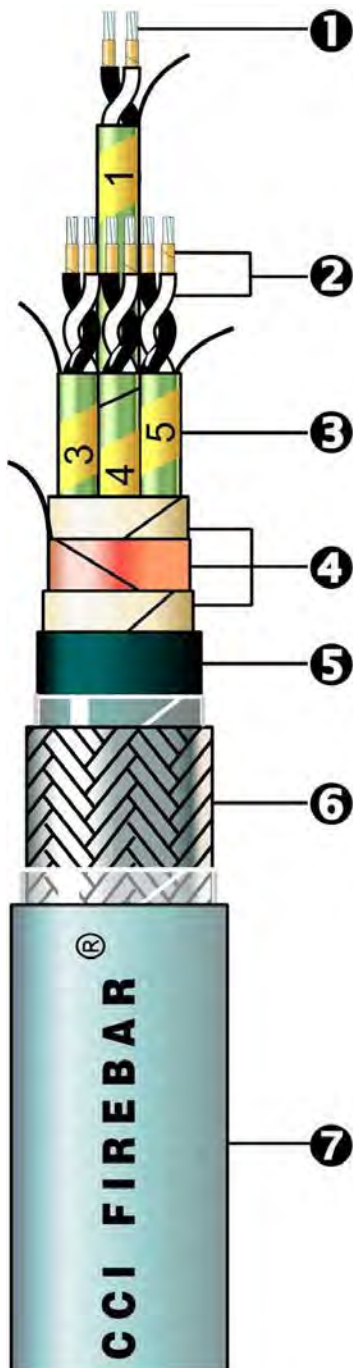
NOTE BS 7846 Cat F3 : 2000 - test parameters

> FIRE: 950 (+0/-50)°C x 120 minutes @ 1000 V, while:
 > MECHANICAL SHOCKS: every 5 minutes hitting the frame with sample mounted in bent formation at Minim. 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	[m m ²]	nominal	nominal	nominal	approx	approx
	triple		[mm]	[mm]	[mm]	[mm]	[kg/km]
1	x 2	x 0,75	1,1	0,9	9,4	14	300
2	x 2	x 0,75	1,1	0,9	14,4	19	530
4	x 2	x 0,75	1,1	0,9	16,6	21	690
7	x 2	x 0,75	1,1	0,9	20,3	25	930
8	x 2	x 0,75	1,1	0,9	21,6	27	1.040
12	x 2	x 0,75	1,1	0,9	26,0	31	1.410
16	x 2	x 0,75	1,1	0,9	29,6	36	1.870
19	x 2	x 0,75	1,1	0,9	31,8	38	2.120
27	x 2	x 0,75	1,1	0,9	37,5	45	2.830
37	x 2	x 0,75	1,1	0,9	43,5	51	3.650
1	x 3	x 0,75	1,1	0,9	9,9	14	320
2	x 3	x 0,75	1,1	0,9	15,7	21	620
4	x 3	x 0,75	1,1	0,9	18,4	23	830
7	x 3	x 0,75	1,1	0,9	23,2	28	1.180
12	x 3	x 0,75	1,1	0,9	29,5	36	1.920
1	x 2	x 1	1,3	0,9	9,8	14	320
2	x 2	x 1	1,3	0,9	15,0	20	590
4	x 2	x 1	1,3	0,9	17,7	22	760
7	x 2	x 1	1,3	0,9	21,0	27	1.040
8	x 2	x 1	1,3	0,9	22,9	28	1.150
12	x 2	x 1	1,3	0,9	27,4	33	1.580
16	x 2	x 1	1,3	0,9	31,1	38	2.080
19	x 2	x 1	1,3	0,9	33,7	41	2.380
27	x 2	x 1	1,3	0,9	39,7	47	3.180
37	x 2	x 1	1,3	0,9	46,0	54	4.130
1	x 3	x 1	1,3	0,9	10,5	15	360
2	x 3	x 1	1,3	0,9	16,7	22	680
4	x 3	x 1	1,3	0,9	19,4	24	910
7	x 3	x 1	1,3	0,9	24,6	30	1.330
12	x 3	x 1	1,3	0,9	31,1	38	2.140
1	x 2	x 1,5	1,6	1,0	11,2	16	380
2	x 2	x 1,5	1,6	1,0	17,1	22	700
4	x 2	x 1,5	1,6	1,0	20,1	25	930
7	x 2	x 1,5	1,6	1,0	24,3	30	1.290
8	x 2	x 1,5	1,6	1,0	26,2	32	1.450
12	x 2	x 1,5	1,6	1,0	31,6	38	2.130
16	x 2	x 1,5	1,6	1,0	36,0	43	2.670
19	x 2	x 1,5	1,6	1,0	39,0	46	3.080
27	x 2	x 1,5	1,6	1,0	46,0	54	4.140
37	x 2	x 1,5	1,6	1,0	53,3	62	5.390
1	x 3	x 1,5	1,6	1,0	11,8	16	420
2	x 3	x 1,5	1,6	1,0	19,0	24	850
4	x 3	x 1,5	1,6	1,0	22,3	28	1.130
7	x 3	x 1,5	1,6	1,0	28,2	34	1.680
12	x 3	x 1,5	1,6	1,0	36,0	43	2.720

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



Design and construction	BS 7917 as applicable
Nominal voltage U_0/U	150/250 V
Max operating voltage U_{max}	280 V
Maximum rated temperature	95 °C according to IEC 60092-360
Flame retardancy	BS EN 60332-1-2 BS EN 60332-3-22 Cat A
Fire resistance	BS 7846 : 2000 Cat F3 (see NOTE) BS 8434-2 (see page 26)
Halogen content & corrosivity	BS EN 60754-1 & 2 BS EN 60684-2
Smoke density	BS EN 61034-1 & 2
UV resistance	UL 1581 § 1200
Ozone resistance	IEC 60092-360
Cold Bend and Impact test (- 40° C)	CSA C 22.2 N° 0.3-09 & N° 38-18
on request:	
Oils & MUDs outer sheath resistant	NEK 606:2016 Table 1 Category d

Construction	
1 CONDUCTOR	tinned annealed copper flexible Class 2 or Class 5 BS EN 60228
2 INSULATION	mica tape + S95 HF comp. IEC 60092.360
3 INDIVIDUAL SCREEN	Al/PE tape + tinned coper drain wire
4 FIREBAR® protection & OVERALL SCREEN	• FLAMEBAR® fiberglass tapes • Cu/PE tape + tinned copper drain wire
5 INNER SHEATH	HF extruded compound
6 ARMOUR	tinned copper wire braid
7 OUTER SHEATH	SW4 (SHF2) compound BS 7655-2-6 or SHF2 H-M compound NEK 606:2016
	see Generals section

Cores identification	
pair	black white
triple	black white red
multi pairs/triples	progressively numbered tapes

Sheath colour	grey
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Sheath marking	
CCI FIREBAR® BS 7917 (outer sheath)	n x (pair/triple) x sect mm ² (ic) ELECTRIC CABLE
150/250 V BS EN 60332-3-22 Cat A BS 7846:2000 Cat F3	meter marking year QA n°

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

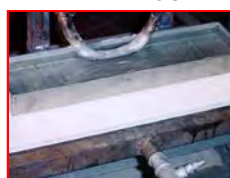
FIRE & MECHANICAL SHOCKS



WATER SPRAY



WATER IMMERSION



NOTE BS 7846 Cat F3 : 2000 - test parameters

> FIRE: 950 (+0/-50)°C x 120 minutes @ 1000 V, while:
 > MECHANICAL SHOCKS: every 5 minutes hitting the frame with sample mounted in bent formation at Minim. 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	14,5	19	560
4	x 2	x 0,75	1,1	0,9	17,0	22	740
7	x 2	x 0,75	1,1	0,9	20,5	26	1.010
8	x 2	x 0,75	1,1	0,9	22,0	27	1.140
12	x 2	x 0,75	1,1	0,9	26,3	33	1.640
16	x 2	x 0,75	1,1	0,9	30,1	37	2.060
19	x 2	x 0,75	1,1	0,9	32,4	39	2.340
27	x 2	x 0,75	1,1	0,9	38,1	46	3.140
37	x 2	x 0,75	1,1	0,9	44,2	52	4.070
2	x 3	x 0,75	1,1	0,9	16,1	21	650
4	x 3	x 0,75	1,1	0,9	18,8	24	880
7	x 3	x 0,75	1,1	0,9	23,6	29	1.270
12	x 3	x 0,75	1,1	0,9	30,1	37	2.050
2	x 2	x 1	1,3	0,9	15,2	20	600
4	x 2	x 1	1,3	0,9	18,0	23	820
7	x 2	x 1	1,3	0,9	21,7	27	1.140
8	x 2	x 1	1,3	0,9	23,1	29	1.260
12	x 2	x 1	1,3	0,9	27,8	34	1.850
16	x 2	x 1	1,3	0,9	31,7	39	2.320
19	x 2	x 1	1,3	0,9	34,3	41	2.630
27	x 2	x 1	1,3	0,9	40,4	48	3.580
37	x 2	x 1	1,3	0,9	46,8	55	4.640
2	x 3	x 1	1,3	0,9	16,9	22	710
4	x 3	x 1	1,3	0,9	19,8	25	970
7	x 3	x 1	1,3	0,9	25,0	30	1.420
12	x 3	x 1	1,3	0,9	31,6	39	2.310
2	x 2	x 1,5	1,6	1,0	17,5	22	730
4	x 2	x 1,5	1,6	1,0	20,5	26	1.000
7	x 2	x 1,5	1,6	1,0	24,8	30	1.400
8	x 2	x 1,5	1,6	1,0	26,6	32	1.560
12	x 2	x 1,5	1,6	1,0	32,1	39	2.310
16	x 2	x 1,5	1,6	1,0	36,3	44	2.930
19	x 2	x 1,5	1,6	1,0	39,6	47	3.360
27	x 2	x 1,5	1,6	1,0	46,8	55	4.540
37	x 2	x 1,5	1,6	1,0	54,3	63	5.910
2	x 3	x 1,5	1,6	1,0	19,3	24	890
4	x 3	x 1,5	1,6	1,0	22,7	28	1.190
7	x 3	x 1,5	1,6	1,0	28,6	34	1.800
12	x 3	x 1,5	1,6	1,0	36,5	44	2.950



Electrical data



1 core

CONSTRUCTION	MAX. CONDUCTOR RESISTANCE		REACTANCE		CAPACITANCE		INDUCTANCE		IMPEDANCE				MAXIMUM CURRENT (*) in free air	SHORT CIRCUIT 1 sec @ 90°C/250°C [kA]
	[Ω/km]		[Ω/km]		[μFarad/km]	[μHenry/km]	20°C		[Ω/km]		90°C			
	n	[mm ²]	20°C	90°C	50 Hz	60 Hz	nominal	nominal	50 Hz	60 Hz	50 Hz	60 Hz		
1 x 10	1,84	2,35	0,121	0,146	0,213	403	1,84	1,85	2,35	2,35	69	1,43		
1 x 16	1,16	1,48	0,116	0,139	0,256	387	1,17	1,17	1,48	1,49	92	2,29		
1 x 25	0,734	0,936	0,116	0,139	0,301	369	0,74	0,75	0,94	0,95	123	3,58		
1 x 35	0,529	0,675	0,090	0,108	0,338	288	0,54	0,54	0,68	0,68	153	5,01		
1 x 50	0,391	0,499	0,091	0,109	0,362	289	0,40	0,41	0,51	0,51	188	7,15		
1 x 70	0,270	0,344	0,086	0,104	0,421	275	0,28	0,29	0,35	0,36	243	10,0		
1 x 95	0,195	0,249	0,085	0,102	0,477	271	0,21	0,22	0,26	0,27	298	13,6		
1 x 120	0,154	0,196	0,083	0,100	0,521	266	0,18	0,18	0,21	0,22	348	17,2		
1 x 150	0,126	0,161	0,083	0,100	0,561	265	0,15	0,16	0,18	0,19	404	21,5		
1 x 185	0,100	0,128	0,083	0,099	0,616	263	0,13	0,14	0,15	0,16	464	26,5		
1 x 240	0,0762	0,0972	0,082	0,098	0,687	260	0,11	0,12	0,13	0,14	552	34,3		
1 x 300	0,0607	0,0774	0,080	0,096	0,766	256	0,10	0,11	0,11	0,12	640	42,9		

2 cores

2 x 1,5	12,2	15,6	0,103	0,123	0,151	327	12,2	12,2	15,6	15,6	23	0,21
2 x 2,5	7,56	9,64	0,096	0,115	0,170	306	7,56	7,56	9,64	9,64	31	0,36
2 x 4	4,70	5,99	0,093	0,112	0,180	296	4,70	4,70	5,99	5,99	43	0,57
2 x 6	3,11	3,97	0,089	0,107	0,196	283	3,11	3,11	3,97	3,97	55	0,86
2 x 10	1,84	2,35	0,084	0,101	0,219	268	1,84	1,84	2,35	2,35	75	1,43
2 x 16	1,16	1,48	0,080	0,096	0,246	254	1,16	1,16	1,48	1,48	100	2,29

3 cores

3 x 1,5	12,2	15,6	0,103	0,123	0,151	327	12,2	12,2	15,6	15,6	20	0,21
3 x 2,5	7,56	9,64	0,096	0,115	0,170	306	7,56	7,56	9,64	9,64	28	0,36
3 x 4	4,70	5,99	0,093	0,112	0,180	296	4,70	4,70	5,99	5,99	37	0,57
3 x 6	3,11	3,97	0,089	0,107	0,196	283	3,11	3,11	3,97	3,97	47	0,86
3 x 10	1,84	2,35	0,084	0,101	0,219	268	1,84	1,84	2,35	2,35	65	1,43
3 x 16	1,16	1,48	0,080	0,096	0,246	254	1,16	1,16	1,48	1,48	87	2,29
3 x 25	0,734	0,936	0,079	0,095	0,251	251	0,74	0,74	0,94	0,94	110	3,58
3 x 35	0,529	0,675	0,077	0,092	0,267	244	0,53	0,54	0,68	0,68	137	5,01
3 x 50	0,391	0,499	0,078	0,093	0,261	247	0,40	0,40	0,50	0,51	167	7,15
3 x 70	0,270	0,344	0,075	0,090	0,284	238	0,28	0,28	0,35	0,36	214	10,0
3 x 95	0,195	0,249	0,074	0,089	0,288	237	0,21	0,21	0,26	0,26	259	13,6
3 x 120	0,154	0,196	0,073	0,087	0,301	232	0,17	0,18	0,21	0,21	301	17,2
3 x 150	0,126	0,161	0,073	0,088	0,299	233	0,15	0,15	0,18	0,18	347	21,5
3 x 185	0,100	0,128	0,073	0,087	0,301	232	0,12	0,13	0,15	0,16	397	26,5
3 x 240	0,0762	0,0972	0,072	0,087	0,307	230	0,11	0,12	0,12	0,13	468	34,3
3 x 300	0,0607	0,0774	0,072	0,086	0,313	228	0,09	0,11	0,11	0,12	540	42,9

4 cores

4 x 1,5	12,2	15,6	0,110	0,132	0,135	350	12,2	12,2	15,6	15,6	20	0,21
4 x 2,5	7,56	9,64	0,103	0,124	0,150	329	7,56	7,56	9,64	9,64	28	0,36
4 x 4	4,70	5,99	0,100	0,120	0,158	319	4,70	4,70	5,99	5,99	37	0,57
4 x 6	3,11	3,97	0,096	0,115	0,170	306	3,11	3,11	3,97	3,97	47	0,86
4 x 10	1,84	2,35	0,091	0,110	0,187	291	1,84	1,84	2,35	2,35	65	1,43
4 x 16	1,16	1,48	0,087	0,104	0,206	276	1,16	1,16	1,48	1,48	87	2,29
4 x 25	0,734	0,936	0,086	0,103	0,209	274	0,74	0,74	0,94	0,94	110	3,58
4 x 35	0,529	0,675	0,084	0,101	0,221	267	0,54	0,54	0,68	0,68	137	5,01
4 x 50	0,391	0,499	0,085	0,102	0,217	269	0,40	0,40	0,51	0,51	167	7,15
4 x 70	0,270	0,344	0,082	0,098	0,232	261	0,28	0,29	0,35	0,36	214	10,0
4 x 95	0,195	0,249	0,081	0,098	0,235	259	0,21	0,22	0,26	0,27	259	13,6
4 x 120	0,154	0,196	0,080	0,096	0,244	255	0,17	0,18	0,21	0,22	301	17,2
4 x 150	0,126	0,161	0,080	0,096	0,242	255	0,15	0,16	0,18	0,19	347	21,5
4 x 185	0,1	0,128	0,080	0,096	0,244	255	0,13	0,14	0,15	0,16	397	26,5
4 x 240	0,0762	0,0972	0,079	0,095	0,247	253	0,11	0,12	0,13	0,14	468	34,3
4 x 300	0,0607	0,0774	0,079	0,095	0,251	251	0,10	0,11	0,11	0,12	540	42,9

multicore

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	
n	[mm ²]	20°C	90°C	50 Hz	60 Hz	nominal	nominal	50 Hz	60 Hz	50 Hz	60 Hz	[A]	[kA]		
5	x 1,5	12,2	15,6	0,113	0,135	0,130	359	12,2	12,2	15,6	15,6	12	0,21		
7	x 1,5	12,2	15,6	0,146	0,176	0,088	466	12,2	12,2	15,6	15,6	11	0,21		
12	x 1,5	12,2	15,6	0,175	0,210	0,069	557	12,2	12,2	15,6	15,6	9	0,21		
19	x 1,5	12,2	15,6	0,190	0,228	0,062	605	12,2	12,2	15,6	15,6	8	0,21		
27	x 1,5	12,2	15,6	0,206	0,247	0,056	655	12,2	12,2	15,6	15,6	7	0,21		
37	x 1,5	12,2	15,6	0,215	0,258	0,065	686	12,2	12,2	15,6	15,6	6	0,21		
5	x 2,5	7,56	9,64	0,106	0,127	0,135	338	7,56	7,56	9,64	9,64	17	0,36		
7	x 2,5	7,56	9,64	0,140	0,168	0,094	445	7,56	7,56	9,64	9,64	15	0,36		
12	x 2,5	7,56	9,64	0,168	0,202	0,072	536	7,56	7,56	9,64	9,64	12	0,36		
19	x 2,5	7,56	9,64	0,183	0,220	0,065	583	7,56	7,56	9,64	9,64	11	0,36		
27	x 2,5	7,56	9,64	0,199	0,239	0,058	634	7,56	7,56	9,64	9,64	10	0,36		
37	x 2,5	7,56	9,64	0,209	0,251	0,055	665	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

3800/6600 V

CONSTRUCTION	MAX. CONDUCTOR RESISTANCE		REACTANCE		CAPACITANCE		INDUCTANCE		IMPEDANCE				MAXIMUM CURRENT (*)	SHORT CIRCUIT
	[Ω/km]		[Ω/km]		[μFarad/km] [μHenry/km]		20°C		[Ω/km]		90°C		in free air	1 sec @ 90°C/250°C
	n	[mm ²]	20°C	90°C	50 Hz	60 Hz	nominal	nominal	50 Hz	60 Hz	50 Hz	60 Hz	[A]	[kA]
1 x 25	0,734	0,936	0,144	0,173	0,251	458	0,75	0,75	0,95	0,95	117	3,58		
1 x 35	0,529	0,675	0,137	0,165	0,274	437	0,55	0,55	0,69	0,69	145	5,01		
1 x 50	0,391	0,499	0,133	0,160	0,293	425	0,41	0,42	0,52	0,52	179	7,15		
1 x 70	0,270	0,344	0,126	0,151	0,333	402	0,30	0,31	0,37	0,38	231	10,0		
1 x 95	0,195	0,249	0,120	0,144	0,375	382	0,23	0,24	0,28	0,29	283	13,6		
1 x 120	0,154	0,196	0,115	0,138	0,408	366	0,19	0,21	0,23	0,24	331	17,2		
1 x 150	0,126	0,161	0,114	0,137	0,441	363	0,17	0,19	0,20	0,21	384	21,5		
1 x 185	0,100	0,128	0,110	0,132	0,485	350	0,15	0,17	0,17	0,18	441	26,5		
1 x 240	0,0762	0,0972	0,106	0,127	0,543	338	0,13	0,15	0,14	0,16	524	34,3		
1 x 300	0,0607	0,0774	0,102	0,122	0,608	324	0,12	0,14	0,13	0,14	608	42,9		
3 x 25	0,734	0,936	0,115	0,138	0,251	368	0,74	0,75	0,94	0,95	105	3,58		
3 x 35	0,529	0,675	0,110	0,132	0,274	351	0,54	0,55	0,68	0,69	130	5,01		
3 x 50	0,391	0,499	0,107	0,128	0,293	340	0,41	0,41	0,51	0,52	159	7,15		
3 x 70	0,270	0,344	0,101	0,121	0,333	321	0,29	0,30	0,36	0,36	203	10,0		
3 x 95	0,195	0,249	0,096	0,115	0,375	306	0,22	0,23	0,27	0,27	246	13,6		
3 x 120	0,154	0,196	0,093	0,112	0,408	296	0,18	0,19	0,22	0,23	286	17,2		
3 x 150	0,126	0,161	0,090	0,109	0,441	288	0,16	0,17	0,18	0,19	330	21,5		
3 x 185	0,100	0,128	0,088	0,105	0,485	279	0,13	0,15	0,16	0,17	377	26,5		
3 x 240	0,0762	0,0972	0,084	0,101	0,543	269	0,11	0,13	0,13	0,14	435	34,3		

6350/11000 V

1 x 25	0,734	0,936	0,146	0,176	0,228	466	0,75	0,75	0,95	0,95	111	3,58
1 x 35	0,529	0,675	0,137	0,165	0,249	437	0,55	0,55	0,69	0,69	140	5,01
1 x 50	0,391	0,499	0,136	0,163	0,266	432	0,41	0,42	0,52	0,52	171	7,15
1 x 70	0,270	0,344	0,128	0,154	0,301	408	0,30	0,31	0,37	0,38	221	10,0
1 x 95	0,195	0,249	0,122	0,146	0,338	388	0,23	0,24	0,28	0,29	271	13,6
1 x 120	0,154	0,196	0,119	0,142	0,367	378	0,19	0,21	0,23	0,24	316	17,2
1 x 150	0,126	0,161	0,116	0,139	0,396	369	0,17	0,19	0,20	0,21	367	21,5
1 x 185	0,100	0,128	0,112	0,134	0,435	355	0,15	0,17	0,17	0,19	422	26,5
1 x 240	0,0762	0,0972	0,108	0,129	0,487	342	0,13	0,15	0,14	0,16	502	34,3
1 x 300	0,0607	0,0774	0,103	0,124	0,544	329	0,12	0,14	0,13	0,15	581	42,9
3 x 25	0,734	0,936	0,128	0,154	0,228	377	0,75	0,75	0,94	0,95	105	3,58
3 x 35	0,529	0,675	0,122	0,146	0,249	360	0,54	0,55	0,69	0,69	130	5,01
3 x 50	0,391	0,499	0,116	0,139	0,266	349	0,41	0,42	0,51	0,52	159	7,15
3 x 70	0,270	0,344	0,108	0,130	0,301	329	0,29	0,30	0,36	0,37	203	10,0
3 x 95	0,195	0,249	0,105	0,126	0,338	313	0,22	0,23	0,27	0,28	246	13,6
3 x 120	0,154	0,196	0,102	0,122	0,367	303	0,18	0,20	0,22	0,23	286	17,2
3 x 150	0,126	0,161	0,098	0,118	0,396	295	0,16	0,17	0,19	0,20	330	21,5
3 x 185	0,100	0,128	0,096	0,115	0,435	285	0,14	0,15	0,16	0,17	377	26,5
3 x 240	0,0762	0,0972	0,092	0,110	0,487	275	0,12	0,13	0,13	0,15	435	34,3

8700/15000 V

1 x 25	0,734	0,936	0,151	0,181	0,186	481	0,75	0,76	0,95	0,95	111	3,58
1 x 35	0,529	0,675	0,144	0,173	0,202	459	0,55	0,56	0,69	0,70	140	5,01
1 x 50	0,391	0,499	0,140	0,168	0,215	446	0,42	0,43	0,52	0,53	171	7,15
1 x 70	0,270	0,344	0,132	0,159	0,242	421	0,30	0,31	0,37	0,38	221	10,0
1 x 95	0,195	0,249	0,128	0,153	0,270	406	0,23	0,25	0,28	0,29	271	13,6
1 x 120	0,154	0,196	0,124	0,149	0,292	395	0,20	0,21	0,23	0,25	316	17,2
1 x 150	0,126	0,161	0,121	0,145	0,314	385	0,17	0,19	0,20	0,22	367	21,5
1 x 185	0,100	0,128	0,116	0,140	0,344	371	0,15	0,17	0,17	0,19	422	26,5
1 x 240	0,0762	0,0972	0,112	0,134	0,383	357	0,14	0,15	0,15	0,17	502	34,3
1 x 300	0,0607	0,0774	0,107	0,129	0,427	342	0,12	0,14	0,13	0,15	581	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	0,116	0,139	0,216	370	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
3 x 185	0,100	0,128	0,094	0,113	0,344	301	0,14	0,15	0,16	0,17	377	26,5

(*) 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	90°C	50 Hz	60 Hz	max.	nominal	20°C	90°C	max.
pair	2	x 0,75	26,3	33,5	0,100	0,120	0,110	318	26,3	33,5	12,1
	2	x 1	19,3	24,6	0,094	0,113	0,115	299	19,3	24,6	15,5
	2	x 1,5	12,9	16,5	0,087	0,104	0,125	277	12,9	16,4	21,5
triple	3	x 0,75	26,3	33,5	0,100	0,120	0,110	318	26,3	33,5	12,1
	3	x 1	19,3	24,6	0,094	0,113	0,115	299	19,3	24,6	15,5
	3	x 1,5	12,9	16,5	0,087	0,104	0,125	277	12,9	16,5	21,5

1 core

CONSTRUCTION	MAX. CONDUCTOR RESISTANCE		REACTANCE		CAPACITANCE		INDUCTANCE		IMPEDANCE				MAXIMUM CURRENT (*) in free air [A]	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	60 Hz	nominal	nominal	50 Hz	60 Hz	50 Hz	60 Hz		
1 x 10	1,84	2,38	0,113	0,136	0,149	361	1,84	1,84	2,39	2,39	72	171		
1 x 16	1,16	1,50	0,105	0,126	0,163	337	1,16	1,17	1,51	1,51	97	2,74		
1 x 25	0,734	0,951	0,103	0,123	0,169	329	0,74	0,74	0,96	0,96	128	4,28		
1 x 35	0,529	0,685	0,098	0,118	0,197	313	0,54	0,54	0,69	0,70	160	5,99		
1 x 50	0,391	0,506	0,097	0,116	0,196	308	0,40	0,41	0,52	0,52	197	8,55		
1 x 70	0,270	0,350	0,092	0,110	0,218	292	0,29	0,29	0,36	0,37	254	12,0		
1 x 95	0,195	0,253	0,089	0,107	0,243	284	0,21	0,22	0,27	0,27	311	16,2		
1 x 120	0,154	0,199	0,086	0,104	0,254	276	0,18	0,19	0,22	0,22	364	20,5		
1 x 150	0,126	0,163	0,085	0,102	0,264	272	0,15	0,16	0,18	0,19	422	25,7		
1 x 185	0,100	0,130	0,084	0,101	0,288	268	0,13	0,14	0,15	0,16	485	31,6		
1 x 240	0,0762	0,0987	0,083	0,099	0,296	265	0,11	0,13	0,13	0,14	577	41,0		
1 x 300	0,0607	0,0786	0,081	0,097	0,310	259	0,10	0,11	0,11	0,13	670	51,3		

2 cores

2 x 1,5	12,2	15,8	0,089	0,107	0,160	286	12,2	12,2	15,8	15,8	24	0,26
2 x 2,5	7,56	9,79	0,084	0,101	0,180	270	7,56	7,56	9,79	9,79	33	0,43
2 x 4	4,70	6,09	0,079	0,095	0,207	254	4,70	4,70	6,09	6,09	45	0,68
2 x 6	3,11	4,03	0,076	0,091	0,230	243	3,11	3,11	4,03	4,03	57	1,03
2 x 10	1,84	2,38	0,073	0,087	0,261	232	1,84	1,84	2,38	2,39	78	1,71
2 x 16	1,16	1,50	0,070	0,084	0,293	224	1,16	1,16	1,50	1,50	105	2,74

3 cores

3 x 1,5	12,2	15,8	0,089	0,107	0,160	286	12,2	12,2	15,8	15,8	21	0,26
3 x 2,5	7,56	9,79	0,084	0,101	0,180	270	7,56	7,56	9,79	9,79	29	0,43
3 x 4	4,70	6,09	0,079	0,095	0,207	254	4,70	4,70	6,09	6,09	38	0,68
3 x 6	3,11	4,03	0,076	0,091	0,230	243	3,11	3,11	4,03	4,03	49	1,03
3 x 10	1,84	2,38	0,073	0,087	0,261	232	1,84	1,84	2,38	2,39	68	1,71
3 x 16	1,16	1,50	0,070	0,084	0,293	224	1,16	1,16	1,50	1,50	91	2,74
3 x 25	0,734	0,951	0,070	0,084	0,299	223	0,74	0,74	0,95	0,95	116	4,28
3 x 35	0,529	0,685	0,068	0,082	0,319	218	0,53	0,54	0,69	0,69	144	5,99
3 x 50	0,391	0,506	0,069	0,083	0,318	218	0,40	0,40	0,51	0,51	175	8,55
3 x 70	0,270	0,350	0,067	0,081	0,338	215	0,28	0,28	0,36	0,36	224	12,0
3 x 95	0,195	0,253	0,067	0,080	0,343	214	0,21	0,21	0,26	0,27	271	16,2
3 x 120	0,154	0,199	0,066	0,079	0,359	212	0,17	0,17	0,21	0,21	315	20,5
3 x 150	0,126	0,163	0,066	0,080	0,357	212	0,14	0,15	0,18	0,18	363	25,7
3 x 185	0,100	0,130	0,066	0,079	0,359	212	0,12	0,13	0,15	0,15	415	31,6
3 x 240	0,0762	0,0987	0,066	0,079	0,366	211	0,10	0,11	0,12	0,13	490	41,0
3 x 300	0,0607	0,0786	0,066	0,079	0,373	210	0,09	0,10	0,10	0,11	565	51,3

4 cores

4 x 1,5	12,2	15,8	0,097	0,116	0,145	308	12,2	12,2	15,8	15,8	21	0,26
4 x 2,5	7,56	9,79	0,092	0,110	0,161	292	7,56	7,56	9,79	9,79	29	0,43
4 x 4	4,70	6,09	0,087	0,104	0,182	276	4,70	4,70	6,09	6,09	38	0,68
4 x 6	3,11	4,03	0,083	0,100	0,200	266	3,11	3,11	4,03	4,03	49	1,03
4 x 10	1,84	2,38	0,080	0,096	0,223	255	1,84	1,84	2,38	2,39	68	1,71
4 x 16	1,16	1,50	0,077	0,093	0,246	246	1,16	1,16	1,50	1,51	91	2,74
4 x 25	0,734	0,951	0,077	0,092	0,250	245	0,74	0,74	0,95	0,96	116	4,28
4 x 35	0,529	0,685	0,075	0,091	0,264	241	0,53	0,54	0,69	0,69	144	5,99
4 x 50	0,391	0,506	0,076	0,091	0,263	241	0,40	0,40	0,51	0,51	175	8,55
4 x 70	0,270	0,350	0,074	0,089	0,277	238	0,28	0,28	0,36	0,36	224	12,0
4 x 95	0,195	0,253	0,074	0,089	0,280	237	0,21	0,21	0,26	0,27	271	16,2
4 x 120	0,154	0,199	0,073	0,087	0,291	234	0,17	0,18	0,21	0,22	315	20,5
4 x 150	0,126	0,163	0,000	0,000	0,289	235	0,13	0,13	0,16	0,16	363	25,7
4 x 185	0,100	0,130	0,099	0,119	0,291	234	0,14	0,16	0,16	0,18	415	31,6
4 x 240	0,0762	0,0987	0,133	0,159	0,295	233	0,15	0,18	0,17	0,19	490	41,0
4 x 300	0,0607	0,0786	0,161	0,194	0,300	232	0,17	0,20	0,18	0,21	565	51,3

multicore

CONSTRUCTION	MAX. CONDUCTOR RESISTANCE		REACTANCE		CAPACITANCE		INDUCTANCE		IMPEDANCE				MAXIMUM CURRENT (*) in free air [A]	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	60 Hz	nominal	noinal	50 Hz	60 Hz	50 Hz	60 Hz		
5 x 1,5		12,2	15,8	0,105	0,126	0,140	334	12,2	12,2	15,8	15,8	13	0,26	
7 x 1,5		12,2	15,8	0,138	0,166	0,097	441	12,2	12,2	15,8	15,8	12	0,26	
12 x 1,5		12,2	15,8	0,167	0,200	0,077	532	12,2	12,2	15,8	15,8	10	0,26	
19 x 1,5		12,2	15,8	0,182	0,218	0,070	579	12,2	12,2	15,8	15,8	10	0,26	
27 x 1,5		12,2	15,8	0,198	0,237	0,060	629	12,2	12,2	15,8	15,8	9	0,26	
37 x 1,5		12,2	15,8	0,207	0,249	0,060	660	12,2	12,2	15,8	15,8	7	0,26	
5 x 2,5		7,56	9,79	0,098	0,117	0,155	311	7,56	7,56	9,79	9,79	18	0,43	
7 x 2,5		7,56	9,79	0,131	0,157	0,104	417	7,56	7,56	9,79	9,79	16	0,43	
12 x 2,5		7,56	9,79	0,160	0,192	0,082	508	7,56	7,56	9,79	9,79	13	0,43	
19 x 2,5		7,56	9,79	0,174	0,209	0,074	555	7,56	7,56	9,79	9,79	12	0,43	
27 x 2,5		7,56	9,79	0,190	0,228	0,074	606	7,56	7,56	9,79	9,79	11	0,43	
37 x 2,5		7,56	9,79	0,200	0,240	0,063	636	7,56	7,56	9,79	9,79	9	0,43	

(*) Maximum current rate based on 95°C conductor temperature and 45°C ambient temperature IEC 60092-352 – see Generals section

3800/6600 V

CONSTRUCTION	MAX. CONDUCTOR RESISTANCE		REACTANCE		CAPACITANCE		INDUCTANCE		IMPEDANCE				MAXIMUM CURRENT (*) in free air [A]	SHORT CIRCUIT 1 sec @ 90°C/250°C [kA]
	[Ω/km]		[Ω/km]		[μFarad/km] [μHenry/km]		20°C		[Ω/km]		90°C			
	n	[mm²]	20°C	90°C	50 Hz	60 Hz	nominal	nominal	50 Hz	60 Hz	50 Hz	60 Hz		
1 x 50		0,391	0,499	0,161	0,193	0,223	513	0,42	0,44	0,52	0,53	179	7,15	
1 x 70		0,270	0,344	0,152	0,183	0,250	485	0,31	0,33	0,38	0,39	231	10,0	
1 x 95		0,195	0,249	0,145	0,174	0,278	461	0,24	0,26	0,29	0,30	283	13,6	
1 x 120		0,154	0,196	0,139	0,167	0,300	443	0,21	0,23	0,24	0,26	331	17,2	
1 x 150		0,126	0,161	0,135	0,162	0,321	431	0,18	0,21	0,21	0,23	384	21,5	
1 x 185		0,100	0,128	0,130	0,156	0,351	414	0,16	0,19	0,18	0,20	441	26,5	
1 x 240		0,0762	0,0972	0,125	0,150	0,390	398	0,15	0,17	0,16	0,18	524	34,3	
1 x 300		0,0607	0,0774	0,120	0,144	0,433	381	0,13	0,16	0,14	0,16	608	42,9	
3 x 50		0,391	0,499	0,120	0,144	0,223	381	0,41	0,42	0,51	0,52	159	7,15	
3 x 70		0,270	0,344	0,113	0,135	0,250	359	0,29	0,30	0,36	0,37	203	10,0	
3 x 95		0,195	0,249	0,107	0,128	0,278	340	0,22	0,23	0,27	0,28	246	13,6	
3 x 120		0,154	0,196	0,103	0,124	0,300	329	0,19	0,20	0,22	0,23	286	17,2	
3 x 150		0,126	0,161	0,100	0,120	0,321	319	0,16	0,17	0,19	0,20	330	21,5	
3 x 185		0,100	0,128	0,097	0,116	0,351	308	0,14	0,15	0,16	0,17	377	26,5	

6350/11000 V

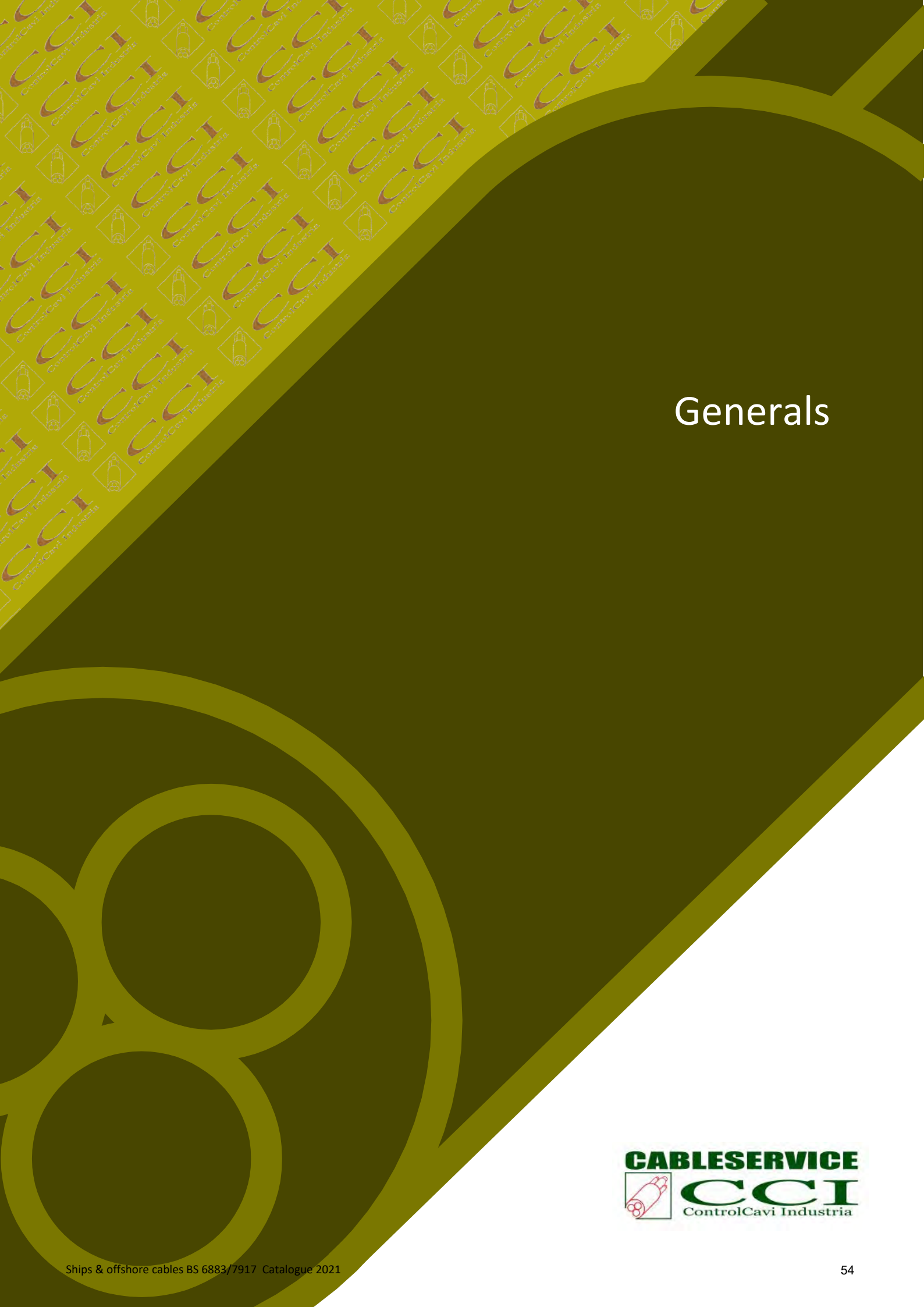
1 x 50		0,391	0,499	0,163	0,195	0,210	518	0,42	0,44	0,52	0,54	179	7,15
1 x 70		0,270	0,344	0,154	0,184	0,234	489	0,31	0,33	0,38	0,39	231	10,0
1 x 95		0,195	0,249	0,145	0,174	0,260	461	0,24	0,26	0,29	0,30	283	13,6
1 x 120		0,154	0,196	0,140	0,168	0,281	447	0,21	0,23	0,24	0,26	331	17,2
1 x 150		0,126	0,161	0,135	0,162	0,301	431	0,18	0,21	0,21	0,23	384	21,5
1 x 185		0,100	0,128	0,131	0,158	0,328	418	0,17	0,19	0,18	0,20	441	26,5
1 x 240		0,0762	0,0972	0,126	0,151	0,363	401	0,15	0,17	0,16	0,18	524	34,3
1 x 300		0,0607	0,0774	0,121	0,145	0,403	384	0,14	0,16	0,14	0,16	608	42,9
3 x 50		0,391	0,499	0,122	0,146	0,210	388	0,41	0,42	0,51	0,52	159	7,15
3 x 70		0,270	0,344	0,115	0,138	0,234	365	0,29	0,30	0,36	0,37	203	10,0
3 x 95		0,195	0,249	0,109	0,131	0,260	347	0,22	0,23	0,27	0,28	246	13,6
3 x 120		0,154	0,196	0,105	0,126	0,281	335	0,19	0,20	0,22	0,23	286	17,2
3 x 150		0,126	0,161	0,102	0,122	0,301	325	0,16	0,18	0,19	0,20	330	21,5
3 x 185		0,100	0,128	0,098	0,118	0,328	313	0,14	0,15	0,16	0,17	377	26,5

8700/15000 V

1 x 50		0,391	0,499	0,165	0,198	0,182	527	0,42	0,44	0,53	0,54	179	7,15
1 x 70		0,270	0,344	0,156	0,188	0,202	498	0,31	0,33	0,38	0,39	231	10,0
1 x 95		0,195	0,249	0,149	0,178	0,224	473	0,25	0,26	0,29	0,31	283	13,6
1 x 120		0,154	0,196	0,143	0,171	0,241	455	0,21	0,23	0,24	0,26	331	17,2
1 x 150		0,126	0,161	0,139	0,167	0,257	443	0,19	0,21	0,21	0,23	384	21,5
1 x 185		0,100	0,128	0,135	0,162	0,280	429	0,17	0,19	0,19	0,21	441	26,5
1 x 240		0,0762	0,0972	0,128	0,154	0,309	408	0,15	0,17	0,16	0,18	524	34,3
1 x 300		0,0607	0,0774	0,123	0,147	0,342	391	0,14	0,16	0,15	0,17	608	42,9
3 x 50		0,391	0,499	0,128	0,153	0,182	407	0,41	0,42	0,51	0,52	159	7,15
3 x 70		0,270	0,344	0,120	0,144	0,202	383	0,30	0,31	0,36	0,37	203	10,0
3 x 95		0,195	0,249	0,114	0,137	0,224	363	0,23	0,24	0,27	0,28	246	13,6
3 x 120		0,154	0,196	0,110	0,132	0,241	350	0,19	0,20	0,23	0,24	286	17,2
3 x 150		0,126	0,161	0,107	0,128	0,257	339	0,16	0,18	0,19	0,21	330	21,5

(*) Maximum current rate based on 95°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	0,113	0,136	0,120	361	26,3	34,1	13,7
	2	x 1,0	19,3	25,0	0,118	0,141	0,125	375	19,3	25,0	19,4
	2	x 1,5	12,9	16,7	0,126	0,151	0,135	400	12,9	16,7	31,0
triple	3	x 0,75	26,3	34,1	0,113	0,136	0,120	361	26,3	34,1	13,7
	3	x 1,0	19,3	25,0	0,118	0,141	0,125	366	19,3	25,0	19,4
	3	x 1,5	12,9	16,7	0,126	0,151	0,135	400	12,9	16,7	31,0



Generals



PRELIMINARY

SHF2 H-M outer sheath (on request)

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)

ELECTRICALS

CONDUCTOR ELECTRICAL RESISTANCE

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

ρ	conductor resistivity	$[\Omega \text{ m m}^2 / \text{m}]$
l	conductor length	$[\text{km}]$
A	cross sectional area	$[\text{mm}^2]$

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:

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

$$R_t \text{ conductor resistance} \quad [\Omega]$$

$$R_{20} \text{ conductor resistance @ } 20^\circ\text{C} \quad [\Omega]$$

$$t \text{ conductor temperature} \quad [^\circ\text{C}]$$

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 (GP4) and HEPR (GP6) = 3670 [MΩ x 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:

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

f frequency	[Hz]
L Inductance	[H/m]
I 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

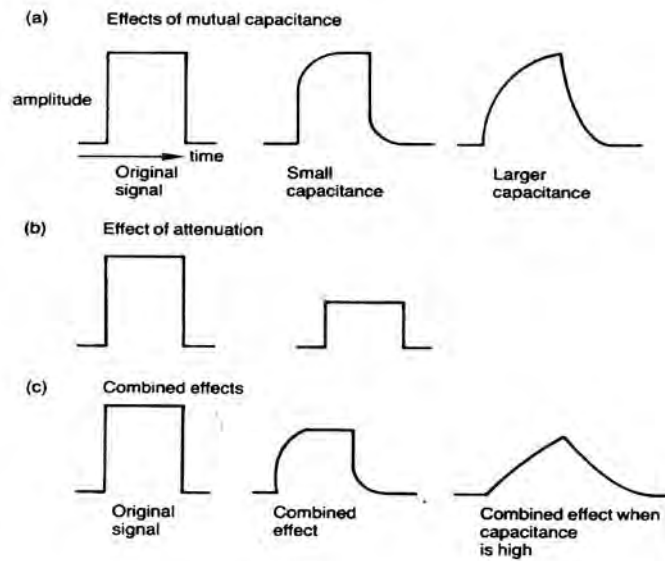
■ Digital signals

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.

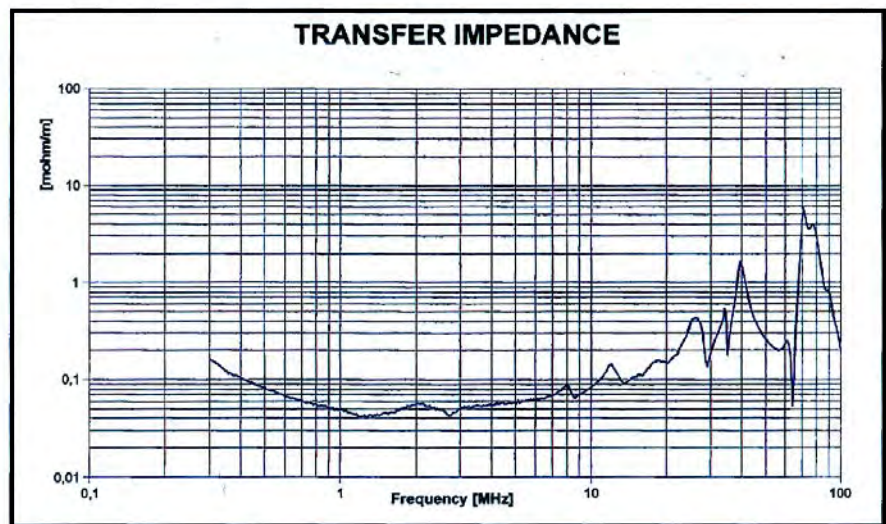
EMC (Electro Magnetic Compatibility) is the ability of the equipment components to minimize the electrical interferences (radio frequency disturbance and electrical surges) produced by such a device.

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 conductor
- 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

$$P = 25 \times Sc \quad [N]$$

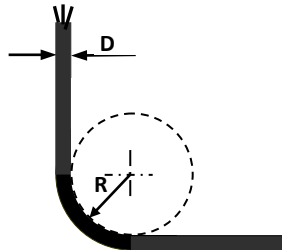
- armoured cables

$$P = 50 \times Sc \quad [N]$$

$$Sc = \text{total cross section of pulled conductors} \quad [mm^2]$$

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
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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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