

Condumax[®]

ELECTRICAL WIRES AND CABLES

OUR ENERGY IS TRUST



TECHNICAL CATALOG OF **PRODUCTS**



Our energy is trust.

The Group Condumax Incesa began its activities in 1964 and is currently recognized as one of the most serious and respected business groups in the energy sector in Brazil.

The Group serves technically demanding markets, including energy concessionaires, clean energy generation companies, the automotive industry, durable and consumer goods industries, agribusiness, and large construction companies.



Condumax specializes in the manufacture of multiple, concentric cables with various types of shielding, photovoltaic cables, cables for the automotive industry and assembled cables. All cables are environmentally friendly, free of heavy metals and comply with European RoHS directives.



Awards

Technical competence and quality are key to operating in demanding markets. The Group is frequently recognized with important awards for its performance with major customers, which reinforces the commitment to ensure that each order is delivered strictly within specifications, on time and with full technical support to customers.



Scan and check out the awards

Technology and Innovation

The constant investment in innovation and technology has made the Group a reference in the development of technical solutions for energy conduction and control for our customers. We develop and nationalize cables and connectors for the most diverse applications, helping the Brazilian industry to have more autonomy and competitiveness.



Many of the products, now approved by major power utilities and automobile manufacturers in Brazil and Latin America, were developed in the laboratories of the Condumax Incesa Group.



Certifications



Visit our website and learn more about our history, company structure, quality policies, sustainability and corporate ethics.

www.condumax.com.br



GENERALITIES

Basic Concepts on Electrical Conductors	6
Minimum Bend Radius for Wires and Cables	8

LOW VOLTAGE ELECTRICAL WIRES AND CABLES - COPPER

Description	Standard	Composition	Temp. (°C)	Tension	Family	Page
Flame-resistant Wire	NBR NM 247-3	Copper / PVC-A	70	450/750 V	001	10
Flame-resistant Cable 450/750 V	NBR NM 247-3	Copper / PVC	70	450/750 V	002	10
Flexible Flame-resistant Cable 450/750 V	NBR NM 247-3	Copper / PVC	70	450/750 V	003	11
Flexible Cable PP 300/500 V	NBR NM 247-5	Copper / PVC-D / PVC ST5	70	300/500 V	004	12
Flexible Cable PP Plane 300/500V	NBR NM 247-5	Copper / PVC-D / PVC ST5	70	300/500 V	005	13
Soldering Cable 450/750 V	NBR 8762	Copper / PVC-A	70	450/750 V	015	14
Soldalink Cable 450/750 V	NBR 8762	Copper / EPR	90	450/750 V	016	15
Maxvinyl Cable 0.6/1 kV	NBR 7288	Copper / PVC-A / PVC ST1	70	0,6/1 kV	024	16
Maxvinyl Cable 0.6/1 kV – Multiple	NBR 7288	Copper / PVC-A / PVC ST1	70	0,6/1 kV	024	17
Maxlink Cable 0.6/1 kV	NBR 7287	Copper / XLPE / PVC ST2	90	0,6/1 kV	062	18
Maxlink Cable 0.6/1 kV – Multiple	NBR 7287	Copper / XLPE / PVC ST2	90	0,6/1 kV	062	19
Maxlink G-Flex Cable 0.6/1 kV	NBR 7286	Copper / HEPR / PVC ST2	90	0,6/1 kV	140	20
Maxlink G-Flex Cable 1.8/3 kV	NBR 7286	Copper / HEPR / PVC ST2	90	1,8/3kV	149	21
Maxlink G-Flex Cable 0.6/1 kV – Multiple	NBR 7286	Copper / HEPR / PVC ST2	90	0,6/1 kV	140	22
Maxlink G-Flex NCI Cable 0.6/1 kV	NBR 7286	Copper / HEPR / PVC ST2	90	0,6/1 kV	145	23
Maxlink G-Flex Flat Cable 0.6/1 kV	NBR 7286	Copper / HEPR / PVC ST2	90	0,6/1 kV	141	24
Maxlink R Cable 0.6/1 kV	NBR 7285	Copper / XLPE	90	0,6/1 kV	117	25
Solarmax Flex SN Cable 0.6/1kVAC - 1.8kVDC	NBR 16612 / EN 50.618	Copper / LSHF / LSHF	120	0,6/1kV	187	26
Maxlink Concentric Cable 0.6/1 kV	NBR 15716	Copper / XLPE	90	0,6/1 kV	213	27
Multiplexed Cable 0.6/1 kV	NBR 8182	Copper / XLPE	90	0,6/1 kV	190/192	28
SafetyMax Flex Cable 750 V	NBR 13248	Copper / LSHF-A	70	450/750 V	162	29
SafetyMax Flex Cable 0.6/1 kV	NBR 13248	Copper / HEPR / SHF1	90	0,6/1 kV	177	30
SafetyMax Flex Cable 0.6/1 kV – Multiple	NBR 13248	Copper / HEPR / SHF1	90	0,6/1 kV	177	31
Flex Control Cable	NBR 7289	Copper / PVC-A / PVC ST1	70	500 V ou 1 kV	316	32
AFM Control Cable 300 V	NTC 072	Copper / PP / PVC ST1	70	300 V	410	35
Maxlink G-Flex Control Cable	NBR 7290	Copper / HEPR / PVC ST2	90	500 V ou 1 kV	375	36
Parallel Flexible Cord 300 V	NBR NM 247-5	Copper/PVC-D	70	300 V	008	39
Flexible Twisted Cord 300 V	NBR 15717	Copper/PVC-D	70	300 V	009	40
Bicolor Polarized Lanyard	NTC 018	Copper/ PVC-A/ PVC Crystal	70	300 V	258	41
Lide Wire and Cable 450 / 750 V	NBR 9117	Copper / PVC EB	105	450/750 V	228	42
Battery Cable	NTC 028	Copper / PVC ST1	70	300 V	257	43
Hydromax Magnetic Wire	NTC 061	Copper / PP	70	450/750 V	551	44
Ignition Cable	NTC 022	Copper / PVC-A/ PVC ST1	70	7.000 VCC	263	43
Soft Bare Copper Cable	NBR 5349	Copper	-	-	237	45
Half Hard or Hard Bare Copper Cable	NBR 6524	Copper	-	-	244/245	45

ALUMINUM CABLES

Description	Standard	Composition	Temp. (°C)	Tension	Family	Page
Solarmax Flex AL Cable 0.6/1kVAC - 1.8kVDC	UL 4703	Aluminum / LSHF / LSHF	120	0,6/1kV	687	46
Maxlink AL Cable 0.6/1 kV	NBR 7287	Aluminum / XLPE / PVC ST2	90	0,6/1 kV	620	47
Maxlink AL Cable 0.6/1 kV – Multiple	NBR 7287	Aluminum / XLPE / PVC ST2	90	0,6/1 kV	620	48
Maxlink AL Cable 1.8/3 kV	NBR 7287	Aluminum / XLPE / PVC ST2	90	1,8/3 kV	624	49

Description	Standard	Composition	Temp. (°C)	Tension	Family	Page
SafetyMax AL Cable 0.6/1kV	NBR 13248	Aluminum / HEPR / SHF1	90	0,6/1 kV	640	50
SafetyMax Cable AL 1.8/3 kV	NBR 13248	Aluminum / HEPR / SHF1	90	1,8/3 kV	641	51
Maxlink R AL Cable 0.6/1 kV	NBR 7285	Aluminum / XLPE	90	0,6/1 kV	625	52
Maxlink Concentric Cable AL 0.6/1 kV	-	Aluminum / XLPE	90	0,6/1 kV	601	53
Multiplexed Cable AL 0.6/1 kV	NBR 8182	Aluminum / XLPE	90	0,6/1 kV	602/604	54
Maxlink Armored Cable AL 0.6/1 kV	NBR 7287	Aluminum / XLPE / Steel Tapes / HDPE	90	0,6/1 kV	609	55
Aluminum Cable AC / AAC	NBR 7271	Aluminum Alloy 1350	-	-	629	56
Aluminum Cable with Steel Core - CAA / ACSR	NBR 7270	Aluminum / Steel	-	-	630	57
Aluminum Cable Alloy 6201 - CAL / AAAC	NBR 10298	Aluminum Alloy 6201	-	-	633	59
Maxlink SC AL Cable 15 kV	NBR 11873	Aluminum / XLPE	90	15 kV	670	60
Maxlink SC DC AL Cable 15 kV	NBR 11873	Aluminum / XLPE / HDPE	90	15 kV	673	61
Maxlink SC AL Cable 25 kV	NBR 11873	Aluminum / XLPE	90	25 kV	671	62
Maxlink SC DC AL Cable 25 kV	NBR 11873	Aluminum / XLPE / HDPE	90	25 kV	674	63
Maxlink SC AL Cable 35 kV	NBR 11873	Aluminum / XLPE	90	35 kV	672	64
Maxlink SC DC AL Cable 35 kV	NBR 11873	Aluminum / XLPE / HDPE	90	35 kV	675	65
Maxlink SC BSC CAA Cable 25kV (RURAL CABLE)	NBR 11873	Aluminum / Steel / XLPE	90	25 kV	671	66

AUTOMOTIVE

Description	Standard	Composition	Temp. (°C)	Tension	Family	Page
Auto Cable FLRY-A T2 300V	ISO 6722-1	Copper / PVC 105 °C	105	300 V	-	67
Auto Cable FLRY-B T2 300V	ISO 6722-1	Copper / PVC 105 °C	105	300 V	-	68
Auto Cable FLY-B T2 300V	ISO 6722-1	Copper / PVC 105 °C	105	300 V	-	69
Auto Cable FLRY-C T2 300V	ISO 6722-1	Copper / PVC 105 °C	105	300 V	-	70
Auto Cable FLY-C T2 300V	ISO 6722-1	Copper / PVC 105 °C	105	300 V	-	71
Auto Cable FLRYW-B T3 300V	ISO 6722-1	Copper / PVC 125 °C	125	300 V	-	72
Auto Cable FLYW-B T3 300V	ISO 6722-1	Copper / PVC 125 °C	125	300 V	-	73
Auto Cable FLR9Y-A T3 300V	ISO 6722-1	Copper / PP 125 °C	125	300 V	-	74
Auto Cable FLR9Y-B T3 300V	ISO 6722-1	Copper / PP 125 °C	125	300 V	-	75
Auto Cable FL9Y-B T3 300V	ISO 6722-1	Copper / PP 125 °C	125	300 V	-	76
Auto Cable FLR9Y-C T3 300V	ISO 6722-1	Copper / TPV 125 °C	125	300 V	-	77
Auto Cable FL9Y-C T3 300V	ISO 6722-1	Copper / TPV 125 °C	125	300 V	-	78
Auto Cable FLR2X-B T3 300V	ISO 6722-1	Copper / XLPE 125 °C	125	300 V	-	79
Auto Cable FL2X-B T3 300V	ISO 6722-1	Copper / XLPE 125 °C	125	300 V	-	80
Drain Wire	ISO 14572	Copper / PVC 125 °C	125	300 V	-	81

AUTOMOTIVE - ASSEMBLED CABLES

Description	Standard	Composition	Temp. (°C)	Tension	Family	Page
Battery and Power Cables	-	-	-	-	-	82
Ropes	-	-	-	-	-	82

CIRCUIT SIZING

Circuit sizing						83
Application - NBR 5410						83
Charts minimum section (phase, neutral and earth conductors)						84
Chart of ways to install						85
Driving capacity and sizing Chart						86
Calculation of voltage drop						97
Calculation of conductor resistance in direct current						100
Calculation of conductor resistance in alternating current						101
Calculation of inductance and reactance						102
Inductive reactances						104
Charts of conductor characteristics (NBR NM 280 and NBR 6524)						105
Calculation of short-circuit current						106
Maximum short-circuit current						107
Example of application						110
Conduit sizing						112
Conversion Chart (AWG-MCM/mm ²)						113

Basic Concepts on Electrical Conductors

Definitions

Rebar - A metal product with a circular solid section, intended for the manufacture of wires.

Metallic Wire - Massive product, with invariable cross section and length much greater than its transverse dimension (diameter). The best known wires are: copper, aluminum, galvanized steel, copper-plated steel, aluminized steel, etc.

The main types of yarn are:

Bare wire - wire without metallic coating, insulation or covering.

Coated Wire - wire with a metallic coating. Ex: tinned copper wire, cadmium plated wire, silver plated copper wire, galvanized steel wire, copper plated steel wire.

Insulated Wire - wire with or without coating, provided with insulation.

Covered Wire - wire with or without coating, provided with a cover.

Conductor - A metallic product, of invariable cross-section and of length much greater than its transverse dimension, used to carry electrical energy and/or electrical signals.

The main materials used in the manufacture of electrical conductors are: copper, aluminum, copper-plated steel, aluminized steel, chromel-alumel alloys, bronze, etc.

Stranding Classes - NBR NM 280 (former NBR 6880) defines for copper conductors the stranding classes, numbered in increasing order of flexibility, according to Chart (25), being:

- Class 1 - Solid conductor. Example: Flameproof wire.
- Class 2 - Stranded conductors, compacted or not.
- Class 4, 5 or 6 - Flexible conductors (ropes or cables composed of trunks or bundles). Examples: Flex flameproof cable, Maxlink G-Flex cables, Flex control cables, etc.

The main types of copper conductors used are:

a) Solid Conductor - conductor with a solid cross section (solid wire).

b) Rigid Conductor (Normal Round) - conductor consisting of solid wires arranged helically in alternating layers or coronas with distinct pitches.

c) Flexible Conductor (Composite Rope) - conductor consisting of bundles (troughs) of wires arranged helically in alternating layers or crowns, with distinct pitches.

d) Compacted Conductor - stranded conductor where the spaces or interstices between the wires have been reduced by mechanical compression.

e) Sector Conductor - conductor whose cross section is in the shape of a circular sector.

f) Compressed Conductor - stranded conductor where the spaces or interstices of the last layer are reduced by mechanical compression.

g) Annular Conductor - a conductor made up of round wires, helically assembled in layers around a core, forming a central channel.

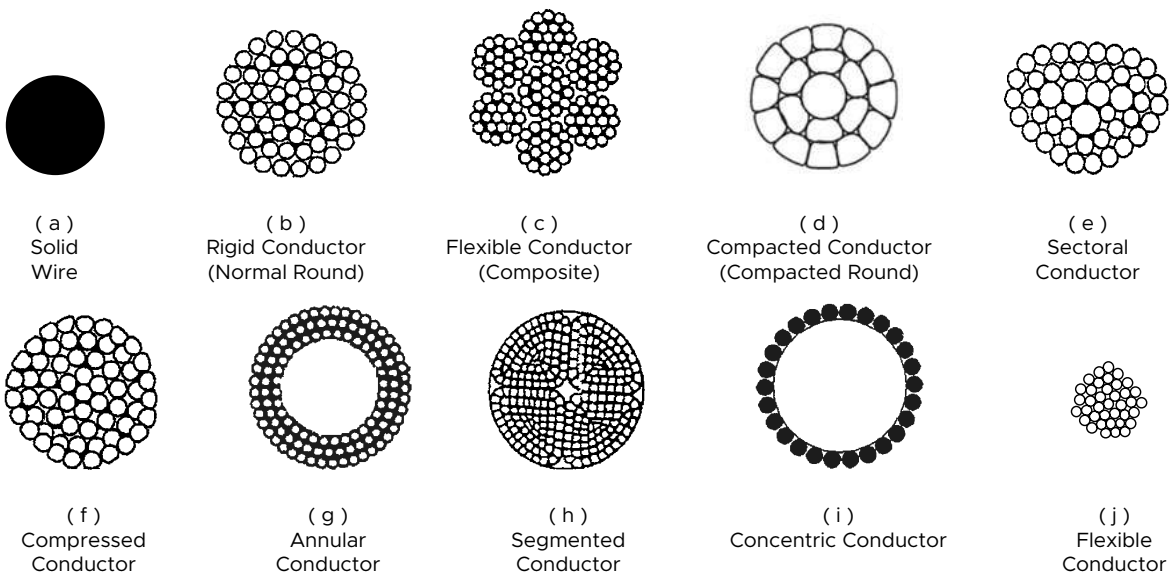
h) Segmented Conductor - conductor formed by elements with a circular sector section.

i) Concentric Conductor - a conductor consisting of a set of wires arranged helically around a core with pre-defined spacing between the wires.

j) Flexible Conductor (Bunched) - stranded conductor, in which the individual wires are brought together in a helical arrangement in a random manner, same direction and pitch, but without forming defined layers or crowns.

l) Stranded wire - a conductor made up of a set of wires braided together in the form of a fabric.

m) Bar - rigid conductor in the form of a tube or profiled section, usually supplied in straight segments.



Cable - It is composed of one or more conductors formed by stranded bare or coated wires, with or without insulation, and the set may have a cover or not. The insulated conductors forming a cable may or may not be joined together to form a multiple or multiplexed cable.

The main types of cables used are:

- a) Bare Cable - cable without insulation or covering, consisting of bare wires.
- b) Jacketed Cable - cable without insulation or covering, consisting of jacketed wires. Ex: tinned copper cable.
- c) Insulated Cable - cable with insulation. Ex: 750 V flameproof cable.
- d) Unipolar cable - cable consisting of a single insulated conductor with a cover. Ex: Maxlink cable 0.6/1 kV.
- e) Multipole cable - cable with two or more insulated conductors and equipped with a cover.

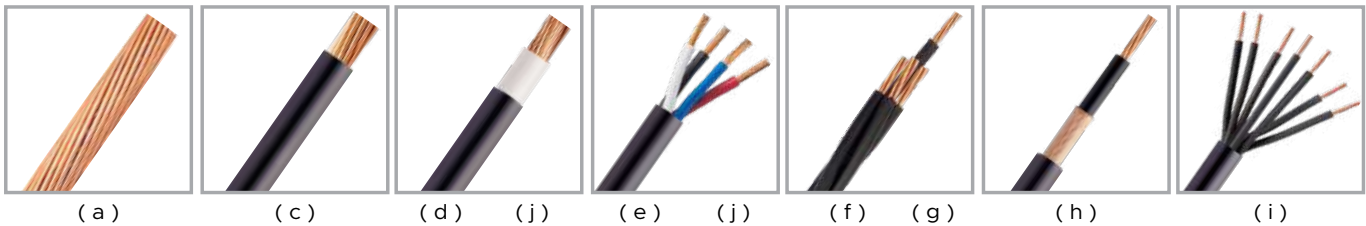
f) Multiplexed cable - cable consisting of two or more insulated conductors or single core cables, arranged helically, without a cover.

g) Self-supporting Multiplexed Cable - cable formed by one or more insulated conductors, or single core cables and an insulated or non-insulated supporting conductor, arranged helically, without a cover.

h) Concentric cable - a multi-core cable consisting of a central insulated conductor and one or more layers of conductors insulated from each other, arranged helically.

i) Control Cable - cable consisting of two or more insulated conductors, used in control circuits and electrical systems.

j) Power Cable - unipolar or multipolar cable used for transportation of electric energy in electric power generation, transmission and distribution facilities (photos d, e).



Insulation - Set of insulating materials with the purpose of electrically isolating the conductor. Insulation has a qualitative meaning, while insulation has a quantitative meaning. Ex: insulation resistance.

Material	Ki
PVC	185
HEPR / XLPE	3700
PE	12000

$$R_i = K_i \times \log(D/d)$$

D – insulated conductor diameter (mm)
d – conductor diameter (mm)

Jacket - A non-metallic, continuous outer covering with no insulating function, intended to protect the wire or cable from external influence.

Inner Jacket - Material used in multipolar cables to fill the spaces between the veins or star area.

Insulation Shielding - Layer of conductive material intended to confine the electric field within the conductors or assembled veins and protect from external electromagnetic influences. Examples of material for shielding: copper tape, aluminized polyester tape, copper mesh.

Frame - Its purpose is to protect the cables against mechanical stress.

Electrical Voltage - The rated insulation voltages of wires and cables are the voltages for which the cables are designed. They are designated by the value V_0/V associated with three-phase systems, where V_0 is the effective value of the voltage between the phase-neutral, phase-ground or phase-shield conductor and V is the effective value of the voltage between phase-phase conductors.

V_0 – voltage between phase and neutral
 V – voltage between phases
 $V = V_0 \times 1,73$

V_0/V
450/750 V
0,6/1 kV
1,8/3 kV
3,6/6 kV
6/10 kV
8,7/15 kV
12/20 kV

Low voltage	$V \leq 1 \text{ kV}$
Medium voltage	$1 \text{ kV} < V \leq 35 \text{ kV}$
High voltage	$V > 35 \text{ kV}$

Resistivity of Conductors

Material	Nominal Diameters (mm)	Resistivity at 20 °C $\Omega \text{ mm}^2/\text{km}$	Conductivity at 20 °C (%)
Annealed copper	-	17,241	100,00
Copper half hard	1,0 a 8,0	17,837	96,66
	8,0 a 11,20	17,654	97,66
Hard copper	1,0 a 8,0	17,930	96,16
	8,0 a 11,20	17,745	97,16
Tinned copper	0,075 a 0,280	18,508	93,15
	0,280 a 0,510	18,312	94,15
	0,510 a 2,620	17,930	96,16
	2,620 a 7,360	17,745	97,16
	7,360 a 11,70	17,654	97,66
Aluminum 1350	-	28,264	61,00
Aluminum alloy 6201	-	32,840	52,50
Tin	-	114,940	15,00
Steel	-	143,675	12,00
Lead	-	215,513	8,00

Basic Concepts on Electrical Conductors

Conductor temperature

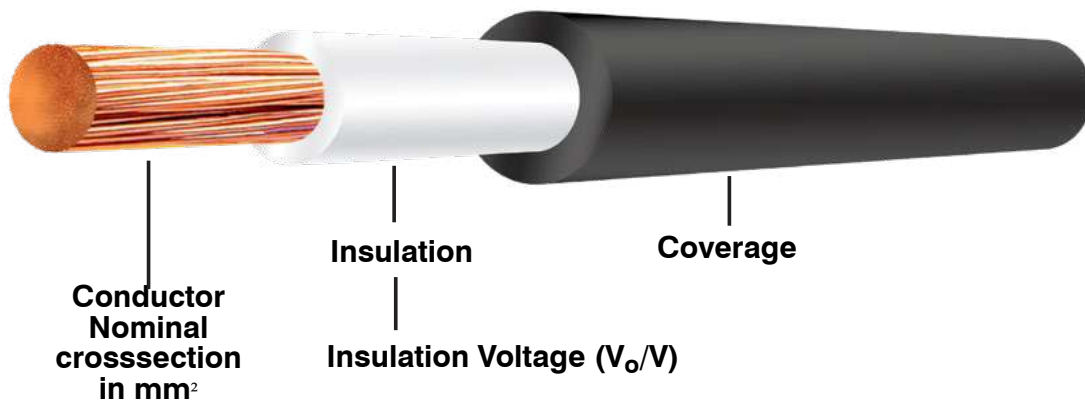
Wires and cables with insulation are characterized by three temperatures, measured on the conductor itself, in the steady state, in the overload state and in the short-circuit state.

Conductor temperature at steady state (or continuous duty) - This is the temperature reached at any point on the conductor under stable operating conditions.

Each type (material) of insulation corresponds to a maximum temperature for continuous service, designated by θ_z .

Temperature in the conductor under overload - This is the temperature reached at any point in the conductor under overload. For power cables, it is established that the overload operation, for maximum temperatures specified according to the insulation, designated by θ_{sc} , shall not exceed 100 hours during twelve consecutive months, nor exceed 500 hours during the life of the cable.

Short-circuit conductor temperature - This is the temperature reached at any point on the conductor during the short-circuit regime. For power cables, the maximum duration of a short-circuit at which the conductor can maintain specified maximum temperatures depending on the insulation, denoted by θ_{cc} , is 5 seconds.



Type of Insulation	Maximum Continuous Service Temperature	Maximum Overload Temperature	Maximum Short Circuit Temperature
PVC	70 °C	100 °C	160 °C
HEPR / XLPE	90 °C	130 °C	250 °C
LSHF-A 70°C	70 °C	100 °C	160 °C
LSHF-A 90°C	90 °C	130 °C	250 °C

Minimum Bend Radius for Wires and Cables

Specific requirements

Minimum radii of curvature for mobile installations

The minimum bending radius for mobile cables, during installation or handling in service, and shall be six times the nominal outer diameter for cables with insulation voltages equal to or less than 3,6/6 kV and eight times the nominal outer diameter for cables with insulation voltages greater than 3,6/6 kV. For flat shaped cables, the smallest nominal dimension is used to determine the minimum radius.

Minimum bending radii of cables for fixed installation

The minimum bending radii for insulated conductors, single-core and multi-core or multiplexed cables, are those set out in the Chart below.

Minimum bending radii of cables

Shielding	Frame	Cable outer diameter (D) mm		
		D ≤ 25	25 < D ≤ 50	D > 50
		Factor (K)		
Unshielded	Not armed	5	7	8
	Smooth helical tape	12	12	12
	Longitudinal plain tape	12	12	12
	Longitudinal corrugated tape	7	7	8
	Helical interlocking tape	7	7	8
	Lead cover	12	12	12
	Smooth aluminum cover	20	20	20
	Corrugated aluminum cover	16	16	16
	Circular or flat wires	12	12	12
	Strand braid	6	7	8
Armored with braid	Not armed	6	7	8
Wired shielded	Not armed	12	12	12
	Smooth helical tape	12	12	12
	Longitudinal plain tape	12	12	12
	Longitudinal corrugated tape	12	12	12
	Helical interlocking tape	12	12	12
	Lead cover	12	12	12
	Smooth aluminum cover	20	20	20
	Corrugated aluminum cover	16	16	16
	Circular or flat wires	12	12	12
	Strand braid	12	12	12
Armored with tape	Not armed	12	12	12
	Smooth helical tape	12	12	12
	Longitudinal plain tape	12	12	12
	Longitudinal corrugated tape	12	12	12
	Helical interlocking tape	12	12	12
	Lead cover	12	12	12
	Smooth aluminum cover	20	20	20
	Corrugated aluminum cover	16	16	16
	Circular or flat wires	12	12	12
	Strand braid	12	12	12

NOTE 1 The minimum bending radius is the result, to three significant figures, of multiplying the FACTOR by the nominal outer diameter of the cable.

NOTE 2 Where not indicated, the frame may consist of steel or aluminum.

NOTE 3 The nominal outer diameter to be considered for multiplexed cables is the nominal diameter over the meeting of the seams.

NOTE 4 These values of minimum bending radius refer to the permanent situation of the cable and not to bends under traction to which the cable may be subjected during its installation: larger minimum bending radii are required for this condition.

NOTE 5 These minimum bending radii refer to the internal surface of the cable and not to its axis.

Example of application:

Whether Maxlink G-flex 240 mm² cable

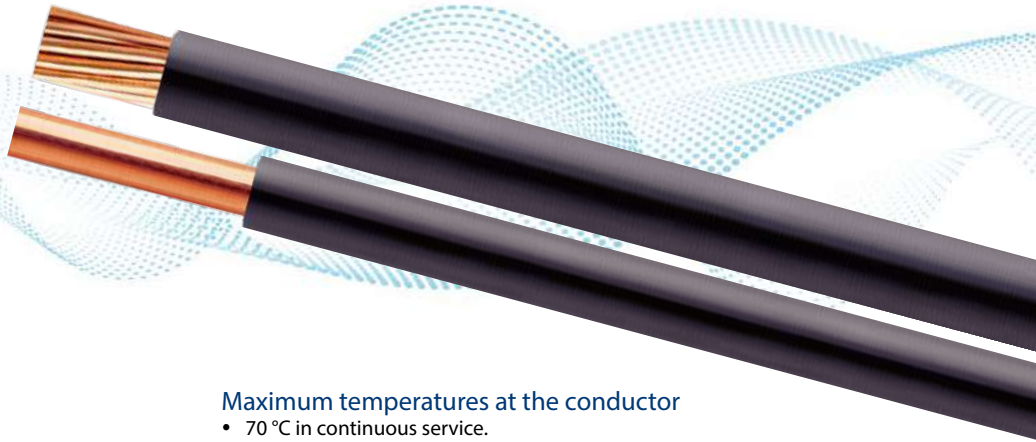
- Cable diameter D = 26.90 mm
- According to the Chart, for unarmored and unshielded cables with a diameter between 25 and 50 mm we must apply K = 7, therefore:
- Minimum radius of curvature is $K \times D = 7 \times 26.9 = 188.3$ mm

Flame-resistant Wire and Flame-resistant Cable

450/750 V

NBR NM 247-3

70 °C



Conductor

- Solid Flameproof Wire
- Electrolytic bare copper wire, soft temper, class 1 stranding.
- Anti-flame cable
- Cable formed by electrolytic bare copper wires, soft temper, class 2 stranding.

Insulation

PVC-A 70 °C BWF - Thermoplastic compound of polyvinyl chloride, with special characteristics as to the non-propagation and self-extinguishing of fire.

Identification

- Solid Flameproof Wire
- Black, White, Light Blue, Red, Green, Yellow.
- Flameproof Cable
- Black, Light Blue, Green.
- Note: other colors, on request.

Maximum temperatures at the conductor

- 70 °C in continuous service.
- 100 °C at overload.
- 160 °C in short circuit.

Implementation

Used in low voltage indoor residential, industrial and commercial electrical installations, in supply, distribution and terminal circuits, offering greater safety because they are BWF (flame resistant).

Applicable Standards

NBR NM 247-3 - Polyvinyl chloride (PVC) insulated cables for rated voltages up to 450/750 V (bare insulated conductors).
 NBR NM 280 - Insulated cable conductors.
 NBR 6245 - Determination of the Oxygen Index - test method.
 NBR NM-IEC 60332-3 - Test methods for electric cables under fire conditions - Part 3: Vertical flame spread test on vertically mounted conductors or cables in bundles.

Flame-resistant Wire 450/750 V

Construction Data*

Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging		
					Box (m)	Roll (m)	Reel (m)
1,50	1,34	0,7	2,7	18,9	100	----	1600
2,50	1,72	0,8	3,2	29,5	100	----	1000
4,00	2,19	0,8	3,7	44,1	100	----	800
6,00	2,66	0,8	4,2	61,7	100	----	600
10,00	3,46	1,0	5,4	103,7	----	100	400

*Data subject to change without prior notice. Other quantities can be supplied on request.

Flame-resistant Cable 450/750 V

Construction Data*

Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
					Roll (m)	Coil (m)
1,50	1,5 r n	0,7	2,9	21,2	100	2000
2,50	2,0 r n	0,8	3,5	33,0	100	2000
4,00	2,5 r n	0,8	4,1	48,8	100	2000
6,00	3,1 r n	0,8	4,6	69,8	100	1000
10,00	3,8 r c	1,0	5,8	106,9	100	1000
16,00	4,8 r c	1,0	6,8	160,6	100	1000
25,00	6,0 r c	1,2	8,4	252,6	100	1000
35,00	6,9 r c	1,2	9,3	340,1	100	1000
50,00	7,9 r c	1,4	10,8	461,7	----	500
70,00	9,5 r c	1,4	12,4	649,7	----	500
95,00	11,4 r c	1,6	14,7	900,2	----	500
120,00	13,0 r c	1,6	16,3	1120,9	----	500
150,00	14,5 r c	1,8	18,2	1387,1	----	500
185,00	16,0 r c	2,0	20,1	1731,8	----	500
240,00	18,0 r c	2,2	22,6	2263,8	----	500
300,00	20,2 r c	2,4	25,2	2832,1	----	250

r n - normal round r c - compact round

*Data subject to change without prior notice

Solid Wire



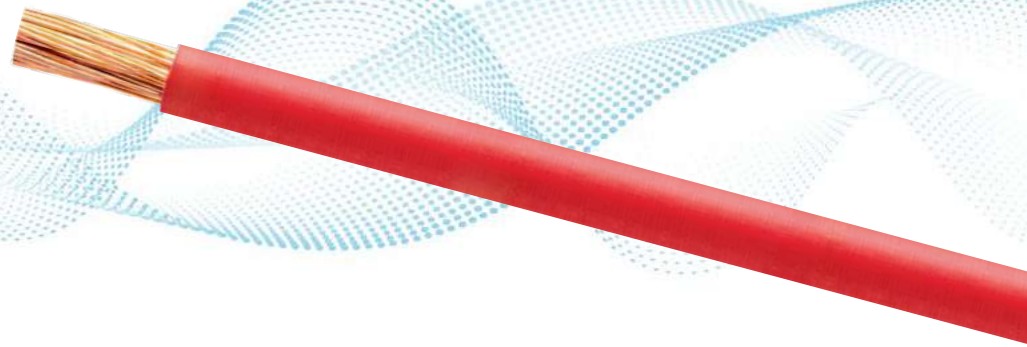
Anti-flame cable



Flexible Flame-resistant Cable 450/750 V

NBR NM 247-3

70 °C



Flexible Conductor

Made of electrolytic bare copper wires, soft temper, stranding class 4 (0.50 to 6.00 mm²) and class 5 (10.00 to 10.00 mm², 300.00 mm²).

Insulation

PVC-A 70 0C BWF - Thermoplastic compound of polyvinyl chloride, with special characteristics as to the non-propagation and self-extinguishing of fire.

Identification

- 0.50 to 6.00 mm²: Black, White, Light Blue, Red, Green, Yellow, Gray, Brown, Green/Yellow.
- 10.00 to 300.00 mm²: Black, Light Blue, Green, White, Red.

Note: other colors, on request.

Maximum temperatures at the conductor

- 70 °C in continuous service.
- 100 °C in overload.
- 160 °C short-circuited.

Implementation

Used in residential, industrial and commercial indoor low voltage electrical installations, in supply, distribution and terminal circuits, offering greater safety because they are BWF type (resistant, flameproof), with greater ease of installation due to their flexibility, thus reducing installation time and cost. They are also used for internal wiring of panels, switchboards, cubicles and other applications where flexible cables are required.

Applicable Standards

NBR NM 247-3 - Polyvinyl chloride (PVC) insulated cables for rated voltages up to 450/750 V (bare insulated conductors).

NBR NM 280 - Insulated cable conductors.

NBR 6245 - Determination of the Oxygen Index - test method.

NBR NM-IEC 60332-3 - Test methods for electric cables under fire conditions - Part 3: Vertical flame spread test on vertically mounted conductors or cables in bundles.

Construction Data*

Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging			
					Box (m)	Roll (m)	Reel (m)	Coil (m)
0,50	0,9	0,6	2,2	8,8	100	----	2700	----
0,75	1,1	0,6	2,3	11,1	100	----	2500	----
1,00	1,2	0,6	2,5	13,8	100	----	2100	----
1,50	1,5	0,7	2,8	19,0	100	----	1500	----
2,50	1,9	0,8	3,5	29,9	100	----	1000	----
4,00	2,4	0,8	4,0	43,2	100	----	700	----
6,00	3,0	0,8	4,5	61,1	100	----	600	----
10,00	4,1	1,0	6,1	105,7	----	100	----	1000
16,00	5,2	1,0	7,2	160,0	----	100	----	1000
25,00	6,5	1,2	8,9	246,8	----	100	----	1000
35,00	7,7	1,2	10,1	338,2	----	100	----	1000
50,00	9,2	1,4	12,0	486,5	----	----	----	500
70,00	11,0	1,4	13,8	669,1	----	----	----	500
95,00	12,6	1,6	15,9	887,9	----	----	----	500
120,00	14,2	1,6	17,5	1109,0	----	----	----	500
150,00	15,9	1,8	19,6	1387,9	----	----	----	500
185,00	17,5	2,0	21,7	1677,8	----	----	----	500
240,00	20,2	2,2	24,7	2202,0	----	----	----	500
300,00	22,5	2,4	27,5	2742,8	----	----	----	250

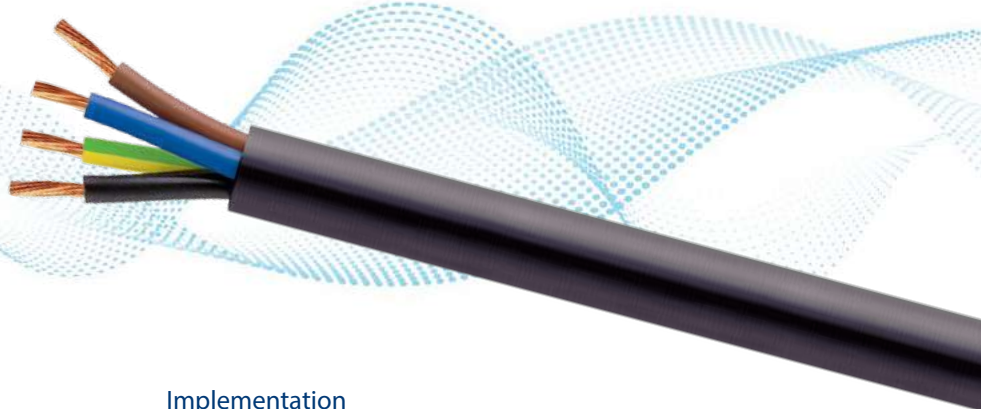


*Data subject to change without prior notice

Flexible Cable PP 300/500 V

NBR NM 247-5

70 °C



Conductor

Made of electrolytic bare copper wire, soft temper, class 5 stranding.

Insulation

PVC-D 70 °C - Thermoplastic polyvinyl chloride compound.

Identification

2 Conductors: Black and Light Blue.

3 Conductors: Black, Light Blue and Brown.

4 Conductors: Black, Light Blue, Brown and Yellow-Green.

5 Conductors: Black, Light Blue, Brown, Yellow-Green and Black.

Coverage

PVC ST5 - Flexible polyvinyl chloride thermoplastic compound, in black color.

Maximum temperatures at the conductor

- 70 °C in continuous service.
- 100 °C at overload.
- 160 °C in short circuit.

Implementation

Due to their excellent appearance and good flexibility, they are used in the connection of household appliances, white goods, portable and mobile appliances (refrigerators, vacuum cleaners, floor polishers, etc.).

They are also used for hand tool connections (drills, sanders, saws, etc.).

Applicable Standards

NBR NM 247-5 - Polyvinyl chloride (PVC) insulated cables for rated voltages up to and including 450/750V - Part 5 - Flexible cables (cords) (IEC 60227-5, MOD).

NBR NM 280 - Insulated cable conductors.

NBR NM 247-1 - Polyvinyl chloride (PVC) insulated cables for rated voltages up to and including 450/750V - Part 1 - General requirements (IEC 60227-1, MOD).

Construction Data*

Number of Conductors	Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
							Roll (m)	Coil (m)
2	0,50	0,9	0,6	0,8	5,7	42,39	100	1000
	0,75	1,1	0,6	0,8	6,1	50,81	100	1000
	1,00	1,3	0,6	0,8	6,4	58,68	100	1000
	1,50	1,5	0,7	0,8	7,3	78,54	100	1000
	2,50	2,0	0,8	1,0	9,0	121,97	100	1000
	4,00	2,5	0,8	1,1	10,4	170,18	100	1000
	6,00	3,1	0,8	1,3	12,0	237,50	100	500
3	10,00	4,1	1,0	1,5	15,3	379,41	----	500
	0,50	0,9	0,6	0,8	6,0	51,81	100	1000
	0,75	1,1	0,6	0,8	6,4	63,00	100	1000
	1,00	1,3	0,6	0,8	6,8	73,55	100	1000
	1,50	1,5	0,7	0,9	8,0	103,36	100	1000
	2,50	2,0	0,8	1,1	9,8	159,89	100	1000
	4,00	2,5	0,8	1,2	11,2	224,33	100	1000
4	6,00	3,1	0,8	1,4	12,9	313,74	100	500
	10,00	4,1	1,0	1,5	16,3	491,92	----	500
	0,50	0,9	0,6	0,8	6,5	62,53	100	1000
	0,75	1,1	0,6	0,8	7,0	76,70	100	1000
	1,00	1,3	0,6	0,9	7,6	93,71	100	1000
	1,50	1,5	0,7	1,0	8,9	131,31	100	1000
	2,50	2,0	0,8	1,1	10,7	198,21	100	1000
5	4,00	2,5	0,8	1,3	12,4	284,28	100	1000
	6,00	3,1	0,8	1,4	14,1	390,69	----	500
	10,00	4,1	1,0	1,6	18,0	622,81	----	500
	0,50	0,9	0,6	0,8	7,1	72,98	100	1000
	0,75	1,1	0,6	0,9	7,8	93,69	100	1000
	1,00	1,3	0,6	0,9	8,3	110,16	100	1000
	1,50	1,5	0,7	1,1	9,9	159,29	100	1000

*Data subject to change without prior notice



Flexible Cable PP Plane 300/500V

NBR NM 247-5

70 °C



Conductor

Made of electrolytic bare copper wire, soft temper, class 5 stranding.

Insulation

PVC-D 70 °C - Thermoplastic polyvinyl chloride compound.

Identification

2 Conductors: Black and Light Blue.

3 Conductors: Black, Light Blue and Brown.

Coverage

PVC ST5 - Flexible polyvinyl chloride thermoplastic compound, in black color.

Maximum temperatures at the conductor

- 70 °C in continuous service.
- 100 °C at overload.
- 160 °C short-circuit.

Implementation

Due to their excellent appearance and good flexibility, they are used in the connection of household appliances, white goods, portable and mobile appliances (refrigerators, vacuum cleaners, floor polishers, etc.). They are also used for connections of portable tools and submerged pumps.

Applicable Standards

NBR NM 247-5 - Polyvinyl chloride (PVC) insulated cables for rated voltages up to and including 450/750V - Part 5 - Flexible cables (cords) (IEC 60227-5, MOD).

NBR NM 280 - Insulated cable conductors.

NBR NM 247-1 - Polyvinyl chloride (PVC) insulated cables for rated voltages up to and including 450/750V - Part 1 - General requirements (IEC 60227-1, MOD).

Construction Data*

Number of Conductors	Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
							Roll (m)	Coil (m)
2	0,50	0,9	0,6	0,8	3,7 x 5,9	33,7	100	1000
	0,75	1,1	0,6	0,8	3,8 x 6,1	38,7	100	1000
	1,00	1,3	0,6	0,8	4,0 x 6,4	45,0	100	1000
	1,50	1,5	0,7	0,8	4,4 x 7,3	60,3	100	1000
	2,50	2,0	0,8	1,0	5,5 x 9,0	94,6	100	1000
3	0,50	0,9	0,6	0,8	3,7 x 8,0	48,5	100	1000
	0,75	1,1	0,6	0,8	3,8 x 8,3	56,1	100	1000
	1,00	1,3	0,6	0,8	4,0 x 8,8	65,5	100	1000
	1,50	1,5	0,7	0,9	4,6 x 10,4	92,2	100	1000
	2,50	2,0	0,8	1,1	5,7 x 12,8	144,0	100	1000



*Data subject to change without prior notice

Soldering Cable 450/750 V

NBR 8762

70 °C

Flexible Conductor

Made of electrolytic bare copper wires, soft temper, stranding class 5 (16.00 to 35.00 mm²) and class 6 (50.00 to 35.00 mm²). 150.00 mm²).

Insulation

PVC-A 70 °C - Thermoplastic polyvinyl chloride compound, black in color.

Maximum temperatures at the conductor

- 70 °C in continuous service.
- 100 °C at overload.
- 160 °C in short circuit.

Implementation

Used to connect the output terminal of the power source to the electrode of the arc welding machine, they are also used in general installations where flexibility is decisive in the choice of cable.

Applicable Standards

NBR 8762 - Extra-flexible cables for arc welding machines and other applications.

NBR NM-IEC 60332-1 - Test methods for electric cables under fire conditions - Part 1: test on a single conductor or insulated cable in vertical position.

Construction Data*

Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
					Roll (m)	Coil (m)
16,00	5,0	1,8	8,6	186,7	25 ou 100	500
25,00	6,2	1,8	9,8	266,9	25 ou 100	500
35,00	7,4	2,0	11,5	372,9	25 ou 100	500
50,00	8,9	2,0	12,9	511,1	25	500
70,00	10,6	2,2	15,0	709,9	25	500
95,00	12,2	2,2	16,7	911,3	25	500
120,00	13,8	2,4	18,7	1165,2	25	500
150,00	15,6	2,4	20,5	1454,8	25	500

*Data subject to change without prior notice

Current Conduction Capacity

Definitions

Load Factor: percentage of the duty cycle at which the cable conducts its rated current. Duty Cycle: by definition 5 minutes.

RATED CURRENT

Nominal crosssection (mm ²)	Load Factor				
	100%	75%	50%	25%	10%
10,00	71	74	81	102	148
16,00	95	101	114	148	220
25,00	131	142	162	213	322
35,00	162	178	206	275	420
50,00	196	218	256	347	535
70,00	251	280	332	453	700
95,00	304	342	407	559	869
120,00	352	397	475	656	1021
150,00	406	460	552	764	1194

Soldalink Cable 450/750 V

NBR 8762

90 °C



Conductor

Made of electrolytic bare copper wires, soft temper, stranding class 5 (16.00 to 35.00 mm²) and class 6 (50.00 to 35.00 mm²). 150.00 mm²).

Separator

Kraft paper tape, applied longitudinally between the conductor and the insulation.

Insulation

Thermosetting elastomeric compound 90 °C, in black color.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C em short-circuit.

Implementation

Used in the connection of the output terminal to the electrode of arc welding machines, internal connections in arc welding machines, electrical panels, power electronic equipment and similar where great flexibility is required combined with a greater current conduction capacity.

Applicable Standards

NBR 8762 - Extra-flexible cables for arc welding machines.
NBR NM-IEC 60332-1 - Test methods for electric cables under fire conditions - Part 1: test on a single conductor or insulated cable in vertical position.

Construction Data*

Nominal crossection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
					Roll (m)	Coil (m)
16,00	5,0	1,8	8,6	168,2	25 ou 100	500
25,00	6,2	1,8	9,8	245,2	25 ou 100	500
35,00	7,4	2,0	11,5	344,1	25 ou 100	500
50,00	8,9	2,0	12,9	477,9	25	500
70,00	10,6	2,2	15,0	669,5	25	500
95,00	12,2	2,2	16,7	863,3	25	500
120,00	13,8	2,4	18,7	1106,0	25	500
150,00	15,6	2,4	20,5	1389,1	25	500

*Data subject to change without prior notice

Current Conduction Capacity

Definitions

Load Factor: percentage of the duty cycle at which the cable conducts its rated current. Duty Cycle: by definition 5 minutes.

RATED CURRENT

Nominal crossection (mm ²)	Load Factor				
	100%	75%	50%	25%	10%
10,00	90	93	101	125	180
16,00	121	128	143	182	270
25,00	161	174	198	256	390
35,00	200	218	252	355	510
50,00	242	268	314	424	652
70,00	310	345	407	554	856
95,00	377	423	502	688	1068
120,00	437	492	587	809	1259
150,00	504	570	682	943	1472

Maxvinyl Cable 0,6/1 kV

NBR 7288

70 °C

Conductor

Cable formed by electrolytic bare copper wires, soft temper, class 2 stranding.

Insulation

PVC-A 70 0C - Thermoplastic compound of polyvinyl chloride, in white color, with special characteristics regarding the nonspread and self-extinguishing of fire.

Coverage

PVC ST1 - Thermoplastic compound of polyvinyl chloride, with special characteristics regarding the non propagation and self extinguishing of fire.

Identification

Black, Light Blue, Green.

Note: other colors, on request.

Maximum temperatures at the conductor

- 70 0C in continuous service.
- 100 0C in overload.
- 160 0C short-circuited.

Implementation

Used in fixed power and light installations in industrial, commercial and residential buildings, in distribution circuits and terminal circuits, and for underground low-voltage power lines.

Applicable Standards

NBR 7288 - Power cables with extruded solid insulation of polyvinyl chloride (PVC) or polyethylene (PE) for voltages from 1 kV to 6 kV.

NBR NM 280 - Insulated cable conductors.

NBR 6245 - Determination of the Oxygen Index - test method.

NBR NM-IEC 60332-3 - Test methods for electric cables under fire conditions - Part 3: Vertical flame spread test on vertically mounted conductors or cables in bundles.

Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
						Roll (m)	Coil (m)
1,50	1,6 r n	0,8	0,9	4,9	39,2	100	2000
2,50	2,0 r n	0,8	0,9	5,3	51,2	100	2000
4,00	2,5 r n	1,0	1,0	6,5	77,8	100	2000
6,00	3,1 r n	1,0	1,0	7,0	101,5	100	1000
10,00	3,7 r c	1,0	1,0	7,6	136,5	100	1000
16,00	4,6 r c	1,0	1,0	8,6	196,5	100	1000
25,00	5,8 r c	1,2	1,1	10,4	300,0	100	1000
35,00	6,9 r c	1,2	1,1	11,5	396,7	100	1000
50,00	7,9 r c	1,4	1,2	13,1	530,6	----	500
70,00	9,5 r c	1,4	1,2	14,7	728,3	----	500
95,00	11,4 r c	1,6	1,3	17,2	1000,6	----	500
120,00	13,0 r c	1,6	1,3	18,8	1232,6	----	500
150,00	14,5 r c	1,8	1,4	20,9	1519,5	----	500
185,00	16,0 r c	2,0	1,5	23,0	1888,6	----	500
240,00	18,0 r c	2,2	1,6	25,6	2449,5	----	500
300,00	20,2 r c	2,4	1,7	28,4	3052,5	----	250

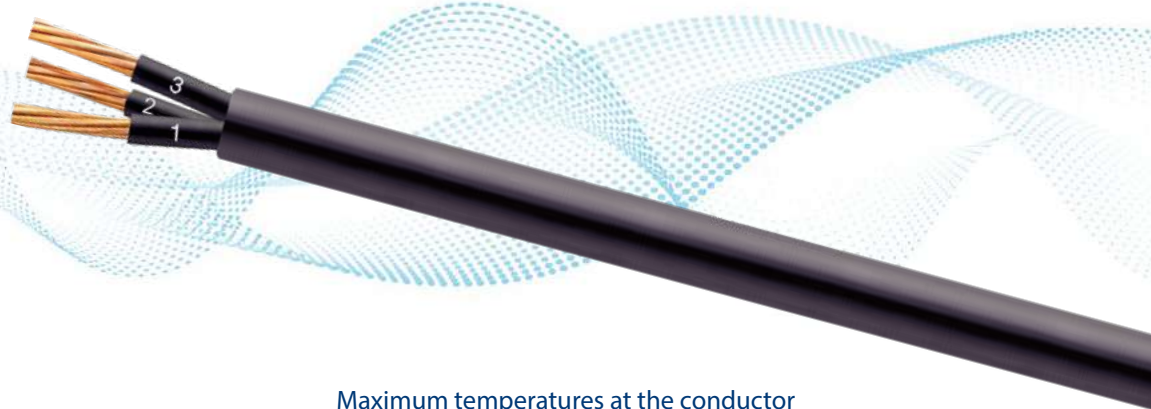


r n - normal round r c - compact round *Data subject to change without prior notice

Maxvinyl Cable 0,6/1 kV - Multiple

NBR 7288

70 °C



Conductor

Cable formed by electrolytic bare copper wires, soft temper, class 2 stranding.

Insulation

PVC-A 70 0C - Thermoplastic compound of polyvinyl chloride, with special characteristics as to the non-propagation and selfextinguishing of fire.

Identification

Numbered or colored black veins.

Coverage

PVC ST1 - Thermoplastic compound of polyvinyl chloride, in black color, with special characteristics regarding the nonpropagation and self-extinguishing of fire.

Maximum temperatures at the conductor

- 70 0C in continuous service.
- 100 0C in overload.
- 160 °C in short circuit.

Implementation

Used in fixed power and light installations in industrial, commercial and residential buildings, in distribution circuits and terminal circuits, and for underground low-voltage power lines.

Applicable Standards

NBR 7288 - Power cables with extruded solid insulation of polyvinyl chloride (PVC) or polyethylene (PE) for voltages from 1 kV to 6 kV.

NBR NM 280 - Insulated cable conductors.

NBR 6245 - Determination of the Oxygen Index - test method.

NBR NM-IEC 60332-3 - Test methods for electric cables under fire conditions - Part 3: Vertical flame spread test on vertically mounted conductors or cables in bundles.

Construction Data*

Number of Conductors	Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
							Roll (m)	Coil (m)
2	1,50	1,6 r n	0,8	1,0	8,3	102,2	100	1000
	2,50	2,0 r n	0,8	1,0	9,1	133,4	100	1000
	4,00	2,5 r n	1,0	1,1	11,2	204,6	100	1000
	6,00	3,1 r n	1,0	1,1	12,3	265,5	100	1000
	10,00	3,7 r c	1,0	1,2	13,7	359,6	100	500
	16,00	4,6 r c	1,0	1,3	15,7	511,6	----	500
	25,00	5,8 r c	1,2	1,4	19,1	778,8	----	500
	35,00	6,9 r c	1,2	1,4	21,3	1016,0	----	500
	50,00	7,9 r c	1,4	1,6	25,9	1448,4	----	500
	70,00	9,5 r c	1,4	1,7	29,3	1960,2	----	500
95,00	11,4 r c	1,6	1,8	34,1	2675,9	----	250	
3	1,50	1,6 r n	0,8	1,0	8,8	122,9	100	1000
	2,50	2,0 r n	0,8	1,1	9,9	168,1	100	1000
	4,00	2,5 r n	1,0	1,1	11,9	252,4	100	1000
	6,00	3,1 r n	1,0	1,2	13,3	339,0	100	1000
	10,00	3,7 r c	1,0	1,2	14,6	458,5	----	500
	16,00	4,6 r c	1,0	1,3	16,8	662,2	----	500
	25,00	5,8 r c	1,2	1,4	20,4	1014,3	----	500
	35,00	6,9 r c	1,2	1,5	23,0	1345,2	----	500
	50,00	7,9 r c	1,4	1,6	27,7	1884,6	----	500
	70,00	9,5 r c	1,4	1,7	31,3	2576,0	----	500
95,00	11,4 r c	1,6	1,9	36,7	3541,2	----	250	
4	1,50	1,6 r n	0,8	1,1	9,7	153,6	100	1000
	2,50	2,0 r n	0,8	1,1	10,8	205,4	100	1000
	4,00	2,5 r n	1,0	1,2	13,2	317,0	100	1000
	6,00	3,1 r n	1,0	1,2	14,6	419,8	----	1000
	10,00	3,7 r c	1,0	1,3	16,3	581,2	----	500
	16,00	4,6 r c	1,0	1,3	18,4	833,8	----	500
	25,00	5,8 r c	1,2	1,5	22,7	1292,0	----	500
	35,00	6,9 r c	1,2	1,6	25,5	1717,0	----	500
	50,00	7,9 r c	1,4	1,7	30,5	2458,0	----	500
	70,00	9,5 r c	1,4	1,8	34,6	3367,5	----	500
95,00	11,4 r c	1,6	2,0	40,5	4633,0	----	250	



r n- normal round r c- compact round *Data subject to change without prior notice

Maxlink Cable 0,6/1 kV

NBR 7287

90 °C

Conductor

Cable formed by electrolytic bare copper wires, soft temper, class 2 stranding.

Insulation

XLPE 90 °C - Thermosetting compound of cross-linked polyethylene, black in color.

Coverage

PVC ST2 - Thermoplastic polyvinyl chloride compound, flame resistant.

Identification

Black, Light Blue, Green.

Note: other colors, on request.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

Used in fixed power and lighting installations in industrial, commercial and residential buildings, in distribution circuits and terminal circuits, and for lowvoltage

underground power lines. Its higher thermal class allows greater current conduction capacity than its PVC equivalent (70 °C).

Applicable Standards

NBR 7287 - Power cables with solid extruded cross-linked polyethylene (XLPE) insulation for insulation voltages from 1 kV to 35 kV.

NBR NM 280 - Insulated cable conductors.

NBR NM-IEC 60332-1 - Test methods for electric cables under fire conditions - Part 1: test on a single conductor or insulated cable in vertical position.

Construction Data*

Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
						Roll (m)	Coil (m)
1,50	1,5 r n	0,7	0,9	4,6	32,9	100	2000
2,50	2,0 r n	0,7	0,9	5,1	45,2	100	2000
4,00	2,5 r n	0,7	0,9	5,7	62,0	100	2000
6,00	3,1 r n	0,7	0,9	6,2	83,5	100	1000
10,00	3,8 r c	0,7	1,0	7,4	125,1	100	1000
16,00	4,8 r c	0,8	1,0	8,4	181,2	100	1000
25,00	6,0 r c	0,9	1,1	10,0	275,9	100	1000
35,00	6,9 r c	0,9	1,1	11,0	366,7	100	1000
50,00	7,9 r c	1,0	1,2	12,4	489,0	----	500
70,00	9,5 r c	1,1	1,2	14,2	685,8	----	500
95,00	11,4 r c	1,1	1,3	16,4	936,7	----	500
120,00	13,0 r c	1,2	1,3	18,2	1165,7	----	500
150,00	14,5 r c	1,4	1,4	20,4	1442,7	----	500
185,00	16,0 r c	1,6	1,4	22,3	1784,7	----	500
240,00	18,0 r c	1,7	1,5	24,7	2319,8	----	500
300,00	20,2 r c	1,8	1,6	27,4	2893,1	----	250

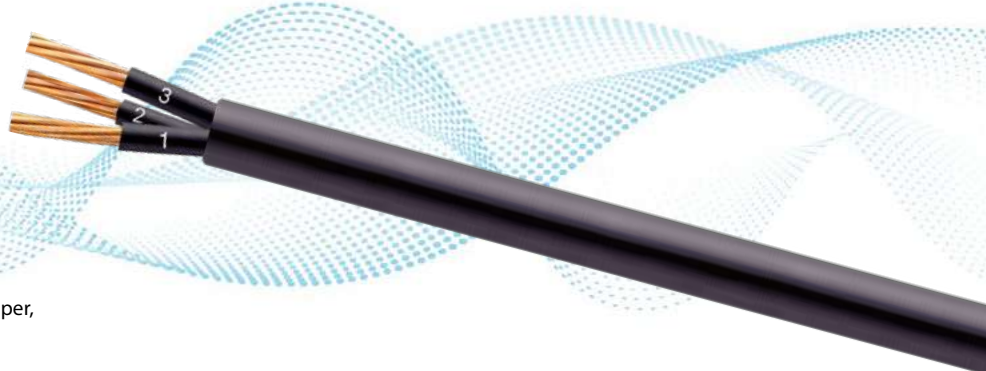


r n- normal round r c- compact round *Data subject to change without prior notice

Maxlink Cable 0,6/1 kV - Multiple

NBR 7287

90 °C



Conductor

Cable formed by electrolytic bare copper wires, soft temper, class 2 stranding.

Insulation

XLPE 90 °C - Thermosetting compound of cross-linked polyethylene.

Identification

Numbered or colored black veins.

Coverage

PVC ST2 - Thermoplastic polyvinyl chloride compound, black in color, flame resistant.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

Used in fixed power and lighting installations in industrial, commercial and residential buildings, in distribution circuits and terminal circuits, and for lowvoltage

underground power lines. Its higher thermal class allows greater current conduction capacity than its PVC equivalent (70 °C).

Applicable Standards

NBR 7287 - Power cables with solid extruded cross-linked polyethylene (XLPE) insulation for insulation voltages from 1 kV to 35 kV.

NBR NM 280 - Insulated cable conductors.

NBR NM-IEC 60332-1 - Test methods for electric cables under fire conditions - Part 1: test on a single conductor or insulated cable in vertical position.

Construction Data*

Number of Conductors	Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
							Roll (m)	Coil (m)
2	1,50	1,5 r n	0,7	1,0	7,8	86,2	100	1000
	2,50	2,0 r n	0,7	1,0	8,7	116,9	100	1000
	4,00	2,5 r n	0,7	1,1	9,9	164,7	100	1000
	6,00	3,1 r n	0,7	1,1	11,1	221,3	100	1000
	10,00	3,8 r c	0,7	1,2	13,3	349,4	100	500
	16,00	4,8 r c	0,8	1,2	15,3	520,1	----	500
	25,00	6,0 r c	0,9	1,3	18,2	708,8	----	500
	35,00	6,9 r c	0,9	1,4	20,4	938,7	----	500
	50,00	7,9 r c	1,0	1,5	24,0	1302,9	----	500
	70,00	9,5 r c	1,1	1,6	27,9	1818,2	----	500
95,00	11,4 r c	1,1	1,7	32,0	2451,6	----	250	
3	1,50	1,5 r n	0,7	1,0	8,2	102,0	100	1000
	2,50	2,0 r n	0,7	1,0	9,2	141,7	100	1000
	4,00	2,5 r n	0,7	1,1	10,6	204,4	100	1000
	6,00	3,1 r n	0,7	1,1	11,8	277,4	100	1000
	10,00	3,8 r c	0,7	1,2	14,1	447,7	----	500
	16,00	4,8 r c	0,8	1,3	16,5	687,3	----	500
	25,00	6,0 r c	0,9	1,4	19,6	911,7	----	500
	35,00	6,9 r c	0,9	1,4	21,7	1207,4	----	500
	50,00	7,9 r c	1,0	1,6	25,8	1677,1	----	500
	70,00	9,5 r c	1,1	1,7	30,0	2354,9	----	500
95,00	11,4 r c	1,1	1,8	34,3	3188,0	----	250	
4	1,50	1,5 r n	0,7	1,0	8,9	122,6	100	1000
	2,50	2,0 r n	0,7	1,1	10,3	178,7	100	1000
	4,00	2,5 r n	0,7	1,1	11,6	251,2	100	1000
	6,00	3,1 r n	0,7	1,2	13,2	350,0	100	1000
	10,00	3,8 r c	0,7	1,2	15,5	519,5	----	500
	16,00	4,8 r c	0,8	1,3	18,1	770,7	----	500
	25,00	6,0 r c	0,9	1,4	21,6	1147,4	----	500
	35,00	6,9 r c	0,9	1,5	24,1	1536,1	----	500
	50,00	7,9 r c	1,0	1,6	28,3	2111,6	----	500
	70,00	9,5 r c	1,1	1,8	33,2	2994,8	----	500
95,00	11,4 r c	1,1	1,9	38,0	4060,2	----	250	

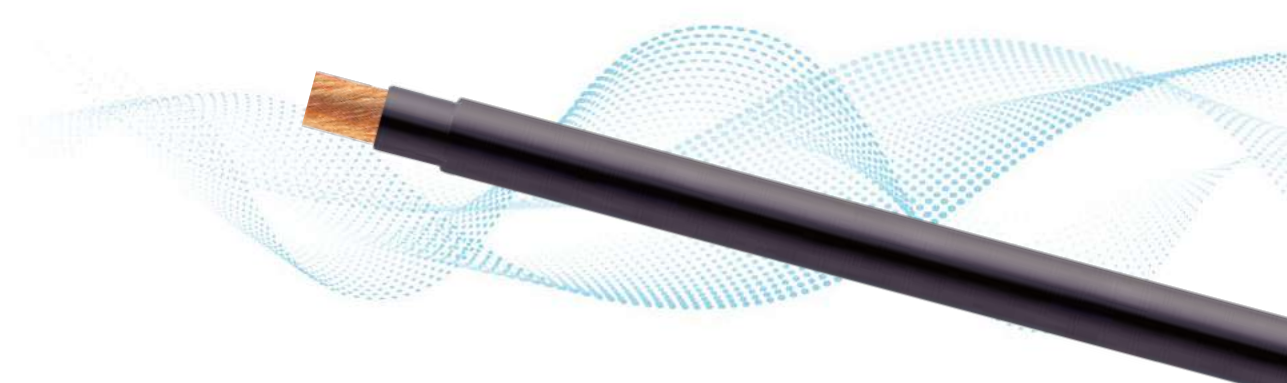


*n - normal round r c - compact round *Data subject to change without prior notice

Maxlink G-Flex Cable 0,6/1 kV

NBR 7286

90 °C



Flexible Conductor

Made of electrolytic bare copper wires, soft temper, stranding class 4 (1.50 to 6.00 mm²) and class 5 (10.00 to 10.00 mm²), 400.00 mm²).

Insulation

HEPR 90 °C - Thermosetting compound based on ethylene propylene (high modulus), in black color.

Coverage

PVC ST2 - Thermoplastic polyvinyl chloride compound, flame resistant.

Identification

Black, Light Blue, Green.
Note: other colors, on request.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

Used in fixed power and light installations in industrial, commercial and residential buildings, in distribution circuits and in terminal circuits, and for underground low-voltage power lines where greater cable flexibility is required coupled with higher current-carrying capacity and longer life. Its higher thermal class (90 °C) allows for higher current carrying capacity than its PVC equivalent (70 °C).

Applicable Standards

NBR 7286 - Power cables with extruded ethylene-propylene rubber (EPR) insulation for voltages from 1 kV to 35 kV.
NBR NM 280 - Insulated cable conductors.
NBR NM-IEC 60332-1 - Test methods for electric cables under fire conditions - Part 1: test on a single conductor or insulated cable in vertical position.

Construction Data*

Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
						Roll (m)	Coil (m)
1,50	1,5	0,7	0,9	4,6	30,8	100	2000
2,50	1,9	0,7	0,9	5,0	41,3	100	2000
4,00	2,4	0,7	0,9	5,6	56,8	100	2000
6,00	3,0	0,7	0,9	6,1	75,9	100	1000
10,00	4,1	0,7	1,0	7,7	122,9	100	1000
16,00	5,2	0,7	1,0	8,8	181,6	100	1000
25,00	6,5	0,9	1,1	10,5	269,8	100	1000
35,00	7,7	0,9	1,1	11,7	363,0	100	1000
50,00	9,2	1,0	1,2	13,7	509,2	----	500
70,00	11,0	1,1	1,2	15,7	707,1	----	500
95,00	12,6	1,1	1,3	17,5	915,2	----	500
120,00	14,2	1,2	1,3	19,4	1151,5	----	500
150,00	15,9	1,4	1,4	21,7	1430,4	----	500
185,00	17,5	1,6	1,4	23,8	1732,6	----	500
240,00	20,2	1,7	1,5	26,9	2266,4	----	500
300,00	22,5	1,8	1,6	29,7	2806,3	----	250
400,00	25,9	2,0	1,7	33,7	3687,5	----	250



*Data subject to change without prior notice

Maxlink G-Flex Cable 1,8/3 kV

NBR 7286

90 °C

Flexible Conductor

Formed of electrolytic bare copper wire, soft temper, class 5 stranding.

Insulation

HEPR 90 °C - Thermosetting compound based on ethylene propylene (high modulus), in black color.

Coverage

PVC ST2 - Thermoplastic polyvinyl chloride compound, flame resistant.

Note: other colors, on request.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

Employed in fixed power and light installations in industrial, commercial and residential buildings, in distribution circuits and in terminal circuits and for underground low-voltage power lines where greater cable flexibility is required coupled with higher current-carrying capacity and longer life. Its higher thermal class (90 °C) allows for higher current carrying capacity than its PVC equivalent (70 °C).

Applicable Standards

NBR 7286 - Power Cables with solid extruded ethylene-propylene rubber (EPR) insulation for voltages from 1 kV to 35 kV.

NBR NM 280 - Insulated cable conductors.

NBR 6244 - Flame resistance test for electrical wires and cables - test method.

Construction Data*

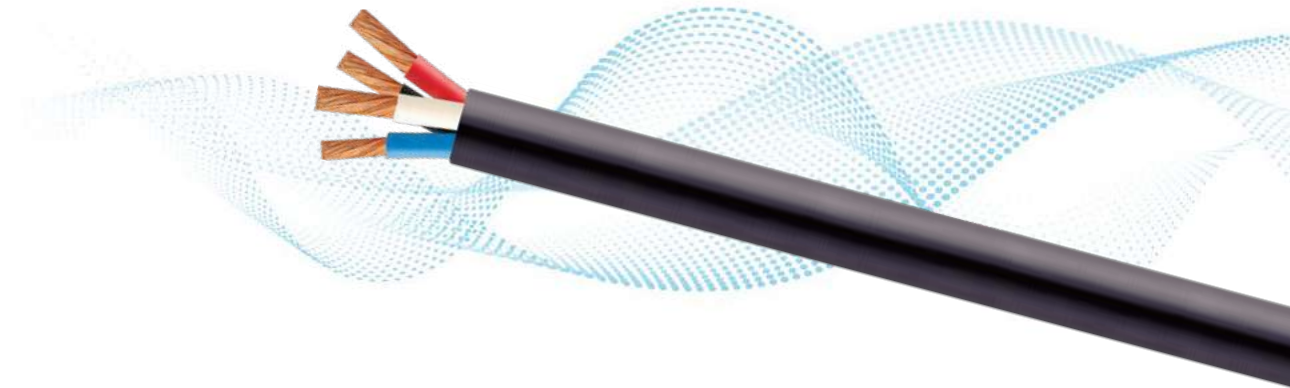
Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging
						Coil (m)
10,00	4,1	2,0	1,1	10,3	163,6	1000
16,00	5,2	2,0	1,1	11,5	226,9	1000
25,00	6,5	2,0	1,1	12,8	312,1	1000
35,00	7,7	2,0	1,2	14,2	415,6	1000
50,00	9,2	2,0	1,2	15,7	557,5	500
70,00	11,0	2,0	1,3	17,7	762,2	500
95,00	12,6	2,0	1,3	19,4	968,9	500
120,00	14,2	2,0	1,4	21,3	1214,0	500
150,00	15,9	2,0	1,4	22,9	1472,2	500
185,00	17,5	2,0	1,5	24,8	1773,9	500
240,00	20,2	2,0	1,6	27,7	2304,2	500
300,00	22,5	2,0	1,6	30,1	2824,8	250
400,00	25,9	2,0	1,7	33,8	3687,5	250
500,00	29,1	2,2	1,8	37,7	4630,3	250

*Data subject to change without prior notice

Maxlink G-Flex Cable 0,6/1 kV - Multiple

NBR 7286

90 °C



Flexible Conductor

Made of electrolytic bare copper wires, soft temper, stranding class 4 (1.50 to 6.00 mm²) and class 5 (10.00 to 10.00 mm²). 120.00 mm²).

Insulation

HEPR 90 °C - Ethylene propylene based thermosetting compound (high modulus).

Identification

2 Conductors: Black, Light Blue.
3 Conductors: Black, Light Blue, White.
4 Conductors: Black, Light Blue, White, Red. Note: other colors, on request.

Coverage

PVC ST2 - Thermoplastic polyvinyl chloride compound, black in color, flame resistant.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

Used in fixed power and light installations in industrial, commercial and residential buildings, in distribution circuits and in terminal circuits, and for underground low-voltage power lines where greater cable flexibility is required coupled with higher current-carrying capacity and longer life. Its higher thermal class (90 °C) allows for higher current carrying capacity than its PVC equivalent (70 °C).

Applicable Standards

NBR 7286 - Power cables with extruded ethylene-propylene rubber (EPR) insulation for voltages from 1 kV to 35 kV.

NBR NM 280 - Insulated cable conductors.

NBR NM-IEC 60332-1 - Test methods for electric cables under fire conditions - Part 1: test on a single conductor or insulated cable in vertical position.

Construction Data*

Number of Conductors	Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
							Roll (m)	Coil (m)
2	1,50	1,5	0,7	1,0	7,7	80,6	100	1000
	2,50	1,9	0,7	1,0	8,5	108,1	100	1000
	4,00	2,4	0,7	1,1	9,8	151,0	100	1000
	6,00	3,0	0,7	1,1	10,9	201,7	100	1000
	10,00	4,1	0,7	1,2	13,8	328,7	100	500
	16,00	5,2	0,7	1,2	16,1	482,6	----	500
	25,00	6,5	0,9	1,3	19,3	709,6	----	500
	35,00	7,7	0,9	1,4	21,9	960,0	----	500
	50,00	9,2	1,0	1,5	26,6	1410,0	----	500
	70,00	11,0	1,1	1,6	30,9	1943,3	----	500
3	1,50	1,5	0,7	1,0	8,1	95,3	100	1000
	2,50	1,9	0,7	1,0	9,1	130,7	100	1000
	4,00	2,4	0,7	1,1	10,4	186,8	100	1000
	6,00	3,0	0,7	1,1	11,6	251,8	100	1000
	10,00	4,1	0,7	1,2	14,7	412,6	----	500
	16,00	5,2	0,7	1,3	17,4	623,2	----	500
	25,00	6,5	0,9	1,4	20,8	901,7	----	500
	35,00	7,7	0,9	1,4	23,5	1213,4	----	500
	50,00	9,2	1,0	1,6	28,6	1778,6	----	500
	70,00	11,0	1,1	1,7	33,2	2470,5	----	500
4	1,50	1,5	0,7	1,0	8,8	114,4	100	1000
	2,50	1,9	0,7	1,1	10,1	163,6	100	1000
	4,00	2,4	0,7	1,1	11,4	229,0	100	1000
	6,00	3,0	0,7	1,2	12,9	317,4	100	1000
	10,00	4,1	0,7	1,2	16,2	514,3	----	500
	16,00	5,2	0,7	1,3	19,1	779,3	----	500
	25,00	6,5	0,9	1,4	22,9	1125,7	----	500
	35,00	7,7	0,9	1,5	26,1	1537,8	----	500
	50,00	9,2	1,0	1,6	31,5	2228,8	----	500
	70,00	11,0	1,1	1,8	36,8	3121,9	----	500
4	95,00	12,6	1,1	1,9	40,9	4010,1	----	250
	120,00	14,2	1,2	2,0	45,6	5063,6	----	250

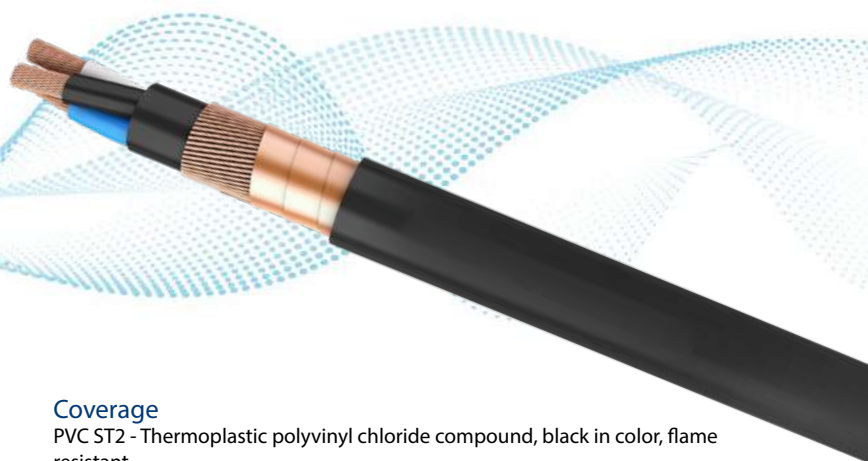
*Data subject to change without prior notice



Maxlink G-Flex NCI Cable 0,6/1 kV

NBR 7286

90 °C



Conductor

Made of electrolytic bare copper wires, soft temper, stranding class 4 (1.50 to 6.00 mm²) and class 5 (10.00 to 10.00 mm²). 185.00 mm².

Insulation

HEPR 90 °C - Ethylene propylene based thermosetting compound (self modulating).

Identification

Black, Light Blue, White.
Note: other colors, on request.

Filling

PVC - Thermoplastic polyvinyl chloride compound, black in color.

Neutral Conductor

Formed by electrolytic bare copper wires, soft temper, applied helically around the phase conductors, in a concentric way.

Shielding

BFC - Copper tape shielding, with minimum 15% remount.

Coverage

PVC ST2 - Thermoplastic polyvinyl chloride compound, black in color, flame resistant.

Maximum temperatures at the conductor

- 90 °C continuously.
- 130 °C under overload conditions.
- 250 °C under short-circuit conditions.

Implementation

Especially used in the connection of frequency inverters, as it has a copper tape shield applied over the neutral conductor that reduces electromagnetic interference, thus ensuring better performance of the electrical system.

Applicable Standards

- NBR 7286 - Power cables with extruded ethylene-propylene rubber (EPR) insulation for voltages from 1 kV to 35 kV.
- NBR NM 280 - Insulated cable conductors.
- NBR NM-IEC 60332-1 - Test methods for electric cables under fire conditions - Part 1: test on a single conductor or insulated cable in vertical position.

Construction Data*

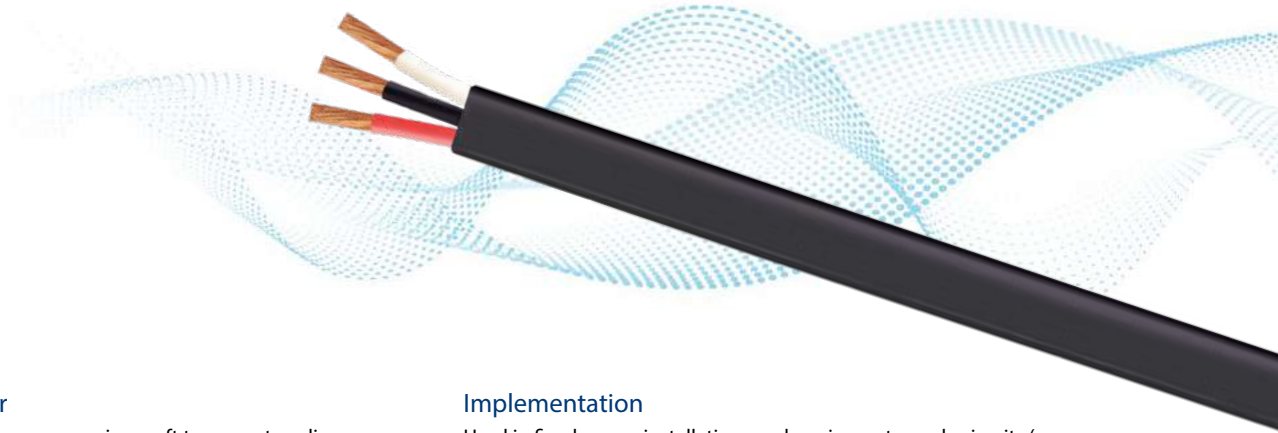
Number of conductors Phases	Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Diameter Isolated Veins (mm ²)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
								Roll (m)	Coil (m)
3	1,50	1,5	0,7	2,9	1,4	11,7	196,6	100	1000
	2,50	1,9	0,7	3,3	1,4	12,7	249,5	100	1000
	4,00	2,4	0,7	3,8	1,4	14,1	326,2	100	1000
	6,00	3,0	0,7	4,4	1,4	15,4	414,6	----	1000
	10,00	4,1	0,7	5,7	1,4	18,7	630,7	----	500
	16,00	5,2	0,7	6,8	1,4	21,5	900,2	----	500
	25,00	6,5	0,9	8,3	1,5	24,9	1237,0	----	500
	35,00	7,7	0,9	9,5	1,6	27,8	1604,7	----	500
	50,00	9,2	1,0	11,2	1,7	32,1	2178,0	----	250
	70,00	11,0	1,1	13,2	1,8	37,5	3026,7	----	250
	95,00	12,6	1,1	14,8	2,0	42,0	3906,0	----	250
	120,00	14,2	1,2	16,6	2,1	46,9	4944,6	----	250
	150,00	15,9	1,4	18,7	2,3	52,1	6123,5		
185,00	17,5	1,6	20,7	2,4	56,9	7243,3			

*Data subject to change without prior notice

Maxlink G-Flex Flat Cable 0,6/1 kV

NBR 7286

90 °C



Flexible Conductor

Made of electrolytic bare copper wires, soft temper, stranding class 4 (1.50 to 6.00 mm²) and class 5 (10.00 to 10.00 mm², 120.00 mm²).

Insulation

HEPR 90 °C - Ethylene propylene based thermosetting compound (high modulus).

Identification

Black, White, Red.

Note: other colors, on request.

Coverage

PVC ST2 - Thermoplastic polyvinyl chloride compound, black in color, flame resistant.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C at overload.
- 250 °C short-circuit.

Implementation

Used in fixed power installations and equipment supply circuits (e.g. submerged pumps). Their highest thermal class (90 °C) provides a higher current-carrying capacity than its PVC equivalent (70 °C).

Applicable Standards

NBR 7286 - Power cables with extruded ethylene-propylene rubber (EPR) insulation for voltages from 1 kV to 35 kV.

NBR NM 280 - Insulated cable conductors.

NBR NM-IEC 60332-1 - Test methods for electric cables under fire conditions - Part 1: test on a single conductor or insulated cable in vertical position.

Construction Data*

Number of Conductors	Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	External Dimensions (mm)	Approx mass (kg/km)	Standard Packaging
							Coil (m)
3	1,50	1,48	0,7	1,1	5,03 x 10,78	90,35	1000
	2,50	1,91	0,7	1,1	5,46 x 12,09	123,28	1000
	4,00	2,43	0,7	1,2	6,18 x 13,83	174,42	1000
	6,00	2,98	0,7	1,2	6,73 x 15,48	234,54	1000
	10,00	4,09	0,8	1,3	8,29 x 19,76	381,81	500
	16,00	5,22	0,8	1,4	9,62 x 23,15	572,75	500
	25,00	6,48	0,9	1,6	11,48 x 28,15	858,81	500
	35,00	7,70	0,9	1,7	13,10 x 32,39	1176,96	500
	50,00	9,17	0,0	1,9	15,22 x 37,96	1657,09	500
	70,00	10,97	1,1	2,0	17,42 x 44,16	2284,51	500
	95,00	12,59	1,1	2,2	19,44 x 49,43	2947,76	500
	120,00	14,23	1,2	2,4	21,73 x 55,49	3740,70	500

*Data subject to change without prior notice

Maxlink R Cable 0,6/1 kV

NBR 7285

90 °C



Conductor

Cable formed by electrolytic bare copper wires, soft temper, class 2 stranding.

Insulation

XLPE 90 °C - Thermosetting compound of cross-linked polyethylene with at least 2% carbon black.

Identification

Black, Light Blue and Green.

Note: other colors, on request.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

Used in fixed power and light installations in industrial, commercial and residential buildings, in distribution circuits and terminal circuits, and for underground low-voltage power lines.

Applicable Standards

NBR 7285 - Power cables with solid extruded cross-linked polyethylene (XLPE) insulation for 0.6/1 kV voltage - without cover.

NBR NM 280 - Insulated cable conductors.

Construction Data*

Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
					Roll (m)	Coil (m)
1,50	1,6 r n	1,2	3,9	22,9	100	2000
2,50	2,0 r n	1,2	4,3	32,8	100	2000
4,00	2,5 r n	1,2	4,9	48,1	100	2000
6,00	3,1 r n	1,2	5,5	68,5	100	1000
10,00	3,8 r c	1,6	7,0	109,3	100	1000
16,00	4,8 r c	1,6	8,0	163,0	100	1000
25,00	6,0 r c	1,6	9,2	247,2	100	1000
35,00	6,9 r c	1,6	10,1	333,7	100	1000
50,00	7,9 r c	2,0	12,0	457,2	----	500
70,00	9,5 r c	2,0	13,6	643,9	----	500
95,00	11,4 r c	2,0	15,5	880,4	----	500
120,00	13,0 r c	2,4	17,9	1116,6	----	500
150,00	14,5 r c	2,4	19,4	1364,8	----	500
185,00	16,0 r c	2,4	21,0	1688,5	----	500
240,00	18,0 r c	2,4	23,0	2193,4	----	500
300,00	20,2 r c	2,8	26,0	2761,8	----	250

r n- normal round r c- compact round

*Data subject to change without prior notice

Solarmax Flex SN Cable 0,6/1kVCA - 1,8kVCC

NBR 16612 / EN 50618

120 °C

Conductor

Formed of electrolytic copper wire, tinned, soft temper, class 5 stranding.

Insulation

LSHF - Thermosetting, non-halogenated polyolefinic compound, natural color, 120 °C, with special characteristics of nonpropagation, self-extinguishing fire and low smoke emission, free of heavy metals, complying with RoHS directives 2000/53 EC and 2002/95 EC, with UV protection, natural color.

Coverage

LSHF - Thermosetting, non-halogenated, polyolefin compound with special non-spreading, self-extinguishing characteristics. fire and low smoke emission, heavy metal free, meeting RoHS directives 2000/53 EC and 2002/95 EC, with UV protection for all cable colors.

Identification

Black, Red or Green/Yellow

Maximum temperatures at the conductor

- Ambient temperatures: -40 to 90 °C
- Maximum conductor temperature: 120 °C (maximum 20,000 hours)
- Short circuit temperature: 250 °C

Working voltage

AC: 0,6/1 kV
DC: 1,8 kV

Implementation

Used in photovoltaic generation systems, connected or not to the electrical grid, in the interconnection between modules, modules-charge controllers, modules-string box, modules-inverters, string box-inverter and interconnection with batteries.

Características Complementares

- Excellent weathering and UV resistance
- Excellent thermal properties (120 °C on the conductor for max. 20,000 hours)
- Resistance to acid and alkaline solutions
- Resistance to low temperatures (-40 °C)
- Halogen-free
- Low emission of smoke and toxic gases
- Heavy metal free (RoHS)
- Excellent flexibility
- Flame retardant

Applicable Standards

NBR 16612 - Power cables for photovoltaic systems, non-halogenated, insulated, with cover, for voltage up to 1.8 kv d.c. between conductors - performance requirements

EN 50.618 - Electric cables for photovoltaic systems

Construction Data* / Electrical Characteristics

Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Resistance Electrical (Rcc 20 °C) (Ω/km)	Resistance Electrical (Rca 90 °C) (Ω/km)	Voltage drop V/(A x km)**	Standard Packaging Coil (m)
2,50	1,9	0,7	0,8	4,8	37,5	8,21	10,47	19,99	2000
4,00	2,6	0,7	0,8	5,5	55,2	5,09	6,49	12,43	2000
6,00	3,1	0,7	0,8	6,1	75,0	3,39	4,32	8,30	2000
10,00	4,1	0,8	0,8	7,3	120,5	1,95	2,49	4,81	1000
16,00	5,2	0,8	0,9	8,6	172,2	1,24	1,58	3,08	1000
25,00	6,4	0,9	1,0	10,3	261,7	0,795	1,010	2,00	1000
35,00	7,7	0,9	1,1	11,7	357,9	0,565	0,720	1,44	1000
50,00	9,2	1,0	1,2	13,7	506,8	0,393	0,501	1,030	1000
70,00	10,9	1,1	1,2	15,6	691,3	0,277	0,353	0,743	500
95,00	12,4	1,1	1,3	17,4	887,4	0,210	0,268	0,580	500
120,00	14,1	1,2	1,3	19,3	1124,3	0,164	0,209	0,467	500
150,00	15,7	1,4	1,4	21,5	1393,0	0,132	0,168	0,390	500
185,00	17,4	1,6	1,6	24,1	1715,7	0,108	0,138	0,331	500
240,00	20,0	1,7	1,7	27,2	2250,3	0,0817	0,104	0,266	500



Current Conduction Capacity

Section (mm ²)	Outdoor Facility Protected from the Sun					Outdoor Installation Exposed to the Sun				
	Ambient Temperature / Operating Temperature at the Conductor									
	20 °C / 90 °C	30 °C / 90 °C	40 °C / 90 °C	50 °C / 90 °C	60 °C / 120 °C *	20 °C / 90 °C	30 °C / 90 °C	40 °C / 90 °C	50 °C / 90 °C	60 °C / 120 °C *
2,50	39	35	32	28	34	35	31	26	22	29
4,00	51	47	42	37	45	46	41	35	28	39
6,00	65	60	53	47	57	58	51	44	36	49
10,00	91	83	74	65	79	80	71	61	49	68
16,00	120	110	98	86	105	106	93	79	63	89
25,00	160	146	131	114	140	139	123	104	82	117
35,00	199	181	163	142	174	172	151	129	100	145
50,00	251	229	205	179	219	215	189	159	123	181
70,00	313	285	255	223	273	267	234	196	151	224
95,00	376	343	307	268	328	319	279	233	178	267
120,00	441	402	360	315	385	373	325	271	205	311
150,00	508	463	415	363	443	426	371	308	232	355
185,00	580	528	474	414	506	483	420	347	259	402
240,00	694	633	568	497	606	575	499	411	303	477

Installation method: two single-core cables laid horizontally against each other.

* Maximum temperature of 120 °C in the conductor for a maximum period of 20,000 h.

Maxlink Concentric Cable 0,6/1 kV

NBR 15716

90 °C

Conductor

- Phase: formed by electrolytic bare copper wires, soft temper, stranding class 2, normal round.
- Neutral: formed by electrolytic bare copper wires, soft temper, applied in helix with juxtaposed wires and concentric to the phase(s). Separator in polyester tape, applied on the neutral conductor.

Insulation

- Phase: XLPE 90 °C - Thermosetting compound of cross-linked polyethylene.
- Neutral: XLPE 90 °C - Thermosetting compound of cross-linked polyethylene, in black color.

Identification

- 1 Phase: Black.
- 2 Phases: Black, White.
- 3 Phases: Black, White, Red.

Other constructions and materials on request.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

Employed in the public low-voltage power distribution network and in the connection of the public network, in the entry standard to the consumer.

Applicable Standards

NBR 15716 - Concentric cables for consumer branches with internal insulation of XLPE and external insulation of PE or XLPE, for voltages up to 0,6/1 kV - Design requirements
NBR NM 280 - Insulated cable conductors.

Construction Data*

Nominal crosssection (mm ²)	Phase Conductor Diameter (mm)	Phase Conductor Diameter (mm)	Thickness Neutral Insulation (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Packaging		Capacity Current Conduction (A)*
						Roll (m)	Coil (m)	
1 x 4,00 + 4,00	2,5	1,0	1,2	4,3	374,7	200	2000	49
1 x 6,00 + 6,00	3,1	1,0	1,2	5,0	141,5	200	2000	63
1 x 10,00 + 10,00	3,9	1,0	1,2	5,9	214,2	100	1000	85
1 x 16,00 + 16,00	2,6	1,0	1,2	10,2	377,4		1000	107
2 x 4,00 + 4,00	2,5	1,0	1,2	13,7	301,1	100	500	
2 x 6,00 + 6,00	3,1	1,0	1,2	5,2	369,9	100	1000	53
2 x 10,00 + 10,00	3,9	1,0	1,2	5,9	462,0	----	1000	67
2 x 16,00 + 16,00	5,0	1,0	1,4	7,1	685		1000	89
2 x 25,00 + 25,00	6,3	1,2	1,4	8,7	1036,6		500	119
3 x 4,00 + 4,00	2,5	1,0	1,2	14,2	335,3	100	500	
3 x 6,00 + 6,00	3,1	1,0	1,2	5,1	452,0	----	1000	400
3 x 10,00 + 10,00	4,0	1,0	1,2	6,0	557,7	----	1000	550
3 x 16,00 + 16,00	5,1	1,0	1,4	7,2	814,0		1000	800
3 x 25,00 + 25,00	6,3	1,2	1,4	8,4	1237,0		500	1100
3 x 35,00 + 35,00	6,9	1,2	1,4	9,3	1628,0		500	1450

*Data subject to change without prior notice

Multiplexed Cable 0,6/1 kV

NBR 8182

90 °C



Conductor

Phase: formed by electrolytic bare copper wires, soft temper, class 2 stranding.

Neutral: formed by electrolytic bare copper wires, medium - hard or hard temper, class 2A stranding.

Insulation Fase / Neutro

XLPE 90 °C - Thermosetting compound of cross-linked polyethylene, black in color.

Identification

Black veins identified by printed numbers, friezes or colored veins (black, gray and red)

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Other constructions and materials on request.

Implementation

Used in the public secondary distribution network of energy at low voltage, urban or rural, aiming at greater safety, reliability and less aggressive visual effect. They are also suitable for use in wooded areas and in atmospheres with the presence of salinity or urban pollution.

Applicable Standards

NBR 8182 - Self-supporting multiplexed power cables with extruded PE or XLPE insulation, for voltages up to 0.6/1 kV.

Construction Data*

Nominal crosssection (mm ²)	Fase				Neutro				Approx mass (kg/km)	Standard Packaging Coil (m)
	Nº of wires	Conductor Diameter (mm)	Thickness Insulation (mm)	Outer Diameter (mm)	Nº of wires	Conductor Diameter (mm)	Thickness Insulation (mm)	Outer Diameter (mm)		
1 x 10,00 + 10,00	7	3,7 r c	1,2	6,1	7	4,1	1,2	6,5	217,6	1000
1 x 16,00 + 16,00	7	4,6 r c	1,2	7,0	7	5,1	1,2	7,5	328,4	1000
1 x 25,00 + 25,00	7	5,8 r c	1,4	8,6	7	6,2	1,4	9,0	495,3	1000
1 x 35,00 + 35,00	7	6,9 r c	1,6	10,1	7	7,5	1,6	10,7	703,6	1000
1 x 50,00 + 50,00	10	7,9 r c	1,6	11,1	7	9,0	1,6	12,2	967,4	500
1 x 70,00 + 70,00	14	9,5 r c	1,8	13,1	19	10,6	1,8	14,2	1331,7	500
1 x 95,00 + 95,00	19	11,4 r c	2,0	15,4	19	12,5	2,0	16,5	1840,9	250
2 x 10,00 + 10,00	7	3,7 r c	1,2	6,1	7	4,1	1,2	6,5	321,8	1000
2 x 16,00 + 16,00	7	4,6 r c	1,2	7,0	7	5,1	1,2	7,5	486,9	1000
2 x 25,00 + 25,00	7	5,8 r c	1,4	8,6	7	6,2	1,4	9,0	742,9	1000
2 x 35,00 + 35,00	7	6,9 r c	1,6	10,1	7	7,5	1,6	10,7	1045,8	1000
2 x 50,00 + 50,00	10	7,9 r c	1,6	11,1	7	9,0	1,6	12,2	1422,7	500
2 x 70,00 + 70,00	14	9,5 r c	1,8	13,1	19	10,6	1,8	14,2	1983,6	500
2 x 95,00 + 95,00	19	11,4 r c	2,0	15,4	19	12,5	2,0	16,5	2741,0	250
3 x 10,00 + 10,00	7	3,7 r c	1,2	6,1	7	4,1	1,2	6,5	426,1	1000
3 x 16,00 + 16,00	7	4,6 r c	1,2	7,0	7	5,1	1,2	7,5	645,5	1000
3 x 25,00 + 25,00	7	5,8 r c	1,4	8,6	7	6,2	1,4	9,0	990,6	1000
3 x 35,00 + 35,00	7	6,9 r c	1,6	10,1	7	7,5	1,6	10,7	1388,0	1000
3 x 50,00 + 50,00	10	7,9 r c	1,6	11,1	7	9,0	1,6	12,2	1877,9	500
3 x 70,00 + 70,00	14	9,5 r c	1,8	13,1	19	10,6	1,8	14,2	2635,5	250
3 x 95,00 + 95,00	19	11,4 r c	2,0	15,4	19	12,5	2,0	16,5	3641,1	250

r c - round compact *Data subject to change without prior notice

SafetyMax Flex Cable 750 V

NBR 13248

70 °C



Flexible Conductor

Made of electrolytic bare copper wires, soft temper, stranding class 4(1,50 a 6,00 mm²) eand class 5 (10,00 a 300,00 mm²).

Insulation

LSHF-A - Thermoplastic polyolefin compound 70 °C, nonhalogenated with low smoke emission, with special characteristics regarding the non-spread and selfextinguishing of fire.

Identification

Black, Light Blue, White, Red, Green, Yellow. Note: other colors, on request.

Maximum temperatures at the conductor

- 70 °C in continuous service.
- 100 °C at overload.
- 160 °C in short circuit.

Implementation

SafetyMax cables are non-halogenated and have low smoke and toxic gas emission and non-fire propagation characteristics. Used in installations in places with high density of occupation of people and difficult conditions of escape, such as: Cinemas, Shopping Centers, Restaurants, Supermarkets, Hospitals, Train / Subway, Educational / Sports / Fair Establishments, as well as in areas of electronics and computing, as recommended by NBR 5410.

Applicable Standards

NBR 13248 - Non-halogenated, low smoke, bare insulated conductors and power cables for voltages up to 1 kV - Performance requirements
NBR NM 280 - Insulated cable conductors.
NBR 6245 - Determination of the Oxygen Index - test method.
NBR NM-IEC 60332-3 - Test methods for electric cables under fire conditions - Part 3: Vertical flame spread test on vertically mounted conductors or cables in bundles.

Construction Data*

Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging			
					Box (m)	Roll (m)	Reel (m)	Coil (m)
1,50	1,5	0,7	2,8	18,9	100	----	1500	----
2,50	1,9	0,8	3,5	29,8	100	----	1000	----
4,00	2,4	0,8	4,0	43,5	100	----	700	----
6,00	3,0	0,8	4,5	61,3	100	----	600	----
10,00	4,1	1,0	6,1	105,5	----	100	----	1000
16,00	5,2	1,0	7,2	163,0	----	100	----	1000
25,00	6,5	1,2	8,9	247,1	----	100	----	1000
35,00	7,7	1,2	10,1	338,3	----	100	----	1000
50,00	9,2	1,4	12,0	484,0	----		----	1000
70,00	11,0	1,4	13,8	672,3	----		----	500
95,00	12,6	1,6	15,9	885,7	----		----	500
120,00	14,2	1,6	17,5	1112,4	----	----	----	500
150,00	15,9	1,8	19,6	1381,4	----	----	----	500
185,00	17,5	2,0	21,7	1686,6	----	----	----	500
240,00	20,2	2,2	24,7	2216,4	----	----	----	500
300,00	22,5	2,4	27,5	2755,8	----	----	----	500



r c- round compact *Data subject to change without prior notice

SafetyMax Flex Cable 0,6/1 kV

NBR 13248

90 °C

Flexible Conductor

Made of electrolytic bare copper wires, soft temper, stranding class 4 (1,50 a 6,00 mm²) and class 5 (10,00 a 400,00 mm²).

Insulation

Thermosetting polyolefin compound 90 °C, black color, nonhalogenated with low smoke emission.

Coverage

SHF1 - Non-halogenated thermoplastic polyolefin compound, with low smoke emission, with special characteristics regarding the non-spread and self-extinguishing of fire.

Identification

Black, Light Blue, Green.

Note: other colors, on request.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

SafetyMax cables are non-halogenated and have low smoke and toxic gas emission and non-fire propagation characteristics. Used in installations in places with high density of occupation of people and difficult escape conditions, such as: Cinemas, Shopping Centers, Restaurants, Supermarkets, Hospitals, Train / Subway, Educational / Sports / Fair Establishments, as well as in electronic and computer areas, as recommended by NBR 5410.

Applicable Standards

NBR 13248 - Non-halogenated, low smoke, bare insulated conductors and power cables for voltages up to 1 kV - Performance requirements

NBR NM 280 - Insulated cable conductors.

NBR 6245 - Determination of the Oxygen Index - test method.

NBR NM-IEC 60332-3 - Test methods for electric cables under fire conditions - Part 3: Vertical flame spread test on vertically mounted conductors or cables in bundles.

Construction Data*

Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
						Roll (m)	Coil (m)
1,50	1,5	0,7	0,9	4,6	30,8	100	2000
2,50	1,9	0,7	0,9	5,0	41,3	100	2000
4,00	2,4	0,7	0,9	5,6	56,8	100	2000
6,00	3,0	0,7	0,9	6,1	75,9	100	1000
10,00	4,1	0,7	0,9	7,5	119,1	100	1000
16,00	5,2	0,7	1,0	8,8	181,6	100	1000
25,00	6,5	0,9	1,1	10,5	269,8	100	1000
35,00	7,7	0,9	1,1	11,7	363,0	100	1000
50,00	9,2	1,0	1,2	13,7	509,2	----	500
70,00	11,0	1,1	1,2	15,7	707,1	----	500
95,00	12,6	1,1	1,3	17,5	915,2	----	500
120,00	14,2	1,2	1,3	19,4	1151,5	----	500
150,00	15,9	1,4	1,4	21,7	1430,4	----	500
185,00	17,5	1,6	1,4	23,8	1732,6	----	500
240,00	20,2	1,7	1,5	26,9	2266,4	----	500
300,00	22,5	1,8	1,6	29,7	2806,3	----	250
400,00	25,9	2,0	1,7	33,7	3687,5	----	250

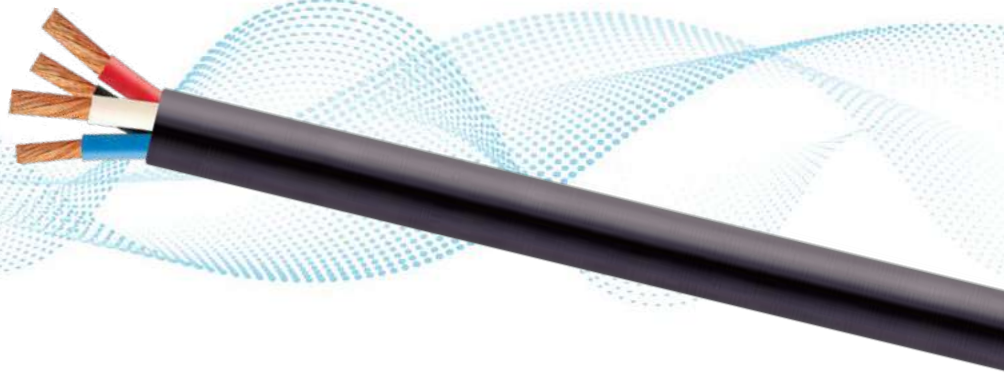


*Data subject to change without prior notice

SafetyMax Flex Cable 0,6/1 kV - Multiple

NBR 13248

90 °C



Flexible Conductor

Made of electrolytic bare copper wires, soft temper, stranding class 4 (1,50 a 6,00 mm²) and class 5 (10,00 a 120,00 mm²).

Insulation

HEPR 90 °C thermosetting polyolefin compound, nonhalogenated, with low smoke emission.

Identification

2 Conductors: Black, Light Blue.
3 Conductors: Black, Light Blue, White.
4 Conductors: Black, Light Blue, White, Red.
Note: other colors, on request.

Coverage

SHF1 - Non-halogenated thermoplastic polyolefin compound, with low smoke emission, with special characteristics regarding the non-spread and self-extinguishing of fire.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

SafetyMax cables are non-halogenated and have low smoke and toxic gas emission and non-fire propagation characteristics. Used in installations in places with high density of occupation of people and difficult conditions of escape, such as: Cinemas, Shopping Centers, Restaurants, Supermarkets, Hospitals, Train / Subway, Educational / Sports / Fair Establishments, as well as in areas of electronics and computing, as recommended by NBR 5410.

Applicable Standards

NBR 13248 - Non-halogenated, low smoke, bare insulated conductors and power cables for voltages up to 1 kV - Performance requirements
NBR NM 280 - Insulated cable conductors.
NBR 6245 - Determination of the Oxygen Index - test method.
NBR NM-IEC 60332-3 - Test methods for electric cables under fire conditions - Part 3: Vertical flame spread test on vertically mounted conductors or cables in bundles.

Construction Data*

Number of Conductors	Nominal crossection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
							Roll (m)	Coil (m)
2	1,50	1,5	0,7	1,0	7,7	80,6	100	1000
	2,50	1,9	0,7	1,0	8,5	108,1	100	1000
	4,00	2,4	0,7	1,1	9,8	151,0	100	1000
	6,00	3,0	0,7	1,1	10,9	201,7	100	1000
	10,00	4,1	0,7	1,2	13,8	328,7	100	500
	16,00	5,2	0,7	1,2	16,1	482,6	----	500
	25,00	6,5	0,9	1,3	19,3	709,6	----	500
	35,00	7,7	0,9	1,4	21,9	960,0	----	500
	50,00	9,2	1,0	1,5	26,6	1400,7	----	500
	70,00	11,0	1,1	1,6	30,9	1937,8	----	500
	95,00	12,6	1,1	1,7	34,3	2471,8	----	250
120,00	14,2	1,2	1,8	38,4	3118,6	----	250	
3	1,50	1,5	0,7	1,0	8,1	95,3	100	1000
	2,50	1,9	0,7	1,0	9,1	130,7	100	1000
	4,00	2,4	0,7	1,1	10,4	186,8	100	1000
	6,00	3,0	0,7	1,1	11,6	251,8	100	1000
	10,00	4,1	0,7	1,2	14,7	412,6	----	500
	16,00	5,2	0,7	1,3	17,4	623,2	----	500
	25,00	6,5	0,9	1,4	20,8	922,6	----	500
	35,00	7,7	0,9	1,4	23,5	1241,6	----	500
	50,00	9,2	1,0	1,6	28,6	1778,6	----	500
	70,00	11,0	1,1	1,7	33,2	2470,5	----	500
	95,00	12,6	1,1	1,8	37,0	3171,0	----	250
120,00	14,2	1,2	1,9	41,2	4000,2	----	250	
4	1,50	1,5	0,7	1,0	8,8	117,0	100	1000
	2,50	1,9	0,7	1,1	10,1	166,2	100	1000
	4,00	2,4	0,7	1,1	11,4	233,7	100	1000
	6,00	3,0	0,7	1,2	12,9	322,1	100	1000
	10,00	4,1	0,7	1,2	16,2	521,7	----	500
	16,00	5,2	0,7	1,3	19,1	789,9	----	500
	25,00	6,5	0,9	1,4	22,9	1172,1	----	500
	35,00	7,7	0,9	1,5	26,1	1599,3	----	500
	50,00	9,2	1,0	1,6	31,5	2228,8	----	500
	70,00	11,0	1,1	1,8	36,8	3121,9	----	500
	95,00	12,6	1,1	1,9	40,9	4010,1	----	250
120,00	14,2	1,2	2,0	45,6	5063,6	----	250	

*Data subject to change without prior notice



Flex Control Cable

NBR 7289

70 °C

Flexible Conductor

Formed by electrolytic bare copper wires, soft temper, stranding class 4 (1,00 a 6,00 mm²) and class 5 (10,00 mm²).

Tinned conductors on request.

Insulation

PVC-A 70 °C - Thermoplastic compound of polyvinyl chloride, with special characteristics as to the nonpropagation and selfextinguishing of fire.

Identification

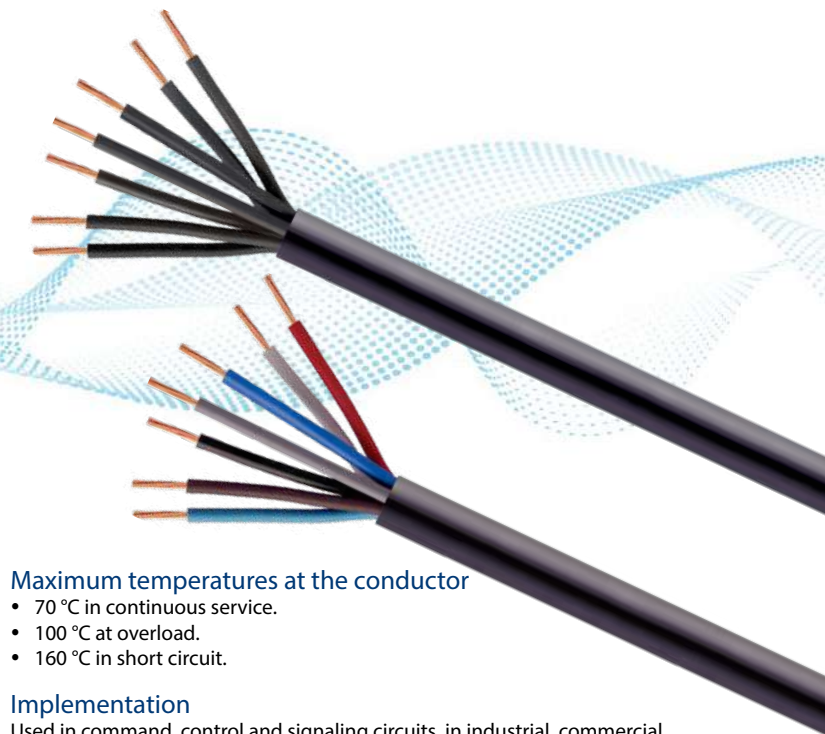
Numbered or colored black veins.

Coverage

PVC ST1 - Thermoplastic compound of polyvinyl chloride, in black color, with special characteristics regarding the nonpropagation and self-extinguishing of fire.

Tension

1,00 mm²: 500V
1,50 a 10,00 mm²: 1 kV



Maximum temperatures at the conductor

- 70 °C in continuous service.
- 100 °C at overload.
- 160 °C in short circuit.

Implementation

Used in command, control and signaling circuits, in industrial, commercial installations, power plants, substations, control of machinery and equipment in general.

Applicable Standards

NBR 7289 - Control cables with extruded PE or PVC insulation for voltages up to 1kV.
NBR NM 280 - Insulated cable conductors.
NBR 6245 - Determination of the Oxygen Index - test method.
NBR NM-IEC 60332-3 - Test methods for electric cables under fire conditions - Part 3: Vertical flame spread test on vertically mounted conductors or cables in bundles.

Armored

Implementation

When controlled circuits are sensitive to external interference, it is advisable to build a barrier under the core to ensure the quality of the conducted signals. CONDUMAX regularly produces the shielding models below.

Copper Wire Tape BFC



Copper Wire Mesh BMC



Polyester Tape Aluminized BFA



Flex Control Cable

NBR 7289

70 °C



Coil of: 500
and 1000 m
Other bids on
request

Construction Data*

Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Number of Conductors	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)
1,00	1,2	0,6	2	1,0	6,8	67,8
			3	1,0	7,2	80,3
			4	1,0	7,8	96,4
			5	1,0	8,5	117,1
			6	1,1	9,4	142,4
			7	1,1	9,4	149,1
			8	1,1	10,2	170,9
			9	1,1	10,9	195,4
			10	1,2	12,4	224,7
			11	1,2	12,3	231,3
			12	1,2	12,3	238,0
			13	1,2	12,9	262,7
			14	1,2	12,9	269,3
			15	1,2	13,6	298,3
			16	1,2	13,6	304,9
			17	1,2	14,3	335,0
			18	1,2	14,3	341,7
			19	1,2	14,3	348,4
			20	1,3	15,3	384,8
			21	1,3	15,3	391,4
			22	1,3	16,0	407,6
			23	1,3	16,0	430,6
			24	1,3	17,3	462,7
			25	1,3	17,3	469,4
			1,50	1,5	0,8	2
3	1,0	8,6				114,6
4	1,1	9,5				142,9
5	1,1	10,4				174,1
6	1,1	11,3				206,0
7	1,1	11,3				215,9
8	1,2	12,5				254,3
9	1,2	13,4				291,7
10	1,2	15,1				326,2
11	1,2	15,1				336,1
12	1,2	15,1				346,1
13	1,3	16,0				390,9
14	1,3	16,0				400,8
15	1,3	16,9				444,9
16	1,3	16,9				454,7
17	1,3	17,8				500,4
18	1,3	17,8				510,4
19	1,3	17,8				520,3
20	1,4	19,0				574,0
21	1,4	19,0				583,9
22	1,4	19,9				607,2
23	1,4	19,9				643,5
24	1,5	21,8				701,8
25	1,5	21,8				711,8
2,50	1,9	0,8				2
			3	1,1	9,7	157,7
			4	1,1	10,6	192,0
			5	1,1	11,6	235,3
			6	1,2	12,9	286,1
			7	1,2	12,9	301,7
			8	1,2	14,0	347,4
			9	1,2	15,0	398,8
			10	1,3	17,1	454,8
			11	1,3	17,1	470,6
			12	1,3	17,1	486,3
			13	1,3	18,0	538,7
			14	1,3	18,0	554,4
			15	1,4	19,2	624,4
			16	1,4	19,2	640,0
			17	1,4	20,2	704,3
			18	1,4	20,2	720,0
			19	1,4	20,2	735,8
			20	1,5	21,5	808,0
			21	1,5	21,5	823,8
			22	1,5	22,6	858,9
			23	1,5	22,6	908,3
			24	1,6	24,7	989,5
			25	1,6	24,7	1005,4
			4,00	2,4	1,0	2
3	1,1	11,7				234,7
4	1,2	13,0				293,8
5	1,2	14,3				362,1
6	1,3	15,8				438,9
7	1,3	15,8				464,0
8	1,3	17,2				535,2
9	1,4	18,7				624,6
10	1,4	21,1				699,6
11	1,4	21,1				724,8
12	1,4	21,1				749,9
13	1,5	22,4				843,3
14	1,5	22,4				868,5
15	1,5	23,7				966,1
16	1,5	23,7				991,0
17	1,6	25,2				1105,0
18	1,6	25,2				1130,3
19	1,6	25,2				1155,7
20	1,6	26,6				1256,9
21	1,6	26,6				1282,3
22	1,7	28,1				1351,5
23	1,7	28,1				1430,3
24	1,8	30,7				1557,2
25	1,8	30,7				1582,9

Flex Control Cable

NBR 7289

70 °C



Coil of: 500 and 1000 m
Other bids on request

Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Number of Conductors	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)
6,00	3,0	1,0	2	1,1	12,1	246,5
			3	1,2	13,1	311,8
			4	1,2	14,3	384,3
			5	1,3	16,0	483,2
			6	1,3	17,4	575,8
			7	1,3	17,4	613,9
			8	1,4	19,2	718,0
			9	1,4	20,7	824,4
			10	1,5	23,6	935,5
			11	1,5	23,6	973,8
			12	1,5	23,6	1012,1
			13	1,6	25,0	1134,4
			14	1,6	25,0	1172,8
			15	1,6	26,4	1302,4
			16	1,6	26,4	1340,3
			17	1,7	28,1	1488,4
			18	1,7	28,1	1527,1
			19	1,7	28,1	1565,7
			10,00	4,1	1,0	2
3	1,3	15,7				474,7
4	1,3	17,2				589,0
5	1,4	19,2				739,2
6	1,4	21,0				886,4
7	1,4	21,0				948,6
8	1,5	23,1				1107,2
9	1,6	25,1				1287,2
10	1,7	28,6				1462,8
11	1,7	28,6				1525,8
12	1,7	28,6				1588,9

*Data subject to change without prior notice

Chart 1 - Current-carrying capacity for outdoor cables (ambient temperature 30 °C).

Nominal crosssection (mm ²)	Current carrying capacity per conductor (A)		
	Number of Conductors		
	2	3	4
0,50	11	9	8
0,75	14	12	10,5
1,00	17	14	12
1,50	22	18,5	17
2,50	30	25	23
4,00	40	34	30
6,00	51	43	39
10,00	70	60	53

Sizing

Current Conduction Capacity

Chart 3 - Driving capacity correction factors current as a function of the number of loaded conductors.

Number of conductors loaded simultaneously	Correction Factor
5	0,70
6	0,66
7	0,62
8	0,60
9	0,57
10	0,55
11	0,53
12	0,52
13	0,50
14	0,49
15	0,48
16	0,47
17	0,46
18	0,45
19	0,44
20	0,43
21	0,43
22	0,41
23	0,41
24	0,41
25	0,40

Chart 2 - Correction factors of the current conduction capacity for ambient temperature other than 30 °C.

Ambient temperature considered (°C)	Correction Factor
20	1,12
25	1,06
30	1,00
35	0,94
40	0,87
45	0,79
50	0,71

AFM Control Cable 300 V

NTC 072

70 °C



Flexible Conductor

Made of tinned electrolytic copper wire, soft temper, class 4 stranding.

Insulation

PP 70 °C - Polypropylene thermoplastic compound

Coverage

PVC ST1 - Thermoplastic compound of polyvinyl chloride, in black color, flame resistant.

Identification

- 2 Conductors: White, Red
- 3 Conductors: White, Red, Black
- 4 Conductors: White, Red, Black, Blue

Shielding

In tinned copper wire mesh, with at least 85% coating.

Maximum temperatures at the conductor

- 70 °C in continuous service.
- 100 °C at overload.
- 160 °C in short circuit.

Implementation

Used in command, control and signaling circuits, in industrial and commercial installations, machine and equipment control in general.

When controlled circuits are sensitive to external interference, it is advisable to build a barrier under the core to ensure the quality of the conducted signals.

Construction Data*

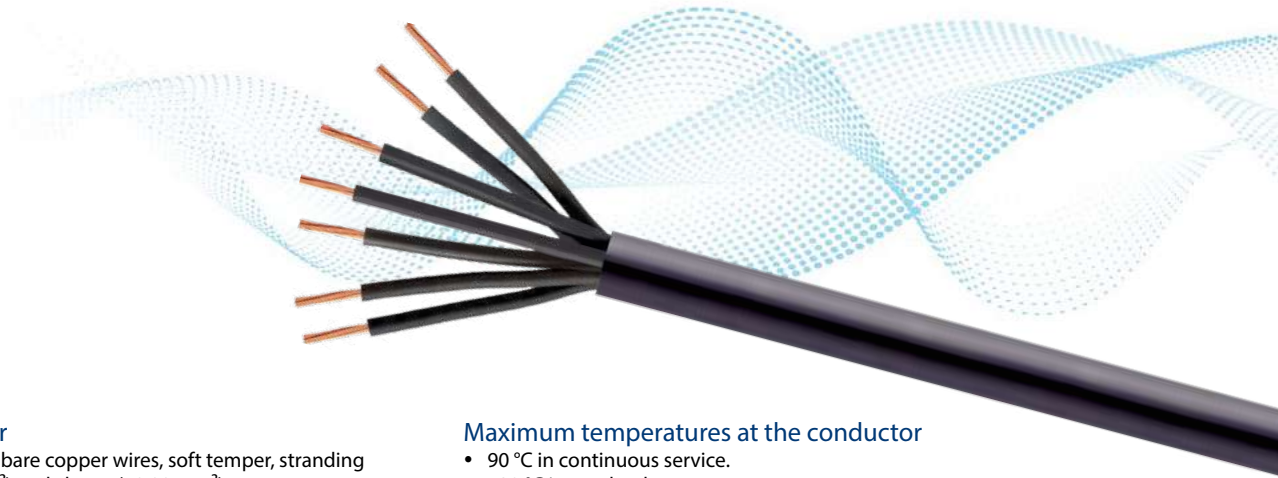
Number of Conductors	Nominal Section (AWG)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
							Roll (m)	Coil (m)
2	18	1,2	0,5	0,8	6,5	53,9	100	1000
3	18	1,2	0,5	0,8	6,9	66,3	100	1000
4	18	1,2	0,5	0,8	7,4	81,5	100	1000

*Data subject to change without prior notice

Maxlink G-Flex Control Cable

NBR 7290

90 °C



Flexible Conductor

Formed by electrolytic bare copper wires, soft temper, stranding class 4 (1,00 a 6,00 mm²) and class 5 (10,00 mm²).

Tinned conductors on request.

Insulation

HEPR 90 °C - Ethylene propylene based thermosetting compound (high modulus).

Identification

Numbered or colored black veins.

Coverage

PVC ST2 - Thermoplastic polyvinyl chloride compound, black in color, flame resistant.

Tension

- 1,00 mm²: 500V
- 1,50 a 10,00 mm²: 1 kV

Packaging

Coil of 500 and 1000 m.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

Used in command, control and signaling circuits, in industrial, commercial installations, power plants, substations, control of machinery and equipment in general..

Applicable Standards

NBR 7290 - Control cables with extruded XLPE or EPR insulation for voltages up to 1 kV.

NBR NM 280 - Insulated cable conductors.

NBR NM-IEC 60332-1 - Test methods for electric cables under fire conditions - Part 1: test on a single conductor or insulated cable in vertical position.

Armored

Implementation

When controlled circuits are sensitive to external interference, it is advisable to build a barrier under the core to ensure the quality of the conducted signals. Condumax regularly produces the shielding models below.

Copper Wire Tape BFC



Copper Wire Mesh BMC



Polyester Tape Aluminized BFA



Maxlink G-Flex Control Cable

NBR 7290

90 °C



Coil of: 500
and 1000 m
Other bids on
request

Construction Data*

Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Number of Conductors	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Number of Conductors	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)
1,00	1,2	0,7	2	1,0	7,2	65,6	2,50	1,9	0,7	2	1,0	8,6	107,0
			3	1,0	7,6	76,5				3	1,1	9,3	133,8
			4	1,0	8,2	91,0				4	1,1	10,1	162,5
			5	1,0	9,0	110,7				5	1,1	11,1	199,4
			6	1,1	10,0	135,3				6	1,1	12,1	237,1
			7	1,1	10,0	143,2				7	1,1	12,1	254,6
			8	1,1	10,8	158,1				8	1,2	13,3	290,1
			9	1,1	11,6	179,5				9	1,2	14,3	329,5
			10	1,2	13,2	212,8				10	1,3	16,3	385,3
			11	1,2	13,2	216,8				11	1,3	16,3	397,6
			12	1,2	13,2	220,7				12	1,3	16,3	409,9
			13	1,2	13,8	245,3				13	1,3	17,1	454,6
			14	1,2	13,8	249,2				14	1,3	17,1	466,9
			15	1,2	14,6	284,6				15	1,3	18,0	527,9
			16	1,2	14,6	282,3				16	1,3	18,0	531,4
			17	1,3	15,5	319,9				17	1,4	19,2	594,3
			18	1,3	15,5	323,8				18	1,4	19,2	606,6
			19	1,3	15,5	327,8				19	1,4	19,2	618,9
			20	1,3	16,4	355,6				20	1,4	20,3	668,8
			21	1,3	16,4	359,6				21	1,4	20,3	681,2
			22	1,3	17,1	378,4				22	1,5	21,5	726,6
			23	1,3	17,1	394,1				23	1,5	21,5	757,1
			24	1,4	18,7	439,9				24	1,5	23,2	824,4
			25	1,4	18,7	443,8				25	1,5	23,2	836,8
			1,50	1,5	0,7	2				1,0	7,7	79,7	4,00
3	1,0	8,1				94,4	3	1,1	10,4	184,0			
4	1,0	8,9				113,6	4	1,1	11,4	226,1			
5	1,1	9,9				143,3	5	1,2	12,7	284,7			
6	1,1	10,7				169,2	6	1,2	13,8	338,9			
7	1,1	10,7				180,7	7	1,2	13,8	366,5			
8	1,1	11,6				200,5	8	1,2	15,0	410,4			
9	1,2	12,7				233,2	9	1,3	16,3	473,8			
10	1,2	14,2				267,5	10	1,4	18,6	550,4			
11	1,2	14,2				274,6	11	1,4	18,6	571,4			
12	1,2	14,2				281,7	12	1,4	18,6	592,4			
13	1,2	15,0				312,4	13	1,4	19,5	656,4			
14	1,2	15,0				319,5	14	1,4	19,5	677,4			
15	1,3	16,0				370,2	15	1,4	20,6	762,8			
16	1,3	16,0				369,9	16	1,4	20,6	772,8			
17	1,3	16,8				407,7	17	1,5	22,0	859,9			
18	1,3	16,8				414,8	18	1,5	22,0	881,0			
19	1,3	16,8				421,9	19	1,5	22,0	902,1			
20	1,3	17,7				456,7	20	1,5	23,2	974,6			
21	1,3	17,7				463,7	21	1,5	23,2	995,8			
22	1,4	18,8				495,7	22	1,6	24,5	1060,2			
23	1,4	18,8				516,8	23	1,6	24,5	1104,8			
24	1,4	20,3				562,8	24	1,6	26,6	1199,7			
25	1,4	20,3				569,8	25	1,6	26,6	1221,1			

Maxlink G-Flex Control Cable

NBR 7290

90 °C



Coil of: 500 and 1000 m

Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Number of Conductors	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)
6,00	3,0	0,7	2	1,1	10,9	198,1
			3	1,1	11,6	248,2
			4	1,2	12,9	313,3
			5	1,2	14,1	387,2
			6	1,3	15,6	469,3
			7	1,3	15,6	510,8
			8	1,3	17,0	573,7
			9	1,4	18,5	659,7
			10	1,4	20,9	754,4
			11	1,4	20,9	787,7
			12	1,4	20,9	820,9
			13	1,5	22,2	918,9
			14	1,5	22,2	952,2
			15	1,5	23,4	1067,7
			16	1,5	23,4	1087,3
			17	1,6	24,9	1205,1
			18	1,6	24,9	1238,6
			19	1,6	24,9	1272,1
			10,00	4,1	0,7	2
3	1,2	14,2				395,5
4	1,3	15,8				500,5
5	1,3	17,3				620,9
6	1,4	19,2				753,4
7	1,4	19,2				821,3
8	1,4	20,9				925,6
9	1,5	22,8				1064,7
10	1,6	25,9				1233,0
11	1,6	25,9				1289,7
12	1,6	25,9				1346,4

*Data subject to change without prior notice

Chart 1 - Current-carrying capacity for outdoor cables (ambient temperature 30 °C).

Nominal crosssection (mm ²)	Current carrying capacity per conductor (A)		
	Number of Conductors		
	2	3	4
0,50	13	12	10,5
0,75	17	15	13
1,00	21	18	16
1,50	26	23	20
2,50	36	32	28
4,00	49	42	37
6,00	63	54	48
10,00	86	75	67

Sizing Current Conduction Capacity

Chart 3 - Driving capacity correction factors current as a function of the number of loaded conductors.

Number of conductors loaded simultaneously	Correction Factor
5	0,70
6	0,66
7	0,62
8	0,60
9	0,57
10	0,55
11	0,53
12	0,52
13	0,50
14	0,49
15	0,48
16	0,47
17	0,46
18	0,45
19	0,44
20	0,43
21	0,43
22	0,41
23	0,41
24	0,41
25	0,40

Chart 2 - Correction factors of the current conduction capacity for ambient temperature other than 30 °C.

Ambient temperature considered (°C)	Correction Factor
20	1,12
25	1,06
30	1,00
35	0,94
40	0,87
45	0,79
50	0,71

Parallel Flexible Cord 300 V

NBR NM 247-5

70 °C

Conductor

Made of electrolytic bare copper wire, soft temper, class 5 stranding.

Insulation

PVC-D 70 °C - Thermoplastic polyvinyl chloride compound, in colors for identification.

Identification

White or Brown

Maximum temperatures at the conductor

- 70 °C in continuous service.
- 100 °C at overload.
- 160 °C in short circuit.

Implementation

The parallel cord is used in lighting, household appliance connections, extension cords and portable electrical appliances in general.

Applicable Standards

NBR NM 247-5 - Polyvinyl chloride (PVC) insulated cables for rated voltages up to and including 450/750V - Part 5 - Flexible cables (cords) (IEC 60227-5, MOD).

NBR NM 280 - Insulated cable conductors.

NBR NM 247-1 - Polyvinyl chloride (PVC) insulated cables for rated voltages up to and including 450/750V - Part 1 - General requirements (IEC 60227-1, MOD).

Construction Data*

Number of Conductors	Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	External Dimensions (mm)	Approx mass (kg/km)	Standard Packaging	
						Roll (m)	Coil (m)
2	0,50	0,9	0,8	2,5 x 5,1	21,6	100	800
	0,75	1,1	0,8	2,7 x 5,4	27,4	100	800
	1,00	1,3	0,8	2,8 x 5,5	31,5	100	700
	1,50	1,5	0,8	3,0 x 6,0	41,2	100	600
	2,50	2,0	0,8	3,5 x 6,9	60,9	100	500
	4,00	2,5	0,8	4,1 x 8,1	90,8	100	300



*Data subject to change without prior notice

Flexible Twisted Cord 300 V

NBR 15717

70 °C



Conductor

Made of electrolytic bare copper wire, soft temper, class 4 stranding.

Insulation

PVC-D 70 °C - Thermoplastic polyvinyl chloride compound, in colors for identification.

Identification

White or Brown.

Maximum temperatures at the conductor

- 70 °C in continuous service.
- 100 °C at overload.
- 160 °C in short circuit.

Implementation

Twisted cord is used for lighting, household appliance connections, extension cords and portable electrical appliances in general.

Applicable Standards

NBR 15717 - Flexible twisted strands for voltages up to 300V - Specifications. NBR NM 280 - Insulated cable conductors.

NBR NM 247-1 - Polyvinyl chloride (PVC) insulated cables for rated voltages up to and including 450/750V - Part 1 - General requirements (IEC 60227-1, MOD).

Construction Data*

Number of Conductors	Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	External Dimensions (mm)	Approx mass (kg/km)	Standard Packaging	
						Roll (m)	Coil (m)
2	0,50	0,9	0,8	2,5 x 5,1	21,6	100	800
	0,75	1,1	0,8	2,7 x 5,4	27,4	100	800
	1,00	1,3	0,8	2,8 x 5,5	31,5	100	700
	1,50	1,5	0,8	3,0 x 6,0	41,2	100	600
	2,50	2,0	0,8	3,5 x 6,9	60,9	100	500
	4,00	2,5	0,8	4,1 x 8,1	90,8	100	300



*Data subject to change without prior notice

Bicolor Polarized Lanyard

NTC 018

70 °C

Flexible Conductor

Made of electrolytic bare copper wire, soft temper, class 4 stranding.

Insulation

PVC-A 70 °C - Thermoplastic polyvinyl chloride compound.

Coverage

Crystal PVC - Thermoplastic compound of polyvinyl chloride.

Identification

Black, Red.

Maximum temperatures at the conductor

- 70 °C in continuous service.
- 100 °C at overload.
- 160 °C in short circuit.

Implementation

Used in sound systems for interconnecting speakers.

Construction Data*

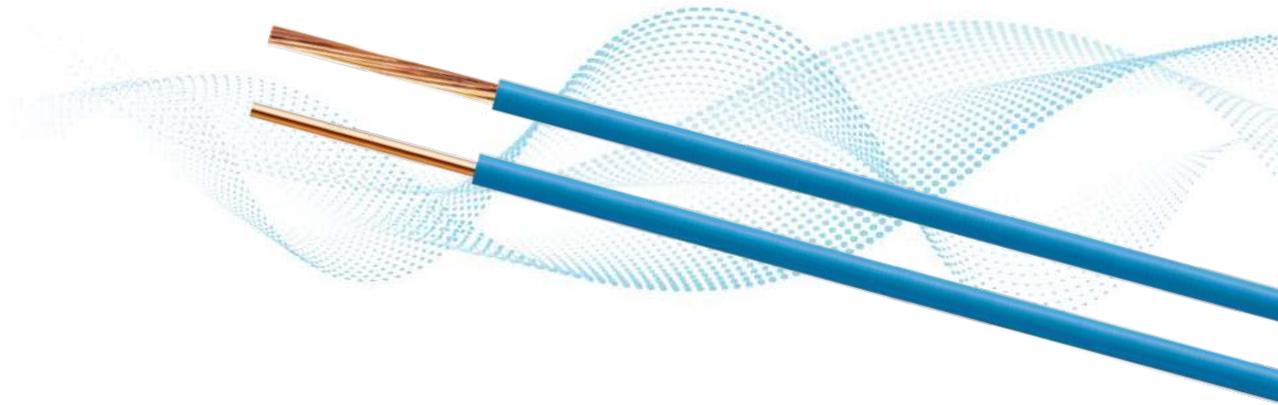
Number of Conductors	Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	External Dimensions (mm)	Approx mass (kg/km)	Standard Packaging	
						Roll (m)	Reel (m)
2	0,30	0,7	0,6	2,0 x 3,9	12,5	100	1000
	0,50	0,9	0,7	2,3 x 4,6	18,3	100	800
	0,75	1,1	0,7	2,5 x 5,0	23,7	100	800
	1,00	1,2	0,7	2,7 x 5,3	28,9	100	700
	1,50	1,5	0,8	3,3 x 6,6	43,3	100	500
	2,50	1,9	0,8	3,7 x 7,4	62,6	100	400
	4,00**	2,4	0,8	4,3 x 8,5	90,4	100	300

**On request *Data subject to change without prior notice

Lide Wire and Cable 450 / 750 V

NBR 9117

105 °C



Conductor

Wire: electrolytic bare copper wire, soft temper, class 1 stranding.
Cable: formed by electrolytic bare copper wires, soft temper, stranding class 4 (0,50 a 6,00 mm²) and class 5 (10,00 a 150,00 mm²)

Insulation

PVC-EB 105 °C - Polyvinyl chloride thermoplastic compound.

Identification

Black, White, Light Blue, Red, Green, Yellow, Gray, Brown, Green/Yellow. Note: other colors, on request.

Maximum temperatures at the conductor

- 105 °C in continuous service.
- 130 °C in overload.
- 160 °C in short circuit.

Implementation

Used for internal wiring of motors, reactors, transformers and other types of equipment and also for internal wiring of panels.

Applicable Standards

NBR 9117 - Flexible or non-flexible conductors, insulated with polyvinyl chloride (PVC/ EB), for 105 °C and voltages up to 750 V, used in internal connections of electrical appliances.

NBR NM 280 - Insulated cable conductors.

Lide wire

Construction Data*

Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
					Roll (m)	Coil (m)
0,50	0,79	0,8	2,3	9,6	100	----
0,75	0,95	0,8	2,5	12,2	100	----
1,00	1,10	0,8	2,6	14,8	100	----
1,50	1,34	0,8	2,9	19,8	100	----
2,50	1,72	0,8	3,3	29,0	100	----
4,00	2,19	0,8	3,7	43,6	100	----
6,00	2,66	0,8	4,2	61,1	100	----
10,00	3,46	1,6	6,6	118,1	100	----

*Data subject to change without prior notice

Cape Lide

Construction Data*

Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
					Roll (m)	Coil (m)
0,50	0,9	0,8	2,4	9,7	100	----
0,75	1,1	0,8	2,6	12,4	100	----
1,00	1,2	0,8	2,8	15,0	100	----
1,50	1,5	0,8	3,0	19,8	100	----
2,50	1,9	0,8	3,5	29,2	100	----
4,00	2,4	0,8	4,0	42,8	100	----
6,00	3,0	0,8	4,5	60,4	100	----
10,00	4,1	1,6	7,3	120,9	100	1000
16,00	5,1	1,6	8,3	182,1	100	1000
25,00	6,5	1,6	9,6	268,1	100	1000
35,00	7,7	1,6	10,9	359,6	100	500
50,00	9,2	2,0	13,2	521,7	----	500
70,00	11,0	2,0	15,0	706,7	----	500
95,00	12,6	2,0	16,6	906,1	----	500
120,00	14,4	2,4	19,2	1191,0	----	250
150,00	16,0	2,4	20,8	1440,3	----	250

*Data subject to change without prior notice

Battery Cable

NTC 028

70 °C

Flexible Conductor

Made of electrolytic bare copper wire, soft temper, class 5 stranding.

Coverage

PVC ST1 - Flexible polyvinyl chloride thermoplastic compound, in black color.

Maximum temperatures at the conductor

- 70 °C in continuous service.
- 100 °C at overload.
- 160 °C in short circuit.

Implementation

Used in connections from the battery to the starter motor of motor vehicles.

Construction Data*

Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
					Roll (m)	Coil (m)
16,00	5,1	1,2	7,5	168,2	25	500
25,00	6,5	1,2	8,8	251,9	25	500
35,00	7,7	1,2	10,1	341,2	25	500
50,00	9,2	1,2	11,6	478,9	25	500
70,00	11,0	1,2	13,4	657,8	25	500

*Data subject to change without prior notice

Ignition Cable 7.000 VCC

NTC 022

70 °C

Flexible Conductor

Made of electrolytic bare copper wire, soft temper, class 4 stranding.

Insulation

PVC-A 70 °C - Thermoplastic polyvinyl chloride compound, black in color.

Coverage

PVC ST1 - Thermoplastic polyvinyl chloride compound, in black color.

Maximum temperatures at the conductor

- 70 °C in continuous service.
- 100 °C at overload.
- 160 °C in short circuit.

Implementation

Used in connections from the coil to the spark plugs of motor vehicles.

Construction Data*

Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging
						Roll (m)
1,00	1,2	1,8	1,0	6,9	60,4	50

*Data subject to change without prior notice

Hydromax Magnetic Wire

NTC 061

70 °C



Conductor

Electrolytic bare copper wire, soft temper, class 1 stranding.

Insulation

PP - Polypropylene, in blue color.

Maximum temperatures at the conductor

- 70 °C in continuous service.
- 100 °C at overload.
- 160 °C in short circuit.

Implementation

Used in submerged pump windings.

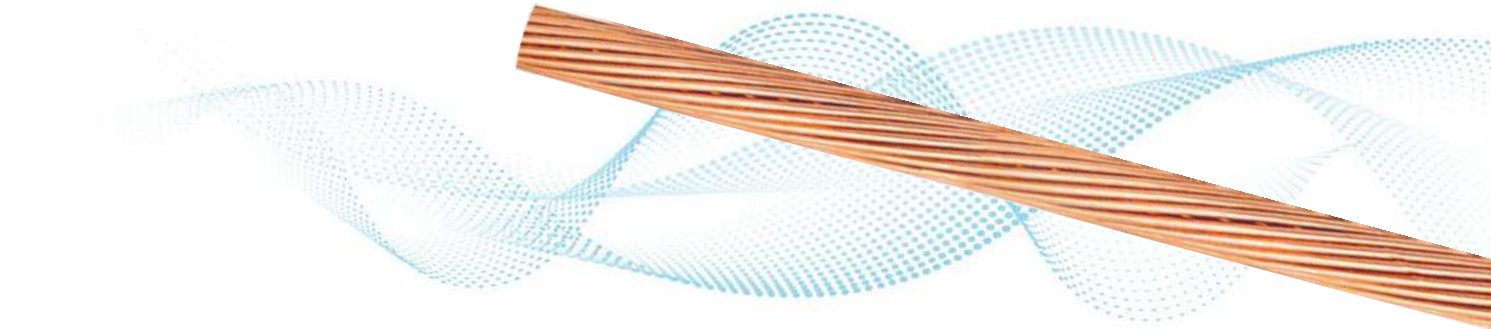
Construction Data*

Conductor Diameter (mm)	Thickness Insulation (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging
				Reel (m)
0,40	0,2	0,9	1,6	5000
0,45	0,2	1,0	1,9	5000
0,50	0,3	1,1	2,4	5000
0,55	0,3	1,1	2,8	4500
0,60	0,3	1,2	3,3	4500
0,65	0,3	1,3	3,8	4000
0,70	0,3	1,3	4,3	4000
0,80	0,3	1,4	5,4	3000
0,90	0,3	1,5	6,7	3000
1,00	0,3	1,7	8,3	2500
1,10	0,3	1,8	9,8	2000
1,20	0,3	1,9	11,5	2000
1,30	0,3	2,0	13,4	1500
1,40	0,3	2,1	15,4	1300
1,50	0,3	2,2	17,6	1200
1,60	0,4	2,4	20,1	1000
1,70	0,4	2,5	22,6	1000
1,80	0,4	2,6	25,0	1000
1,90	0,4	2,7	27,8	900
2,00	0,4	2,8	30,7	800
2,10	0,4	2,9	33,6	700
2,20	0,4	3,0	36,6	700
2,30	0,4	3,1	40,0	600
2,40	0,4	3,2	43,4	600
2,50	0,4	3,3	46,9	600
2,60	0,4	3,4	50,6	500
2,80	0,4	3,6	58,4	500
2,90	0,4	3,7	62,5	400
3,00	0,5	4,0	67,8	400
3,20	0,5	4,2	76,8	300
3,30	0,5	4,3	81,4	300
3,40	0,5	4,4	86,3	300
3,60	0,5	4,6	96,3	200

*Data subject to change without prior notice

Soft Bare Copper Cable

NBR 5349



Conductor

Made of electrolytic Bare Copper Wire, soft temper, class 2 stranding

Implementation

Used in grounding systems.

Applicable Standards

NBR 5349 - Bare Soft Copper Cables for industrial purposes electrical.

Construction Data*

Nominal crosssection (mm ²)	Number of Wires	Conductor Diameter (mm)	Approx mass (kg/km)	Standard Packaging	
				Roll (m)	Coil (m)
10,00	7	3,9	84,5	100	1000
16,00	7	5,0	134,1	100	1000
25,00	7	6,2	213,2	100	500
35,00	7	7,4	295,8	100	500
50,00	19	8,7	401,7	----	500
70,00	19	10,4	580,4	----	250
95,00	19	12,3	805,6	----	250
120,00	37	13,8	1016,1	----	250
150,00	37	15,4	1264,4	----	250

*Data subject to change without prior notice

Half Hard or Hard Bare Copper Cable

NBR 6524



Conductor

Formed by electrolytic Bare Copper Wires, tempered medium hard or hard, stranding 2A or 3A.

Implementation

Employed in overhead lines for power transmission and distribution and in earthing systems.

Applicable Standards

NBR 6524 - Hard and medium-hard copper wires and cables with or without protective covering for aerial installations.

Construction Data*

Section (mm ²)	Training	Stringing Class	Conductor Diameter (mm)	Approx mass (kg/km)	Standard Packaging
					Coil (m)
10	7 x 1,36	2A	4,10	91,2	1000
16	7 x 1,70	2A	5,10	142,5	1000
25	7 x 2,06	2A	6,20	209,1	500
35	7 x 2,50	2A	7,50	308,1	500
50	7 x 3,00	2A	9,00	443,8	500
70	19 x 2,12	3A	10,60	603,2	250
95	19 x 2,50	3A	12,50	839,2	250
120	37 x 2,06	3A	14,40	1112,4	250
150	37 x 2,24	3A	15,70	1315,0	250
185	37 x 2,50	3A	17,50	1637,0	250
240	37 x 2,90	3A	20,30	2213,1	250

*Data subject to change without prior notice

Solarmax Flex AL Cable 0,6/1kVCA - 1,8kVCC

UL 4703

120 °C



Conductor

Made of aluminum wire, soft temper, flexible stranding

Insulation

LSHF - Thermosetting, non-halogenated polyolefin compound, natural color, 120 °C, with special characteristics of nonspreading, self-extinguishing fire and low smoke emission, free of heavy metals, complying with RoHS directives 2000/53 EC and 2002/95 EC, with UV protection, natural color.

Coverage

LSHF - Thermosetting, non-halogenated, polyolefin compound with special non-spreading, self-extinguishing characteristics. fire and low smoke emission, heavy metal free, meeting RoHS directives 2000/53 EC and 2002/95 EC, with UV protection for all cable colors.

Identification

Black, red and green / yellow

Maximum temperatures at the conductor

- Ambient temperatures: -40 to 90 °C
- Maximum conductor temperature: 120 °C (20,000 hours)
- Short circuit temperature: 250 °C (5 sec.)

Working voltage

AC (Uo/U) – 600/1.000 V

DC (U) – 1.800 V

Complementary Features

- Cost reduction compared to tinned copper conductor
- Excellent thermal properties (120 °C on conductor - 20,000 hours)
- Excellent weathering and UV resistance
- Excellent flexibility
- Flame retardant
- Low smoke emission
- Halogen-free
- Resistance to acid and alkaline solutions
- Resistance to low temperatures (-40 °C)
- Heavy metal free (RoHS)

Standards

- UI 4703 - ul standard for safety photovoltaic wire
- Astm b800 - standard specification for 8000 series aluminum alloy wire for electrical purposes - annealed and intermediate tempers

Dimensional Data

Section (mm ²)	Conductor Diameter (mm)	Insulation Thickness (mm)	Cover Thickness (mm)	Outer Diameter (mm)	Approx mass (kg/km)
6,00	3,4	0,7	0,8	6,4	44
10,00	4,2	0,7	0,8	7,3	59
16,00	5,3	0,8	0,8	8,5	81

Current Conduction Capacity

Section in Al (mm ²)	Outdoor Facility Protected from the Sun (A) *	Outdoor Facility Exposed to the Sun (A) *	Directly Buried Installation (A) **
6,00	48	42	42
10,00	61	53	53
16,00	85	74	71

* Considerations:

Ambient temperature: 40 °C;

Conductor temperature: 90 °C;

Two single-core cables, spaced $\geq 0,75 \times$ the outer diameter, horizontally.

** Considerations:

Ambient temperature: 30 °C;

Conductor temperature: 90 °C;

Depth: 0,5 m;

Two unipolar cables, laid horizontally against each other; Thermal resistivity of the soil: 2,5 K.m/W.

Maxlink AL Cable 0,6/1 kV

NBR 7287

90 °C



Conductor

Formed by bare aluminum wires alloy 1350, temper H19, stranding class 2, round compact, meeting the requirements of the standard NBR NM 280.

Insulation

XLPE 90 °C - Thermosetting compound of cross-linked polyethylene, black in color.

Identification

Black, Light Blue, Green
Note: other colors, on request.

Coverage

PVC ST2 - Thermoplastic polyvinyl chloride compound, flame resistant.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

Used in fixed power and lighting installations in industrial, commercial and residential buildings, in distribution circuits and terminal circuits, and for underground low-voltage power lines. Their higher thermal class allows greater current-carrying capacity.

Applicable Standards

NBR 7287 - Power cables with solid extruded cross-linked polyethylene (XLPE) insulation for insulation voltages from 1 kV to 35 kV.
NBR NM 280 - Insulated cable conductors.
NBR NM-IEC 60332-1 - Test methods for electric cables under fire conditions - Part 1: test on a single conductor or insulated cable in vertical position.

Construction Data*

Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging
						Coil (m)
10,00	3,7 r c	0,7	1,0	7,0	61,9	1000
16,00	4,7 r c	0,7	1,0	8,1	84,7	1000
25,00	5,9 r c	0,9	1,1	9,9	127,5	1000
35,00	7,0 r c	0,9	1,1	11,0	161,4	1000
50,00	8,1 r c	1,0	1,2	12,6	211,8	500
70,00	9,7 r c	1,1	1,2	14,4	285,0	500
95,00	11,4 r c	1,1	1,3	16,4	376,7	500
120,00	12,8 r c	1,2	1,3	18,0	460,9	500
150,00	14,2 r c	1,4	1,4	20,0	566,0	500
185,00	15,9 r c	1,6	1,4	22,2	696,7	500
240,00	18,3 r c	1,7	1,5	25,0	892,6	500
300,00	20,4 r c	1,8	1,6	27,6	1097,4	500
400,00	22,9 r c	2,0	1,7	30,5	1382,8	250

r c - round compact *Data subject to change without prior notice

Maxlink AL Cable 0,6/1 kV - Multiple

NBR 7287

90 °C



Conductor

Formed by bare aluminum wires alloy 1350, temper H19, stranding class 2, round compact, meeting the requirements of the standard NBR NM 280.

Insulation

XLPE 90 °C - Thermosetting compound of cross-linked polyethylene, black in color.

Coverage

PVC ST2 - Thermoplastic polyvinyl chloride compound, flame resistant.

Identification

Numbered or colored black veins.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

Used in fixed power and lighting installations in industrial, commercial and residential buildings, in distribution and terminal circuits, and for underground low-voltage power lines. Their higher thermal class allows greater current-carrying capacity.

Applicable Standards

NBR 7287 - Power cables with solid extruded cross-linked polyethylene (XLPE) insulation for insulation voltages from 1 kV to 35 kV.

NBR NM 280 - Insulated cable conductors.

NBR NM-IEC 60332-1 - Test methods for electric cables under fire conditions - Part 1: test on a single conductor or insulated cable in vertical position.

Construction Data*

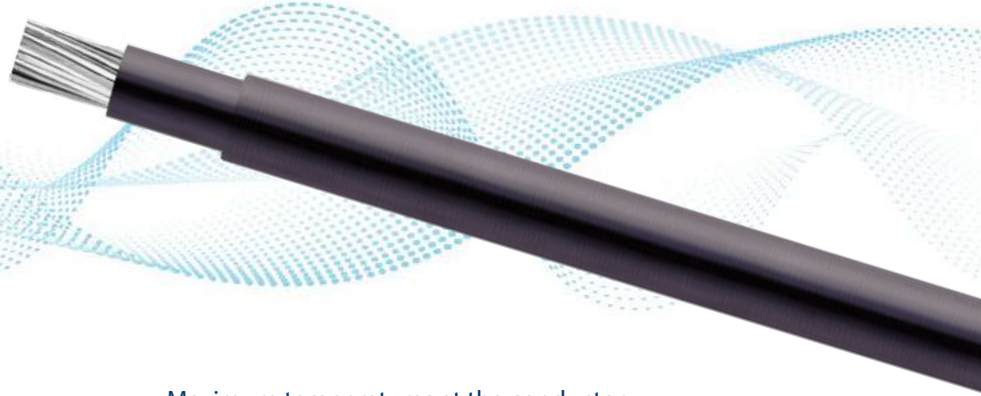
Number of Conductors	Nominal Section (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging
							Coil (m)
2	10,00	3,7 rc	0,7	1,2	12,6	192,5	1000
	16,00	4,7 rc	0,7	1,2	14,7	267,6	1000
	25,00	5,9 rc	0,9	1,3	18,1	394,5	1000
	35,00	7,0 rc	0,9	1,4	20,4	509,5	1000
	50,00	8,1 rc	1,0	1,5	23,4	665,9	500
	70,00	9,7 rc	1,1	1,6	27,3	917,5	500
	95,00	11,4 rc	1,1	1,7	31,0	1195,8	500
	120,00	12,8 rc	1,2	1,8	34,5	1484,7	250
3	10,00	3,7 rc	0,7	1,2	13,4	224,0	1000
	16,00	4,7 rc	0,7	1,2	15,7	313,9	1000
	25,00	5,9 rc	0,9	1,4	19,5	452,4	1000
	35,00	7,0 rc	0,9	1,4	21,8	575,4	1000
	50,00	8,1 rc	1,0	1,6	25,2	765,5	500
	70,00	9,7 rc	1,1	1,7	29,4	1056,6	500
	95,00	11,4 rc	1,1	1,8	33,3	1382,2	500
	120,00	12,8 rc	1,2	1,9	37,2	1721,1	250
4	10,00	3,7 rc	0,7	1,2	14,6	264,5	1000
	16,00	4,7 rc	0,7	1,3	17,4	381,3	1000
	25,00	5,9 rc	0,9	1,4	21,5	548,9	1000
	35,00	7,0 rc	0,9	1,5	24,2	709,6	1000
	50,00	8,1 rc	1,0	1,6	27,7	933,0	500
	70,00	9,7 rc	1,1	1,8	32,7	1307,0	500
	95,00	11,4 rc	1,1	1,9	37,0	1711,9	500
	120,00	12,8 rc	1,2	2,0	41,2	2126,9	250

*r c - round compact *Data subject to change without prior notice*

Maxlink AL Cable 1,8/3 kV

NBR 7287

90 °C



Conductor

Formed by bare aluminum wires alloy 1350, temper H19, stranding class 2, round compact, meeting the requirements of the standard NBR NM 280.

Insulation

XLPE 90 °C - Thermosetting compound of cross-linked polyethylene, black in color.

Identification

Black, Light Blue, Green
Note: other colors, on request.

Coverage

PVC ST2 - Thermoplastic polyvinyl chloride compound, flame resistant.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

Used in fixed power and lighting installations in industrial, commercial and residential buildings, in distribution circuits and terminal circuits, and for underground low-voltage power lines. Their higher thermal class allows greater current-carrying capacity.

Applicable Standards

NBR 7287 - Power cables with solid extruded cross-linked polyethylene (XLPE) insulation for insulation voltages from 1 kV to 35 kV.
NBR NM 280 - Insulated cable conductors.
NBR NM-IEC 60332-1 - Test methods for electric cables under fire conditions - Part 1: test on a single conductor or insulated cable in vertical position.

Construction Data*

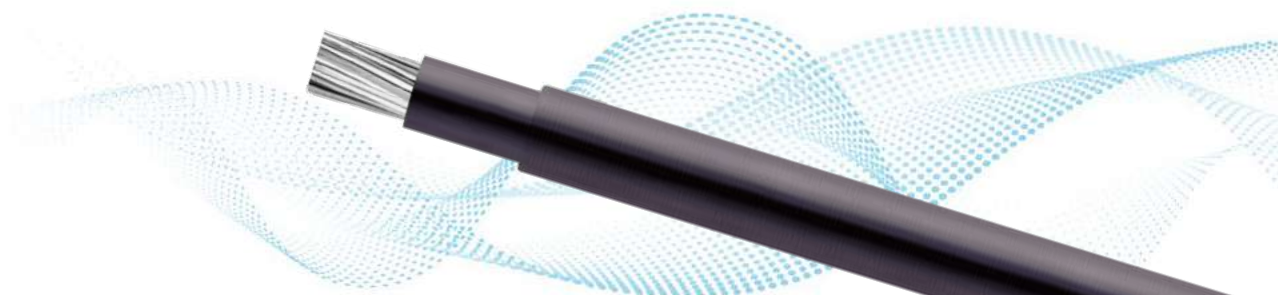
Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)
10,00	4,1	2,0	1,1	10,3	111,8
16,00	4,7	2,0	1,1	11,0	131,2
25,00	5,9	2,0	1,1	12,2	168,4
35,00	6,9	2,0	1,2	13,4	211,9
50,00	8,1	2,0	1,2	14,6	256,7
70,00	9,7	2,0	1,3	16,5	338,5
95,00	11,4	2,0	1,3	18,2	427,5
120,00	12,8	2,0	1,4	19,8	517,7
150,00	14,2	2,0	1,4	21,3	607,5
185,00	15,9	2,0	1,5	23,2	735,9
240,00	18,3	2,0	1,6	25,9	931,4
300,00	20,4	2,0	1,6	28,0	1114,7
400,00	23,1	2,0	1,7	30,7	1372,8

r c - round compact *Data subject to change without prior notice

SafetyMax AL Cable 0,6/1 kV

NBR 13248

90 °C



Conductor

Formed by bare aluminum wires, alloy 1350, temper H19, stranding class 2, round compact, meeting the requirements of the standard NBR NM 280.

Insulation

XLPE 90 °C - Thermosetting compound of cross-linked polyethylene, black in color.

Coverage

SHF1 - Non-halogenated thermoplastic polyolefin compound, with low smoke emission, with special characteristics regarding the non-spread and self-extinguishing of fire.

Identification

Black, Light Blue, Green

Note: other colors on request

Multiple cables on request.

Maximum temperatures at the conductor

- 90 °C in continuous service
- 130 °C at overload
- 250 °C short-circuit

Implementation

SafetyMax AL cables are non-halogenated and have low smoke and toxic gas emission characteristics, in addition to not spreading to fire. Used in installations in places with high density of occupation of people and difficult escape conditions, such as: Cinemas, Shopping Centers, Restaurants, Supermarkets, Hospitals, Train / Subway, Educational / Sports / Fairs, as well as in areas of electronics and computing, Photovoltaic Plants, as recommended by NBR 5410.

Applicable Standards

NBR 13248 - Power cables with extruded insulation for voltages from 1 kV to 35 kV - Constructive requirements

NBR NM 280 - Insulated cable conductors

NBR 6245 - Electric wires and cables - Determination of the oxygen index

NBR NM-IEC 60332-3 - Test methods for electric cables under fire conditions - Part 3: Vertical flame spread test on vertically mounted conductors or cables in bundles.

Construction Data*

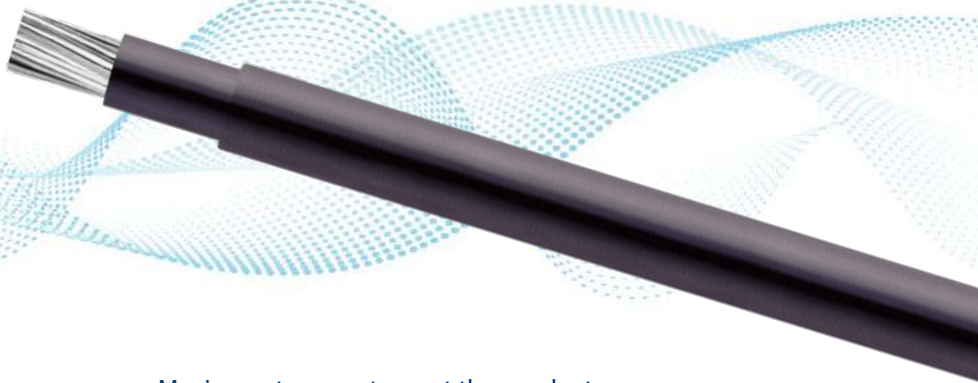
Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging
						Coil (m)
10	3,7 r c	0,7	1,0	7,1	61,1	1000
16	4,7 r c	0,7	1,0	8,1	83,6	1000
25	5,9 r c	0,9	1,1	9,9	125,9	1000
35	6,9 r c	0,9	1,1	11,0	159,7	1000
50	8,1 r c	1,0	1,2	12,6	209,6	500
70	9,7 r c	1,1	1,2	14,4	282,5	500
95	11,4 r c	1,1	1,3	16,4	373,5	500
120	12,8 r c	1,2	1,3	18,0	457,4	500
150	14,2 r c	1,4	1,4	20,0	561,7	500
185	15,9 r c	1,6	1,4	22,2	691,9	500
240	18,3 r c	1,7	1,5	25,0	886,8	500
300	20,4 r c	1,8	1,6	27,6	1087,5	500
400	23,4 r c	2,0	1,7	31,2	1417,7	250

*Data subject to change without prior notice

SafetyMax AL Cable 1,8/3 kV

NBR 13248

90 °C



Conductor

Formed by bare aluminum wires, alloy 1350, temper H19, stranding class 2, round compact, meeting the requirements of standard NBR NM 280.

Insulation

XLPE 90 °C - Thermosetting compound of cross-linked polyethylene, black in color.

Coverage

SHF1 - Non-halogenated thermoplastic polyolefin compound, with low smoke emission, with special characteristics regarding the non-spread and self-extinguishing of fire.

Identification

Black, Light Blue, Green
Note: other colors on request

Multiple cables on request.

Maximum temperatures at the conductor

- 90 °C in continuous service
- 130 °C at overload
- 250 °C short-circuit

Implementation

SafetyMax AL cables are non-halogenated and have low smoke and toxic gas emission characteristics, in addition to not spreading to fire. Used in installations in places with high density of occupation of people and difficult escape conditions, such as: Cinemas, Shopping Centers, Restaurants, Supermarkets, Hospitals, Train / Subway, Educational / Sports / Fairs, as well as in areas of electronics and computing, Photovoltaic Plants, as recommended by NBR 5410.

Applicable Standards

NBR 13248 - Power cables with extruded insulation for voltages from 1 kV to 35 kV - Constructive requirements
NBR NM 280 - Insulated cable conductors
NBR 6245 - Electric wires and cables - Determination of oxygen index
NBR NM-IEC 60332-3 - Test methods for electric cables under fire conditions - Part 3: Vertical flame spread test on vertically mounted conductors or cables in bundles.

Construction Data*

Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging
						Coil (m)
10	3,7 r c	2,0	1,3	10,7	119,8	1000
16	4,7 r c	2,0	1,1	11,0	129,5	1000
25	5,9 r c	2,0	1,1	12,2	166,4	1000
35	6,9 r c	2,0	1,2	13,4	209,5	1000
50	8,1 r c	2,0	1,2	14,6	254,1	500
70	9,7 r c	2,0	1,3	16,5	335,3	500
95	11,4 r c	2,0	1,3	18,2	424,0	500
120	12,8 r c	2,0	1,4	19,8	513,5	500
150	14,2 r c	2,0	1,4	21,3	602,9	500
185	15,9 r c	2,0	1,5	23,2	730,5	500
240	18,3 r c	2,0	1,6	25,9	925,0	500
300	20,4 r c	2,0	1,6	28,0	1107,7	500

*Data subject to change without prior notice

Maxlink R AL Cable 0,6/1 kV

NBR 7285

90 °C

Conductor

Formed by bare aluminum wires alloy 1350, temper H19, stranding class 2, round compact, meeting the requirements of the standard NBR NM 280.

Insulation

XLPE 90 °C - Thermosetting compound of cross-linked polyethylene, with at least 2% carbon black.

Identification

Black, Light Blue and Green.
Note: other colors, on request.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

Used in fixed power and light installations in industrial, commercial and residential buildings, in distribution circuits and terminal circuits, and for underground low-voltage power lines.

Applicable Standards

NBR 7285 - Power cables with solid extruded cross-linked polyethylene (XLPE) insulation for 0.6/1 kV voltage - without cover
NBR NM 280 - Insulated cable conductors.

Construction Data*

Nominal crosssection (mm ²)	Conductor Diameter (mm)	Thickness Insulation (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging
					Coil (m)
10,00	3,7 r c	1,6	6,9	49,6	1000
16,00	4,7 r c	1,6	7,9	69,5	1000
25,00	5,9 r c	1,6	9,1	98,9	1000
35,00	7,0 r c	1,6	10,2	129,0	1000
50,00	8,1 r c	2,0	12,2	179,5	500
70,00	9,7 r c	2,0	13,8	242,5	500
95,00	11,4 r c	2,0	15,5	320,3	500
120,00	12,8 r c	2,4	17,7	412,4	500
150,00	14,2 r c	2,4	19,1	491,7	500
185,00	15,9 r c	2,4	20,9	600,9	500
240,00	18,3 r c	2,6	23,7	778,1	500
300,00	20,4 r c	2,8	26,2	965,2	500

r c - round compact *Data subject to change without prior notice

90 °C



Conductor

- Phase: Formed by bare aluminum wires alloy 1350, temper H19, stranding class 2, normal round, meeting the requirements of the standard NBR NM 280.
- Neutral: Formed by bare aluminum wires, with a minimum elongation of 15%, applied helically around the phase conductor, concentrically, with at least 90% coverage.

Insulation

- Phase: XLPE 90 °C - Thermosetting compound of cross-linked polyethylene, in black color.
- Neutral: XLPE 90 °C - Thermosetting compound of cross-linked polyethylene, black in color, with at least 2% carbon black.

Identification

- 1 Phase: Black.
- 2 Phases: Black, White.
- 3 Phases: Black, White, Red.

Other constructions and materials on request.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

Employed in the public low-voltage power distribution network and in the connection of the public network, in the entry standard to the consumer.

Applicable Standards

Reference NBR 15716 - Concentric cables for consumer branches with internal insulation of XLPE and external insulation of PE or XLPE, for voltages up to 0,6/1 kV - Design requirements
NBR NM 280 - Insulated cable conductors.

Construction Data*

Formation and Nominal Section (mm ²)	Conductor Diameter (mm)	Phase Insulation Thickness (mm)	Neutral Insulation Thickness (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging
						Coil (m)
1 x 10,0 + 10,0	3,9	1	1,2	9,71	97,4	1000
1 x 16,0 + 16,0	4,95	1	1,2	11,34	140,3	1000
1 x 25,0 + 25,0	5,9	1,3	1,2	13,39	206,3	1000
2 x 10,0 + 10,0	3,9	1	1,2	16,7	283,6	1000
2 x 16,0 + 16,0	5	1	1,4	19,3	394,3	1000
3 x 10,00+10,00	3,9	1	1,2	17,6	313,6	1000
3 x 16,00+16,00	5	1	1,4	20,3	442,9	1000
3 x 25,00+25,00	5,9	1	1,5	23,2	584,6	750
3 x 35,00+35,00	6,8	1	1,8	26,2	782,1	750
3 x 50,00+50,00	8	1	1,8	29,1	973,1	500
3 x 70,00+50,00	9,4	1,2	1,8	34,2	1356,5	350
3 x 95,00+50,00	11,5	1,2	1,9	38,2	1655,6	350
3 x 120,00+70,00	12,6	1,2	2,3	41,6	2060,9	350

*Data subject to change without prior notice

Electrical and Mechanical Characteristics

Formation and Nominal Section (mm ²)	Electrical Resistance Rcc / Rca (Ω/k)	Capacity Outdoor Current Conduction* (A)"	XL reactance (Ω/km)	Admittance (S/km)
1 x 10,00 + 10,00	3,08 / 3,95	62	0,12	0,253
1 x 16,00 + 16,00	1,91 / 2,45	76	0,10	0,408
1 x 25,00 + 25,00	1,20 / 1,54	109	0,12	0,649
2 x 10,0 + 10,0	3,08 / 3,95	54	0,10	0,252
2 x 16,0 + 16,0	1,91 / 2,46	71	0,10	0,407
3 x 10,0+10,0	3,08/3,95	40	0,12	0,249
3 x 16,0 + 16,0	1,91 / 2,45	51	0,12	0,408
3 x 25,0 + 25,0	1,20 / 1,54	69	0,12	0,650
3 x 35,0 + 35,0	0,868 / 1,113	86	0,11	0,898
3 x 50,0 + 50,0	0,641 / 0,822	104	0,11	1,217
3 x 70,0 + 50,0	0,443 / 0,568	135	0,11	1,761
3 x 95,0 + 50,0	0,320 / 0,410	168	0,11	2,439
3 x 120,0 + 70,0	0,253 / 0,324	196	0,10	3,086

*Current carrying capacity considering temperature of 40 °C, solar radiation

Multiplexed Cable AL 0,6/1 kV

NBR 8182

90 °C



Conductor

- Phase: formed by bare aluminum wires alloy 1350, temper H19, stranding class 2, round compact, meeting the requirements of standard NBR NM 280.
- Neutral: 10, 16 and 25 mm² - formed by bare aluminum wires alloy 1350, temper H19, stranding class 2, normal round; 35, 50 and 70 mm² - formed by bare aluminum wires alloy 6201, temper T81, stranding class 2, normal round.

Insulation

XLPE 90 °C - Thermosetting compound of cross-linked polyethylene with at least 2% carbon black.

Identification

Black veins identified by printed numbers, friezes or colored veins (black, grey and red)

Other constructions and materials on request.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C in overload.
- 250 °C short-circuit.

Implementation

Used in the public secondary distribution network of low voltage energy, urban or rural, aiming at greater safety, reliability and less aggressive visual effect. They are also suitable for use in wooded areas.

Applicable Standards

NBR 8182 - Self-supporting multiplexed power cables with extruded PE or XLPE insulation, for voltages up to 0.6/1 kV.
NBR NM 280 - Insulated cable conductors.

Construction Data*

Nominal crossection (mm ²)	Conductor Phase				Bare Neutral Conductor		Complete Cable	
	Min. Number of Wires	Conductor Diameter (mm)	Thickness Insulation (mm)	Outer Diameter (mm)	Training	Conductor Diameter (mm)	Approx mass (kg/km)	Standard Packaging Coil (m)
1x10 + 10	7	3,7	1,2	6,1	7 x 1,35	4,1	69,5	2500
1x16 + 16	7	4,7	1,2	7,1	7 x 1,70	5,1	104,3	2000
1x25 + 25	7	5,9	1,4	8,7	7 x 2,08	6,2	158,9	1250
1x35 + 35	7	7,0	1,6	10,1	7 x 2,50	7,5	222,3	1000
2x10 + 10	7	3,7	1,2	6,1	7 x 1,35	4,1	111,6	2000
2x16 + 16	7	4,7	1,2	7,1	7 x 1,70	5,1	165,3	1250
2x25 + 25	7	5,9	1,4	8,7	7 x 2,08	6,2	252,9	1000
2x35 + 35	7	7,0	1,6	10,1	7 x 2,50	7,5	350,7	1000
3x10 + 10	7	3,7	1,2	6,1	7 x 1,35	4,1	153,9	1750
3x16 + 16	7	4,7	1,2	7,1	7 x 1,70	5,1	226,5	1000
3x25 + 25	7	5,9	1,4	8,7	7 x 2,08	6,2	347,2	1000
3x35 + 35	7	7,0	1,6	10,1	7 x 2,50	7,5	479,6	1000
3x50 + 50	10	8,1	1,6	11,4	7 x 3,00	9,00	634,7	750
3x70 + 70	14	9,7	1,8	13,4	7 x 3,45	10,4	885,5	500
3x95 + 70	19	11,4	2,0	15,5	7 x 3,45	10,4	1143,4	500
3x120 + 70	24	12,8	2,0	16,9	7 x 3,45	10,4	1360,1	500

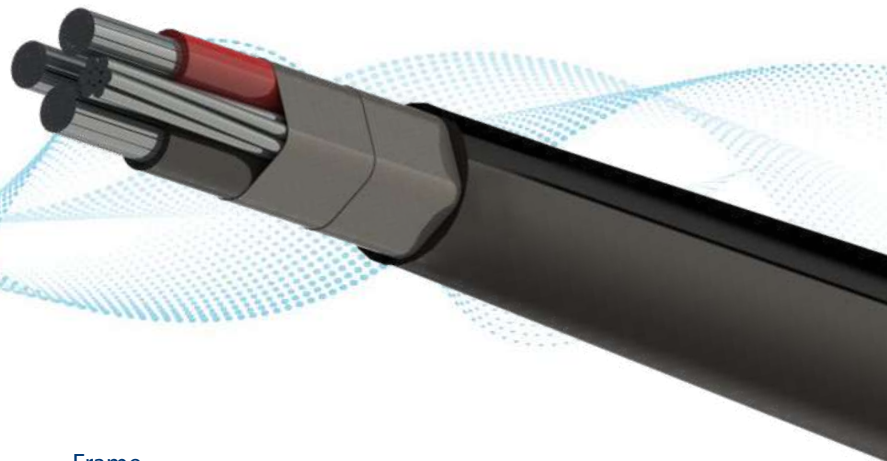
*Data subject to change without prior notice

Electrical and Mechanical Characteristics

Formation Cable (mm ²)	Electrical Resistance (Rcc 20 °C) (Ω/km)	Electrical Resistance (Rca 90 °C) (Ω/km)	Inductive reactance (Ω/km)	Capacity Current Conduction (A)*	Breaking Load (daN)
1x10 + 10	3,08	3,87	0,097	65	195
1x16 + 16	1,91	2,45	0,090	86	300
1x25 + 25	1,2	1,54	0,088	115	446
1x35 + 35	0,868	1,113	0,092	142	1092
2x10 + 10	3,08	3,87	0,110	55	195
2x16 + 16	1,91	2,45	0,101	73	300
2x25 + 25	1,2	1,54	0,100	97	446
2x35 + 35	0,868	1,113	0,103	119	1092
3x10 + 10	3,08	3,87	0,123	44	195
3x16 + 16	1,91	2,45	0,115	59	300
3x25 + 25	1,2	1,54	0,113	80	446
3x35 + 35	0,868	1,113	0,117	100	1092
3x50 + 50	0,641	0,822	0,112	122	1572
3x70 + 70	0,443	0,568	0,109	157	2127
3x95 + 70	0,32	0,41	0,106	196	2127
3x120 + 70	0,253	0,324	0,103	229	2127

* Current carrying capacity considering temperature of 40 °C, solar radiation

90 °C



Conductor

Phases and Neutral: Formed by aluminum wires alloy 1350, tempera H19, stranding class 2, round compact, meeting the requirements of NBR 5118 and NBR NM 280.

Insulation das fases

XLPE 90 °C - Thermosetting compound of cross-linked polyethylene with at least 2% carbon black.

*Optionally, the neutral conductor can be covered with a semiconductor layer or insulated in XLPE 90 °C - Thermosetting cross-linked polyethylene compound with at least 2% carbon black.

Identification

Black veins identified by white printed numbers or colored veins (Black, Gray and Red).

*Other building configurations on request.

Frame

Steel tape.

Coverage

PE ST7 - Thermoplastic polyethylene compound with at least 2% carbon black.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C at overload.
- 250 °C short-circuit.

Implementation

Used in the public secondary distribution network of low voltage energy, urban or rural, aiming at greater safety, reliability and less aggressive visual effect.

Construction Data*

Formation Cable (mm ²)	Conductor Phase				Neutral Conductor	
	Min. Number of Wires	Conductor Diameter (mm)	Thickness Insulation (mm)	Outer Diameter (mm)	Min. Number of Wires	Conductor Diameter (mm)
3x25 + 25	7	5,9	1,4	8,7	7	5,9
3x50 + 35	7	8,0	1,6	11,4	7	6,8
3x70 + 50	19	9,7	1,8	13,4	7	8,0
3x95 + 50	19	11,4	2,0	15,5	7	8,0

Formation Cable (mm ²)	Complete Cable			
	Thickness Insulation (mm)	Conductor Diameter (mm)	Approx mass (kg/km)	Standard Packaging
				Coil (m)
3x25 + 25	1,6	25,4	826,8	3x25+25 = 1500
3x50 + 35	2,0	31,7	1229,2	3x50+35 = 1000
3x70 + 50	2,1	36,7	1594,7	3x70+50 = 750
3x95 + 50	2,2	41,2	1969,4	3x95+50 = 500

*Data subject to change without prior notice

Electrical and Mechanical Characteristics

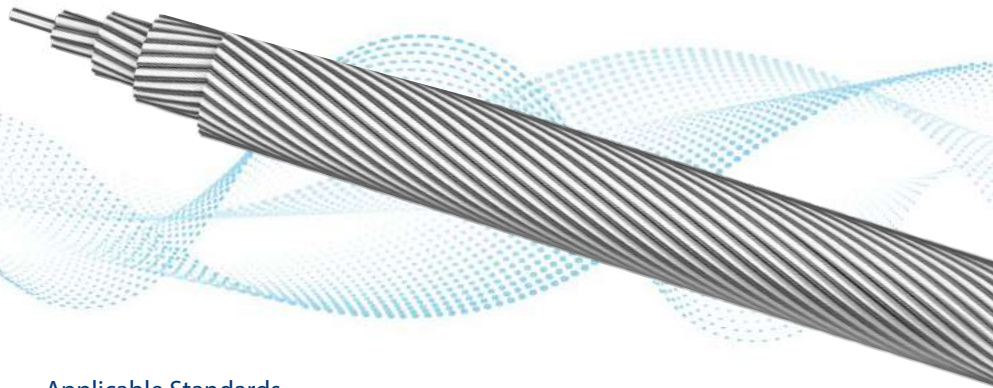
Formation Cable (mm ²)	Electrical Resistance (Rcc 20 °C) (Ω/km)	Electrical Resistance (Rca 90 °C) (Ω/km)	Voltage Drop (FP = 0,95) (V/A*km)	Capacity Current Conduction (A)*		Tensile Rupture (daN)
				30oC **	40oC **	
3x25 + 25	1,2	1,53	2,60	84	72	178
3x50 + 35	0,641	0,822	1,41	127	109	282
3x70 + 50	0,443	0,695	1,08	163	141	341
3x95 + 50	0,320	0,410	0,73	203	176	405

*Current conduction capacity considering solar radiation of 1000 W/m², without wind.

** Ambient Temperature

Aluminum Cable - CA / AAC

NBR 7271



Conductor

Made of bare aluminum wire, alloy 1350, H19 temper, class 2 stranding, normal round. Option of greased cable.

Implementation

Employees on overhead lines for power transmission and distribution.

Applicable Standards

NNBR 7271 - Bare aluminum cables for overhead lines - Specification
NBR 5118 - Bare 1350 aluminum wires of circular section for electrical purposes

Construction Data*

Code Cable	Section (AWG/MCM)	Section (mm ²)	Formation (n° x mm)	Nominal Diameter (mm)	Approx mass (kg/km)	Capacity Current Conduction (A)**	Electrical Resistance (Ω/km)	RMC (kN)	Standard Packaging		
									Approx. mass (m)	Approx. throw (m)	Coil Type
PEACHBELL	6	13,21	7 x 1,55	4,65	36,2	116	2,1755	2,50	250	6910	80/45
ROSE	4	21,12	7 x 1,96	5,88	57,9	155	1,3606	3,91	250	4320	80/45
LILY	3	26,61	7 x 2,20	6,60	72,9	180	1,0799	4,85	250	3430	80/45
IRIS	2	33,54	7 x 2,47	7,41	91,9	208	0,8567	5,99	250	2720	80/45
PANSY	1	42,49	7 x 2,78	8,34	116,4	240	0,6763	7,30	250	2145	80/45
POPPY	1/0	53,52	7 x 3,12	9,36	146,6	278	0,5369	8,84	250	1705	80/45
ASTER	2/0	67,35	7 x 3,50	10,50	184,4	322	0,4267	11,12	250	1355	80/45
PHLOX	3/0	84,91	7 x 3,93	11,79	232,6	372	0,3384	13,45	500	2145	100/60
OXLIP	4/0	107,41	7 x 4,42	13,26	294,2	430	0,2675	17,01	500	1695	100/60
SNEEZEWORT	250	126,67	7 x 4,80	14,40	346,9	478	0,2269	20,06	500	1440	100/60
VALERIAN	249,4	126,37	19 x 2,91	14,55	347,9	479	0,2274	20,68	500	1435	100/60
DAISY	266,9	135,25	7 x 4,96	14,88	370,5	497	0,2125	21,42	500	1345	100/60
LAUREL	266,8	135,20	19 x 3,01	15,05	371,9	499	0,2125	22,13	900	2415	125/70
PEONY	299,7	151,85	19 x 3,19	15,95	417,8	537	0,1892	24,29	900	2150	125/70
TULIP	336,5	170,48	19 x 3,38	16,90	469,1	578	0,1686	27,27	900	1915	125/70
DAFFODIL	350,5	177,62	19 x 3,45	17,25	488,7	592	0,1618	28,41	900	1840	125/70
CANNA	398,8	202,09	19 x 3,68	18,40	556,0	640	0,1422	31,76	900	1615	125/70
GOLDENTUFT	450,2	228,14	19 x 3,91	19,55	627,9	692	0,1260	35,01	900	1430	125/70
COSMOS	475,9	241,15	19 x 4,02	20,10	663,4	718	0,1192	37,01	900	1355	125/70
SYRINGA	475,7	241,03	37 x 2,88	20,16	664,4	719	0,1192	38,60	900	1350	125/70
ZINNIA	499,9	253,30	19 x 4,12	20,60	696,9	740	0,1134	38,87	900	1290	125/70
HYACINTH	499,1	252,89	37 x 2,95	20,65	697,2	740	0,1136	40,50	900	1290	125/70
DAHLIA	557,3	282,37	19 x 4,35	21,75	776,7	790	0,1018	43,33	900	1155	125/70
MISTLETOE	554,7	281,07	37 x 3,11	21,77	774,7	791	0,1022	43,99	1300	1675	125/100
MEADOWSWEET	598,3	303,18	37 x 3,23	22,61	835,6	829	0,0948	47,45	1300	1555	125/100
ORCHID	636,0	322,24	37 x 3,33	23,31	888,5	859	0,0892	50,44	1300	1460	125/100
HEUCHERA	651,3	330,03	37 x 3,37	23,59	909,7	872	0,0871	51,66	1300	1425	125/100
VERBENA	698,5	353,95	37 x 3,49	24,43	975,6	912	0,0812	55,40	1300	1330	125/100
VIOLET	714,6	362,11	37 x 3,53	24,71	998,1	923	0,0794	56,68	1300	1300	125/100
PETÚNIA	751,5	380,81	37 x 3,62	25,34	1049,9	952	0,0755	58,56	1300	1235	125/100
ARBUTUS	793,6	402,14	37 x 3,72	26,04	1108,3	988	0,0715	61,85	1300	1170	125/100
ANEMONE	876,8	444,27	37 x 3,91	27,37	1224,6	1045	0,0647	66,71	1300	1060	125/100
COCKSCOMB	899,4	455,70	37 x 3,96	27,72	1256,0	1064	0,0631	68,42	1300	1035	125/100
MAGNOLIA	954,7	483,74	37 x 4,08	28,56	1333,2	1100	0,0594	72,63	1300	975	125/100
HAWKWEEED	1002,1	507,74	37 x 4,18	29,26	1399,3	1137	0,0566	76,24	1300	925	125/100
BLUEBEEL	1031,0	522,42	37 x 4,24	29,68	1439,7	1155	0,0550	78,44	1300	900	125/100

*Data subject to change without notice ** Ambient temperature 25 °C - Conductor temperature 75 °C

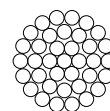
Examples of Stringing:



7 Yarns



19 Yarns

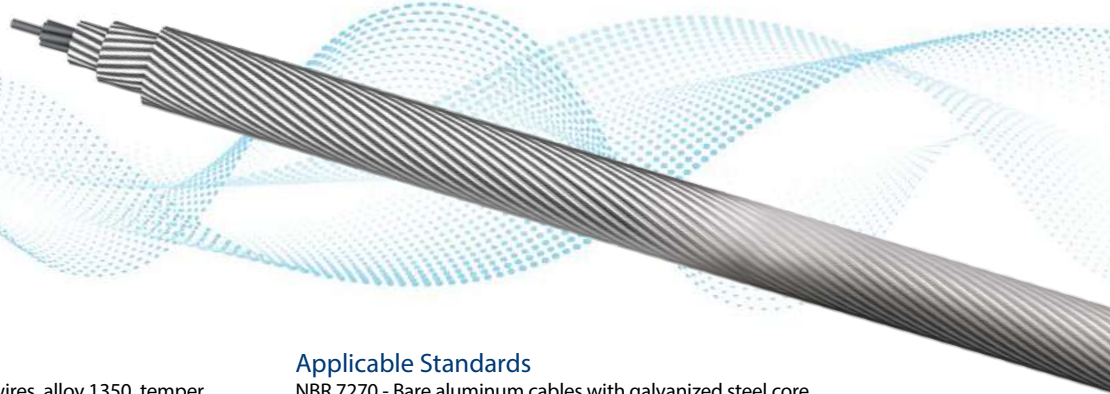


37 Yarns

Aluminum Cable with Steel Core

CAA / ACSR

NBR 7270



Conductor

- Aluminum: Formed by bare aluminum wires, alloy 1350, temper H19, stranding class 2, normal round.
- Steel: Formed of galvanized steel wire or wires class 1 or 2. Option of greased cable.

Implementation

Employees on overhead lines for power transmission and distribution.

Applicable Standards

- NBR 7270 - Bare aluminum cables with galvanized steel core for overhead lines - Specification
- NBR 5118 - Bare 1350 aluminum wires of circular section for electrical purposes
- NBR 6756 - Galvanized steel wire for core of aluminum and aluminum alloy cables

Construction Data*

Code Cable	Section (AWG/MCM)	Section			Training		Nominal Diameter Cable (mm)	Approx mass			Mass Percentage		Driving Capacity Current (A) ¹	Electrical Resistance (Ω/km)	RMC		Standard Packaging		
		Total (mm ²)	Aluminum (mm ²)	Steel (mm ²)	Aluminum (n° x mm)	Steel (n° x mm)		Aluminum (kg/km)	Steel (kg/km)	Total (kg/km)	Aluminum (%)	Steel (%)			Class (1kN)	Class (2kN)	Approx mass (m)	Approx. bid (m)	Coil Type
TURKEY	6	15,52	13,30	2,22	6 x 1,68	1 x 1,68	5,04	36,4	17,2	53,7	67,9%	32,1%	118	2,1570	5,31	5,16	270	5030	80/45
THRUSH	5	19,64	16,83	2,81	6 x 1,89	1 x 1,89	5,67	46,2	21,8	68,0	67,9%	32,1%	136	1,7046	6,65	6,46	270	3970	80/45
SWAN	4	24,71	21,18	3,53	6 x 2,12	1 x 2,12	6,36	58,0	27,5	85,5	67,9%	32,1%	156	1,3545	8,30	8,07	270	3155	80/45
SWALLOW	3	31,14	26,69	4,45	6 x 2,38	1 x 2,38	7,14	73,1	34,6	107,8	67,9%	32,1%	181	1,0749	10,23	9,93	270	2505	80/45
SPARROW	2	39,19	33,59	5,60	6 x 2,67	1 x 2,67	8,01	92,1	43,6	135,6	67,9%	32,1%	206	0,8541	12,65	12,28	270	1990	80/45
ROBIN	1	49,48	42,41	7,07	6 x 3,00	1 x 3,00	9,00	116,2	55,0	171,2	67,9%	32,1%	237	0,6764	15,85	15,38	270	1575	80/45
RAVEN	1/0	62,44	53,52	8,92	6 x 3,37	1 x 3,37	10,11	146,6	69,4	216,0	67,9%	32,1%	273	0,5360	19,46	18,86	270	1250	80/45
QUAIL	2/0	78,55	67,33	11,22	6 x 3,78	1 x 3,78	11,34	184,4	87,3	271,7	67,9%	32,1%	312	0,4261	23,53	22,77	600	2205	100/60
PIGEON	3/0	99,30	85,12	14,19	6 x 4,25	1 x 4,25	12,75	233,1	110,4	343,4	67,9%	32,1%	354	0,3370	29,42	28,47	600	1745	100/60
PENGUIN	4/0	125,09	107,22	17,87	6 x 4,77	1 x 4,77	14,31	293,6	139,0	432,6	67,9%	32,1%	408	0,2676	37,06	35,85	600	1385	100/60
WAXWING	266,4	142,48	134,98	7,50	18 x 3,09	1 x 3,09	15,45	371,6	58,3	430,0	86,4%	13,6%	504	0,2136	31,22	30,71	600	1395	100/60
PARTRIDGE	266,2	156,87	134,87	21,99	26 x 2,57	7 x 2,00	16,28	372,2	172,1	544,4	68,4%	31,6%	514	0,2148	50,11	48,63	600	1100	100/60
OSTRICH	300,4	176,90	152,19	24,71	26 x 2,73	7 x 2,12	17,28	420,3	193,4	613,7	68,5%	31,5%	553	0,1904	56,41	54,75	1100	1790	125/70
MERLIN	335,9	179,68	170,22	9,46	18 x 3,47	1 x 3,47	17,35	468,8	73,6	542,4	86,4%	13,6%	583	0,1694	39,37	38,73	1100	2025	125/70
LINNET	336,6	198,39	170,55	27,83	26 x 2,89	7 x 2,25	18,31	471,1	217,8	688,9	68,4%	31,6%	594	0,1699	62,91	61,04	1100	1595	125/70
ORIOLE	336,5	210,28	170,50	39,78	30 x 2,69	7 x 2,69	18,83	471,0	311,3	782,3	60,2%	39,8%	601	0,1703	77,26	74,59	1100	1405	125/70
CHICKADEE	336,5	212,09	200,93	11,16	18 x 3,77	1 x 3,77	18,85	553,3	86,8	640,1	86,4%	13,6%	648	0,1435	45,13	44,38	1100	1715	125/70
BRANT	397,8	227,68	201,56	26,13	24 x 3,27	7 x 2,18	19,62	556,0	204,5	760,5	73,1%	26,9%	653	0,1437	65,10	63,35	1100	1445	125/70
IBIS	397,3	234,07	201,34	32,73	26 x 3,14	7 x 2,44	19,88	556,0	256,2	812,1	68,5%	31,5%	659	0,1439	72,42	70,23	1100	1350	125/70
LARK	396,5	247,77	200,90	46,88	30 x 2,92	7 x 2,92	20,44	555,0	366,9	921,8	60,2%	39,8%	668	0,1446	90,49	87,34	1100	1190	125/70
PELICAN	478,2	255,77	242,31	13,46	18 x 4,14	1 x 4,14	20,70	667,4	104,7	772,1	86,4%	13,6%	726	0,1190	53,50	52,60	1100	1420	125/70
FLICKER	476,8	272,99	241,58	31,40	24 x 3,58	7 x 2,39	21,49	666,7	245,8	912,5	73,1%	26,9%	735	0,1199	76,55	74,44	1100	1205	125/70
HAWK	476,9	281,13	241,65	39,49	26 x 3,44	7 x 2,68	21,80	667,0	309,1	976,1	68,3%	31,7%	739	0,1199	87,18	84,53	1100	1125	125/70
HEN	476,2	297,57	241,27	56,30	30 x 3,20	7 x 3,20	22,40	666,7	440,6	1107,3	60,2%	39,8%	748	0,1204	105,60	101,80	1600	1440	125/100

Aluminum Cable with Steel Core

CAA / ACSR

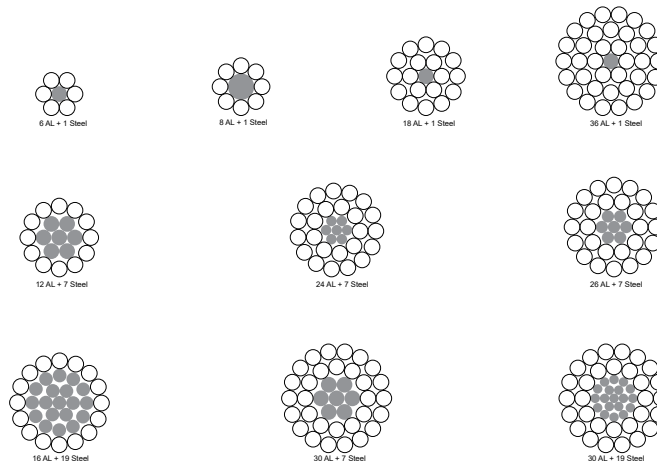
NBR 7270

Construction Data*

Code Cable	Section (AWG/MCM)	Section			Training		Nominal Diameter Cable (mm)	Approx mass			Pasta Percentage		Driving Capacity Current(A)**	Electrical Resistance (Ω/km)	RMC		Standard Packaging		
		Total (mm ²)	Aluminum (mm ²)	Steel (mm ²)	Aluminum (n° x mm)	Steel (n° x mm)		Aluminum (kg/km)	Steel (kg/km)	Total (kg/km)	Aluminum (%)	Steel (%)			Class (1 kN)	Class (2 kN)	Approx mass (m)	Approx. bid (m)	Coil Type
OSPREY	557,5	298,17	282,47	15,69	18 x 4,47	1 x 4,47	22,35	777,9	122,1	900,0	86,4%	13,6%	799	0,1021	62,37	61,31	1600	1775	125/100
PARAKEET	557,2	318,90	282,31	36,60	24 x 3,87	7 x 2,58	23,22	779,1	286,5	1065,6	73,1%	26,9%	809	0,1026	88,29	85,84	1600	1500	125/100
DOVE	557,7	328,50	282,59	45,92	26 x 3,72	7 x 2,89	23,55	780,1	359,3	1139,4	68,5%	31,5%	814	0,1025	100,80	97,76	1600	1400	125/100
EAGLE	556,7	347,89	282,07	65,82	30 x 3,46	7 x 3,46	24,22	779,3	515,1	1294,4	60,2%	39,8%	825	0,1030	123,50	119,10	1600	1235	125/100
PEACOCK	603,1	345,92	306,13	39,78	24 x 4,03	7 x 2,69	24,19	844,5	311,3	1155,8	73,1%	26,9%	853	0,0946	95,86	93,18	1600	1380	125/100
SQUAB	603,6	355,84	305,83	49,81	26 x 3,87	7 x 3,01	24,51	844,3	389,8	1234,2	68,4%	31,6%	859	0,0947	108,10	104,80	1600	1295	125/100
WOOD DUCK	606,0	378,71	307,06	71,65	30 x 3,61	7 x 3,61	25,27	848,5	560,8	1409,3	60,2%	39,8%	864	0,0946	128,70	123,90	1600	1135	125/100
TEAL	606,0	376,68	307,06	69,62	30 x 3,61	19 x 2,16	25,24	848,5	546,6	1395,1	60,8%	39,2%	868	0,0946	133,10	128,60	1600	1145	125/100
KINGBIRD	637,5	340,96	323,01	17,95	18 x 4,78	1 x 4,78	23,90	889,5	139,6	1029,1	86,4%	13,6%	880	0,0893	71,33	70,12	1600	1550	125/100
ROOK	637,5	364,95	323,07	41,88	24 x 4,14	7 x 2,76	24,84	891,5	327,8	1219,3	73,1%	26,9%	881	0,0897	101,00	98,22	1600	1310	125/100
GROSBEAK	635,2	374,34	321,84	52,49	26 x 3,97	7 x 3,09	25,15	888,4	410,8	1299,2	68,4%	31,6%	887	0,0900	111,90	108,30	1600	1230	125/100
SCOTER	636,6	397,83	322,56	75,26	30 x 3,70	7 x 3,70	25,90	891,2	589,1	1480,3	60,2%	39,8%	892	0,0900	135,20	130,20	1600	1080	125/100
EGRET	636,6	396,11	322,56	73,54	30 x 3,70	19 x 2,22	25,90	891,2	577,4	1468,6	60,7%	39,3%	896	0,0900	140,30	135,50	1600	1085	125/100
FLAMINGO	665,6	380,99	337,27	43,72	24 x 4,23	7 x 2,82	25,38	930,8	342,2	1273,0	73,1%	26,9%	907	0,0859	105,50	102,50	1600	1255	125/100
GANNET	667,6	393,16	338,26	54,90	26 x 4,07	7 x 3,16	25,76	933,9	429,6	1363,5	68,5%	31,5%	911	0,0857	117,30	113,60	1600	1170	125/100
STILT	716,9	410,15	363,27	46,88	24 x 4,39	7 x 2,92	26,32	1002,1	366,9	1369,0	73,2%	26,8%	949	0,0798	113,40	110,20	1600	1165	125/100
STARLING	714,3	421,08	361,93	59,15	26 x 4,21	7 x 3,28	26,68	998,8	462,9	1461,7	68,3%	31,7%	954	0,0800	126,00	122,00	1600	1090	125/100
REDWING	714,5	444,47	362,06	82,41	30 x 3,92	19 x 2,35	27,43	1000,6	647,1	1647,6	60,7%	39,3%	964	0,0802	153,70	148,30	2600	1575	170/80
CUCKOO	794,0	454,49	402,33	52,15	24 x 4,62	7 x 3,08	27,72	1110,1	408,1	1518,3	73,1%	26,9%	1014	0,0720	123,80	120,30	2600	1710	170/80
DRAKE	794,5	468,00	402,56	65,44	26 x 4,44	7 x 3,45	28,11	1111,3	512,1	1623,4	68,5%	31,5%	1018	0,0720	139,70	135,30	2600	1600	170/80
MALLARD	797,0	495,62	403,84	91,78	30 x 4,14	19 x 2,48	28,96	1115,8	720,4	1836,2	60,8%	39,2%	1029	0,0719	171,20	165,30	2600	1415	170/80
GROUSE	80,0	54,66	40,54	14,12	8 x 2,54	1 x 4,24	9,32	111,3	109,9	221,1	50,3%	49,7%	242	0,7111	23,10	22,15	700	3165	100/60
PETREL	101,8	81,71	51,61	30,10	12 x 2,34	7 x 2,34	11,70	142,5	235,6	378,1	37,7%	62,3%	288	0,5613	46,20	44,18	700	1850	100/60
MINORCA	110,7	88,84	56,11	32,73	12 x 2,44	7 x 2,44	12,20	155,0	256,2	411,2	37,7%	62,3%	304	0,5163	50,24	48,04	700	1700	100/60
LEGHORN	134,6	107,98	68,20	39,78	12 x 2,69	7 x 2,69	13,45	188,4	311,3	499,7	37,7%	62,3%	342	0,4248	60,60	57,93	700	1400	100/60
GUINEA	158,6	127,24	80,36	46,88	12 x 2,92	7 x 2,92	14,60	221,9	366,9	588,8	37,7%	62,3%	380	0,3605	71,18	68,09	700	1185	100/60
DOTTEREL	176,4	141,56	89,41	52,15	12 x 3,08	7 x 3,08	15,40	247,2	408,1	655,3	37,7%	62,3%	406	0,3240	76,84	73,34	700	1065	100/60
DORKING	190,5	152,81	96,51	56,30	12 x 3,20	7 x 3,20	16,00	266,6	440,6	707,3	37,7%	62,3%	425	0,3002	82,96	79,17	1400	1975	125/70
BRAHMA	202,9	194,57	102,79	91,78	16 x 2,86	19 x 2,48	18,12	284,7	720,4	1005,0	28,3%	71,7%	453	0,2818	126,60	120,70	1400	1390	125/70
COCHIN	211,2	169,47	107,04	62,44	12 x 3,37	7 x 3,37	16,85	295,7	488,6	784,4	37,7%	62,3%	455	0,2707	92,00	87,81	1400	1780	125/70

*Data subject to change without notice ** Ambient temperature 25 °C - Conductor temperature 75 °C

Examples of Stringing:



Aluminum Cable Alloy 6201

CAL / AAAC

NBR 10298

Conductor

Formed of bare aluminum wire, alloy 6201, temper T81, stranding class 2, normal round.
Greased cable option

Implementation

Employees on overhead lines for power transmission and distribution.

Applicable Standards

NBR 10298 - Bare aluminum-magnesium-silicon alloy cables for overhead lines - Specification

NBR 5285 - Aluminum-magnesium-silicon alloy wire, T81 temper, bare, circular section, for electrical purposes.

Construction Data*

Code Cable	Section (AWG/MCM)	Section (mm ²)	Formation (n° x mm)	Nominal Diameter (mm)	Approx mass (kg/km)	Capacity Current Conduction (A)**	Electrical Resistance (Ω/km)	RMC (kN)	Standard Packaging		
									Approx mass (m)	Lance Aprox.(m)	Coil Type
AKRON	31	15,52	7 x 1,68	5,04	42,3	120	2,1588	4,93	230	5435	80/45
ALTON	49	24,71	7 x 2,12	6,36	67,4	161	1,3557	7,85	230	3410	80/45
AMES	77	39,19	7 x 2,67	8,01	106,9	215	0,8547	12,45	230	2150	80/45
AZUZA	123	62,44	7 x 3,37	10,11	170,2	288	0,5365	19,00	460	2700	100/60
ANAHEIM	155	78,55	7 x 3,78	11,34	214,1	333	0,4264	23,91	460	2145	100/60
AMHERST	196	99,30	7 x 4,25	12,75	270,6	384	0,3373	30,22	460	1695	100/60
ALLIANCE	247	125,09	7 x 4,77	14,31	340,9	445	0,2678	38,07	460	1345	100/60
BUTTE	313	158,59	19 x 3,26	16,30	434,2	517	0,2112	46,75	460	1055	100/60
CANTON	395	199,90	19 x 3,66	18,30	547,5	599	0,1676	58,93	830	1515	125/70
CAIRO	467	236,38	19 x 3,98	19,90	647,3	664	0,1417	69,69	830	1280	125/70
DARIEN	559,8	283,67	19 x 4,36	21,80	776,6	744	0,1181	83,63	830	1065	125/70
ELGIN	653,3	331,04	19 x 4,71	23,55	906,3	819	0,1012	97,59	1500	1655	150/80
FLINT	739,1	374,52	37 x 3,59	25,13	1027,2	887	0,0894	108,00	1500	1460	150/80
GREELEY	926,8	469,62	37 x 4,02	28,14	1288,2	1018	0,0713	135,50	1500	1160	150/80

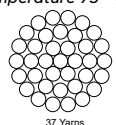
*Data subject to change without notice ** Ambient temperature 25 °C - Conductor temperature de 75 °C

Normal formations

Section (AWG/MCM)	Section (mm ²)	Formation (n° x mm)	Nominal Diameter (mm)	Approx mass (kg/km)	Capacity Current Conduction (A)**	Electrical Resistance (Ω/km)	RMC (kN)	Standard Packaging		
								Approx mass (m)	Approx. throw (m)	Coil Type
4	21,12	7 x 1,96	5,88	57,6	146	1,5860	6,71	230	3990	80/45
63,4	33,54	7 x 2,47	7,41	91,4	195	0,9987	10,66	230	2515	80/45
105,6	53,52	7 x 3,12	9,36	145,9	261	0,6259	17,01	230	1575	80/45
133,1	67,35	7 x 3,50	10,50	183,6	302	0,4974	20,50	460	2505	100/60
167,8	84,91	7 x 3,93	11,79	231,5	349	0,3945	25,84	460	1985	100/60
211,6	107,41	7 x 4,42	13,26	292,8	404	0,3119	32,69	460	1570	100/60
250,0	126,37	19 x 2,91	14,55	346,2	449	0,2651	38,90	460	1325	100/60
300,0	151,85	19 x 3,19	15,95	415,8	504	0,2206	46,75	460	1105	100/60
350,0	177,62	19 x 3,45	17,25	486,4	555	0,1886	52,36	830	1705	125/70
400,0	203,19	19 x 3,69	18,45	556,4	603	0,1649	59,90	830	1490	125/70
450,0	228,14	19 x 3,91	19,55	624,9	649	0,1468	67,26	830	1325	125/70
500,0	253,30	19 x 4,12	20,60	693,5	693	0,1322	74,68	830	1195	125/70
550,0	279,26	37 x 3,10	21,70	766,1	737	0,1200	84,12	830	1080	125/70
600,0	303,18	37 x 3,23	22,61	831,6	777	0,1105	91,32	1500	1800	150/80
650,0	330,03	37 x 3,37	23,59	905,3	817	0,1015	95,20	1500	1655	150/80
700,0	353,95	37 x 3,49	24,43	970,9	856	0,0946	102,10	1500	1545	150/80
750,0	380,81	37 x 3,62	25,34	1044,8	893	0,0880	109,90	1500	1435	150/80
800,0	404,31	37 x 3,73	26,11	1109,0	931	0,0829	116,60	1500	1350	150/80
900,0	455,70	37 x 3,96	27,72	1250,0	1000	0,0735	131,50	1500	1200	150/80
1000,0	507,74	37 x 4,18	29,26	1392,5	1067	0,0660	146,50	1500	1075	150/80

*Data subject to change without prior notice ** Ambient temperature 25 °C - Conductor temperature 75 °C

Examples of Stringing:



Maxlink SC AL Cable 15 kV

NBR 11873



90 °C

Conductor

Formed by bare aluminum wires, alloy 1350, temper H19, stranding class 2, round compact, meeting the requirements of the standard NBR NM 280.

Conductor Lockout

In water blocking tape.

Coverage

XLPE 90 °C - Anti-tracking cross-linked polyethylene compound, in gray or black, with protection against UV rays.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C at overload.
- 250 °C short-circuit.

Implementation

Used in the installation of compact 15kV networks, in areas where space is limited and less visual pollution is required, such as: tree-lined streets or squares, offering a smaller number of tree prunings and greater protection for the conductor.

Applicable Standards

NBR 11873 - Cables covered with polymeric material for overhead power distribution networks fixed in spacers, at voltages from 13.8 kV to 34.5 kV. NBR NM 280 - Insulated cable conductors
NBR 5118 - Bare 1350 aluminum wires of circular section for electrical purposes

Construction Data*

Nominal Section (mm ²)	Number of wires	Conductor Diameter (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging
						Coil (m)
35,00	7	6,8 r c	3,0	13,0	176,2	1000
50,00	7	8,0 r c	3,0	14,2	218,2	1000
70,00	19	9,5 r c	3,0	15,7	286,2	1000
95,00	19	11,2 r c	3,0	17,4	368,2	1000
120,00	37	12,8 r c	3,0	19,0	446,9	1000
150,00	37	14,0 r c	3,0	20,2	526,5	1000
185,00	37	15,8 r c	3,0	22,1	639,5	500
240,00	37	18,0 r c	3,0	24,3	804,8	500
300,00	37	20,4 r c	3,0	26,4	991,7	500

*Data subject to change without prior notice

Electrical and Mechanical Characteristics

Nominal crossection (mm ²)	Electrical Resistance (R _{cc} 20 °C) (Ω/km)	Electrical Resistance (R _{ca} 90 °C) (Ω/km)	Inductive reactance (Ω/km)	Capacity Current Conduction (A)*	Tensile Strength (daN)
35,00	0,868	1,113	0,136	199	455
50,00	0,641	0,822	0,131	246	650
70,00	0,443	0,568	0,126	291	910
95,00	0,320	0,410	0,121	360	1235
120,00	0,253	0,324	0,118	432	1560
150,00	0,206	0,263	0,115	496	1943
185,00	0,164	0,210	0,113	553	2405
240,00	0,125	0,160	0,096	640	3120
300,00	0,100	0,129	0,110	759	3900

* Current-carrying capacity at 40 °C, solar radiation 1000 W/m², wind speed 2.2 km/h.

Maxlink SC DC AL Cable 15 kV

NBR 11873

90 °C



Conductor

Formed by bare aluminum wires, alloy 1350, temper H19, stranding class 2, round compact, meeting the requirements of standard NBR NM 280.

Conductor Lockout

In water blocking tape.

Conductor Shielding

In semiconductor thermosetting compound.

Coverage

In double layer being the inner layer in XLPE - Cross-linked polyethylene compound in black color and the outer layer in HDPE - High density polyethylene compound anti tracking in gray color, with protection against UV rays.

Maximum temperatures at the conductor

- 90 °C in continuous service
- 130 °C at overload
- 250 °C short-circuit

Implementation

Used in the installation of compact 15 kV networks, in areas where space is limited and less visual pollution is required, such as: tree-lined streets or squares, offering a smaller number of tree prunings and greater protection for the conductor.

Applicable Standards

NBR 11873 - Cables covered with polymeric material for overhead power distribution networks fixed in spacers, at voltages from 13.8 kV to 34.5 kV. NBR NM 280 - Insulated cable conductors
NBR 5118 - Bare 1350 aluminum wires of circular section for electrical purposes

Construction Data*

Nominal crossection (mm ²)	Number of wires	Conductor Diameter (mm)	Thickness Shielding Semi Conductor (mm)	Thickness Coverage (mm)		Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging
				XLPE (mm)	HDPE (mm)			Coil (m)
35,00	7	6,8 rc	0,4	1,5	1,5	13,7	195,3	1000
50,00	7	8,0 rc	0,4	1,5	1,5	15,0	239,1	1000
70,00	19	9,5 rc	0,4	1,5	1,5	16,5	310,1	1000
95,00	19	11,2 rc	0,4	1,5	1,5	18,2	394,2	1000
120,00	37	12,8 rc	0,4	1,5	1,5	19,8	475,9	1000
150,00	37	14,0 rc	0,4	1,5	1,5	21,0	559,0	1000
185,00	37	15,8 rc	0,4	1,5	1,5	22,8	673,4	500
240,00	37	18,0 rc	0,4	1,5	1,5	25,1	841,7	500
300,00	37	20,4 rc	0,4	1,5	1,5	27,2	1041,3	500

*Data subject to change without prior notice

Electrical and Mechanical Characteristics

Nominal crossection (mm ²)	Electrical Resistance (Rcc 20 °C) (Ω/km)	Electrical Resistance (Rca 90 °C) (Ω/km)	Inductive reactance (Ω/km)	Capacity Current Conduction (A)*	Tensile Strength (daN)
35,00	0,868	1,113	0,136	199	455
50,00	0,641	0,822	0,131	246	650
70,00	0,443	0,568	0,126	291	910
95,00	0,320	0,410	0,121	360	1235
120,00	0,253	0,324	0,118	432	1560
150,00	0,206	0,263	0,115	496	1943
185,00	0,164	0,210	0,113	553	2405
240,00	0,125	0,160	0,096	640	3120
300,00	0,100	0,129	0,110	759	3900

* Current-carrying capacity at 40 °C, solar radiation 1000 W/m², wind speed 2.2 km/h.

Maxlink SC AL Cable 25 kV

NBR 11873



90 °C

Conductor

Formed by bare aluminum wires, alloy 1350, temper H19, stranding class 2, round compact, meeting the requirements of the standard NBR NM 280.

Conductor Lockout

In water blocking tape.

Coverage

XLPE 90 °C Anti-tracking cross-linked polyethylene compound, in gray or black, with protection against UV rays.

Maximum temperatures at the conductor

- 90 °C in continuous service.
- 130 °C at overload.
- 250 °C short-circuit.

Implementation

Used in the installation of compact 25 kV networks, in areas where space is limited and less visual pollution is required, such as: tree-lined streets or squares, offering a smaller number of tree prunings and greater protection for the conductor.

Applicable Standards

NBR 11873 - Cables covered with polymeric material for overhead power distribution networks fixed in spacers, at voltages from 13.8 kV to 34.5 kV. NBR NM 280 - Insulated cable conductors

NBR 5118 - Bare 1350 aluminum wires of circular section for electrical purposes

Construction Data*

Nominal crosssection (mm ²)	Number of wires	Conductor Diameter (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging
						Coil (m)
35,00	7	6,8 r c	4,0	15,0	216,8	1000
50,00	7	8,0 r c	4,0	16,2	262,7	1000
70,00	19	9,5 r c	4,0	17,7	334,2	1000
95,00	19	11,2 r c	4,0	19,4	420,5	1000
120,00	37	12,8 r c	4,0	21,1	504,8	1000
150,00	37	14,0 r c	4,0	22,3	587,1	1000
185,00	37	15,8 r c	4,0	24,1	703,3	500
240,00	37	18,0 r c	4,0	26,3	875,9	500
300,00	37	20,4 r c	4,0	28,4	1071,6	500

*Data subject to change without prior notice

Características Elétricas e Mecânicas

Nominal crosssection (mm ²)	Electrical Resistance (Rcc 20 °C) (Ω/km)	Electrical Resistance (Rca 90 °C) (Ω/km)	Inductive reactance (Ω/km)	Capacity Current Conduction (A)*	Tensile Strength (daN)
35,00	0,868	1,113	0,136	186	455
50,00	0,641	0,822	0,131	224	650
70,00	0,443	0,568	0,126	280	910
95,00	0,320	0,410	0,121	342	1235
120,00	0,253	0,324	0,118	355	1560
150,00	0,206	0,264	0,115	399	1943
185,00	0,210	0,21	0,113	464	2405
240,00	0,160	0,16	0,096	552	3120
300,00	0,100	0,129	0,110	777	3900

* Current-carrying capacity considering temperature of 40 °C, solar radiation of W/m², wind speed: 2,2 km/h

Maxlink SC DC AL Cable 25 kV

NBR 11873

90 °C



Conductor

Cable formed by aluminum wires alloy 1350, tempera H19, stranding class 2, round compact, meeting the requirements of the standard NBR 5118 and NBR NM 280.

Conductor Lockout

In Water Blocking Tape.

Conductor Shielding

Semiconductor shielding in polymeric material compatible with cover material.

Coverage

In double layer being the inner layer in XLPE - Cross-linked polyethylene compound and the outer layer in HDPE - High density polyethylene compound with Anti-Tracking characteristics.

Maximum temperatures at the conductor

- 70 °C in continuous service
- 90 °C at overload
- 160 °C short-circuit

Implementation

Indicated in the installations of compact 25kV networks, in regions where the space is reduced such as streets or wooded squares, offering less tree pruning, better visual aspect and greater protection for the conductor, reducing the number of interruptions of the electricity supply and consequently reducing the cost of maintenance.

Applicable Standards

NBR 11873 - Cables covered with polymeric material for overhead power distribution networks fixed in spacers, at voltages from 13.8 kV to 34.5 kV NBR NM 280 - Insulated cable conductors.

NBR 5118 - Bare aluminum wires of circular section for electrical wires

Construction Data*

Nominal crosssection (mm ²)	Number of wires	Conductor Diameter (mm)	Thickness Shielding (mm)	Thickness XLPE (mm)	Thickness HDPE (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging
								Coil (m)
35,00	7	6,8 r c	0,4	2,0	2,0	15,8	239,9	1000
50,00	7	8,0 r c	0,4	2,0	2,0	17,0	287,3	1000
70,00	19	9,5 r c	0,4	2,0	2,0	18,5	361,7	1000
95,00	19	11,2 r c	0,4	2,0	2,0	20,3	452,4	1000
120,00	37	12,8 r c	0,4	2,0	2,0	21,9	538,9	1000
150,00	37	14,0 r c	0,4	2,0	2,0	23,1	623,6	1000
185,00	37	15,8 r c	0,4	2,0	2,0	24,9	744,0	500
240,00	37	18,0 r c	0,4	2,0	2,0	27,1	920,9	500
300,00	37	20,4 r c	0,4	2,0	2,0	29,2	1125,1	500

r c - round compact *Data subject to change without notice

Electrical and Mechanical Characteristics

Nominal crosssection (mm ²)	Electrical Resistance (Rcc 20 °C) (Ω/km)	Electrical Resistance (Rca 90 °C) (Ω/km)	Inductive reactance (Ω/km)	Capacity Current Conduction (A)*	Tensile Strength (daN)
35,00	0,868	1,113	0,136	186	455
50,00	0,641	0,822	0,131	224	650
70,00	0,443	0,568	0,126	280	910
95,00	0,320	0,410	0,121	342	1235
120,00	0,253	0,324	0,118	355	1560
150,00	0,206	0,264	0,115	399	1943
185,00	0,210	0,21	0,113	464	2405
240,00	0,160	0,16	0,096	552	3120
300,00	0,100	0,129	0,110	777	3900

* Current-carrying capacity considering temperature of 40 °C, solar radiation of 1000 W/m², wind speed: 2,2 km/h

Maxlink SC AL Cable 35 kV

NBR 11873



90 °C

Conductor

Formed by bare aluminum wires, alloy 1350, temper H19, stranding class 2, round compact, meeting the requirements of the standard NBR NM 280.

Conductor Lockout

In water blocking tape.

Conductor Shielding

In semiconductor thermosetting compound.

Coverage

XLPE 90 °C - Anti tracking cross-linked polyethylene compound, in gray or black colors, with UV protection.

Maximum temperatures at the conductor

- 90 °C in continuous service
- 130 °C at overload
- 250 °C short-circuit

Implementation

Used in the installation of 35 kV compact networks, in areas where space is limited and less visual pollution is required, such as tree-lined streets or squares, offering less tree pruning and greater protection for the conductor.

Applicable Standards

NBR 11873 - Cables covered with polymeric material for overhead power distribution networks fixed in spacers, at voltages from 13.8 kV to 34.5 kV. NBR NM 280 - Insulated cable conductors
NBR 5118 - Bare 1350 aluminum wires of circular section for electrical purposes

Construction Data*

Nominal Section (mm ²)	Number of wires	Conductor Diameter (mm)	Thickness Shielding Semi Conductor (mm)	Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging
							Coil (m)
70,00	19	9,5 r c	0,4	7,6	25,8	595,7	1000
95,00	19	11,2 r c	0,4	7,6	27,6	702,8	1000
120,00	37	12,8 r c	0,4	7,6	29,2	805,9	1000
150,00	37	14,0 r c	0,4	7,6	30,4	905,2	1000
185,00	37	15,8 r c	0,4	7,6	32,1	1041,8	500
240,00	37	18,0 r c	0,4	7,6	34,5	1245,2	500
300,00	37	20,4 r c	0,4	7,6	36,4	1428,9	500

*Data subject to change without prior notice

Electrical and Mechanical Characteristics

Nominal crosssection (mm ²)	Electrical Resistance (Rcc 20 °C) (Ω/km)	Electrical Resistance (Rca 90 °C) (Ω/km)	Inductive reactance (Ω/km)	Capacity Current Conduction (A)*	Tensile Strength (daN)
70,00	0,443	0,568	0,126	270	910
95,00	0,320	0,410	0,121	329	1235
120,00	0,253	0,324	0,118	381	1560
150,00	0,206	0,264	0,115	432	1943
185,00	0,164	0,210	0,113	497	2405
240,00	0,125	0,160	0,096	589	3120
300,00	0,100	0,129	0,110	843	3900

* Current-carrying capacity at 40 °C, solar radiation 1000 W/m², wind speed: 2.2 km/h

Maxlink SC DC AL Cable 35 kV

NBR 11873

90 °C



Conductor

Cable formed by aluminum wires alloy 1350, tempera H19, stranding class 2, round compact, meeting the requirements of the standard NBR 5118 and NBR NM 280.

Conductor Lockout

In Water Blocking Tape.

Conductor Shielding

Semiconductor shielding in polymeric material compatible with cover material.

Coverage

Double-layered with the inner layer made of XLPE 90 °C - Cross-linked polyethylene compound and the outer layer of in HDPE - High density polyethylene compound with Anti-Tracking characteristics.

Maximum temperatures at the conductor

- 90 °C in continuous service
- 130 °C at overload
- 250 °C short-circuit

Implementation

Indicated in the installations of compact 35kV networks, in regions where the space is reduced such as streets or wooded squares, offering less tree pruning, better visual aspect and greater protection for the conductor, reducing the number of interruptions of the electricity supply and consequently reducing the cost of maintenance.

Applicable Standards

NBR 11873 - Cables covered with polymeric material for overhead power distribution networks fixed in spacers, at voltages from 13.8 kV to 34.5 kV NBR NM 280 - Insulated cable conductors.

NBR 5118 - Bare aluminum wires of circular section for electrical wires

Construction Data*

Nominal crosssection (mm ²)	Number of wires	Conductor Diameter (mm)	Thickness Shielding (mm)	Thickness XLPE (mm)	Thickness HDPE (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging Coil (m)
70,00	19	9,5 r c	0,4	3,8	3,8	25,8	599,8	1000
95,00	19	11,2 r c	0,4	3,8	3,8	27,5	707,4	1000
120,00	37	12,8 r c	0,4	3,8	3,8	29,1	810,8	1000
150,00	37	14,0 r c	0,4	3,8	3,8	30,3	908,1	1000
185,00	37	15,8 r c	0,4	3,8	3,8	32,2	1050,2	500
240,00	37	18,0 r c	0,4	3,8	3,8	34,4	1248,6	500
300,00	37	20,4 r c	0,4	3,8	3,8	36,4	1481,2	500

r c - round compact *Data subject to change without prior notice

Electrical and Mechanical Characteristics

Nominal crosssection (mm ²)	Electrical Resistance (Rcc 20 °C) (Ω/km)	Electrical Resistance (Rca 90 °C) (Ω/km)	Inductive reactance (Ω/km)	Capacity Current Conduction (A)*	Tensile Strength (daN)
70,00	0,443	0,568	0,126	270	910
95,00	0,320	0,410	0,121	329	1235
120,00	0,253	0,324	0,118	381	1560
150,00	0,206	0,264	0,115	432	1943
185,00	0,164	0,210	0,113	497	2405
240,00	0,125	0,160	0,096	589	3120
300,00	0,100	0,129	0,110	843	3900

* Current-carrying capacity considering temperature 40 °C, solar radiation 1000 W/m², vwind speed: 2.2 km/h

Maxlink SC BSC CAA Cable 25kV

NBR 11873

90 °C



Conductor

Cable made of aluminum wires alloy 1350, temper H19, stranding class 2, normal round with steel core.

Conductor Lockout

In polymeric compound.

Conductor Shielding

Semiconductor shielding in polymeric material compatible with cover material.

Coverage

XLPE 90 °C - Anti Tracking cross-linked polyethylene compound, in gray color, with protection against UV rays.

Maximum temperatures at the conductor

- 90 °C in continuous service
- 130 °C at overload
- 250 °C short-circuit

Implementation

Indicated in the installations of compact 25kV networks, in regions where the space is reduced such as streets or wooded squares, offering less tree pruning, better visual aspect and greater protection for the conductor, reducing the number of interruptions of the electricity supply and consequently reducing the cost of maintenance.

Applicable Standards

NBR 11873 - Cables covered with polymeric material for overhead power distribution networks

NBR NM 280 - Insulated cable conductors, for voltages from 13.8 kV to 34.5 kV.

NBR 5118 - Bare aluminum wires of circular section for electrical wires

Construction Data*

Nominal Section AWG	Number of wires		Conductor Diameter (mm)		Thickness Coverage (mm)	Outer Diameter (mm)	Approx mass (kg/km)	Standard Packaging
	AL	Steel						Coil (m)
2	6	1	8,0	rn	4,0	17,0	314	1000

*r n - normal round *Data subject to change without notice*

Electrical and Mechanical Characteristics

Nominal Section (AWG)	Electrical Resistance (Rcc 20 °C) (Ω/km)	Capacity Current Conduction (A)*	Tensile Strength (daN)
2	0,850	223	1265

* Current carrying capacity considering a temperature of 40 °C, solar radiation of 1000 W/m², wind speed: 2,2 km/h

Auto Cable FLRY-A T2 300V

ISO 6722-1

Conductor

Formed of electrolytic bare copper wire, soft temper, stranding class A, according to ISO 6722-1.

Insulation

PPVC 105 °C - Flame retardant polyvinyl chloride thermoplastic compound, class B (T2), according to ISO 6722-1.

Identification

White, Yellow, Blue, Dark Blue, Green, Red, Black, Brown, Gray, Violet, Pink, Orange, Beige and Dark Green.

Note: Cables can be manufactured with two color combinations, through longitudinal stripes, where the main color represents at least 70%.

Maximum temperatures at the conductor

- -40 °C to 105 °C in continuous service.

Implementation

Employed in electrical harnesses of motor vehicles, agricultural machinery and implements.

Applicable Standards

ISO 6722-1 - Road vehicles - 60V and 600V single-core cables - Part 1: Dimensions, test methods and requirements for copper conductor cables.

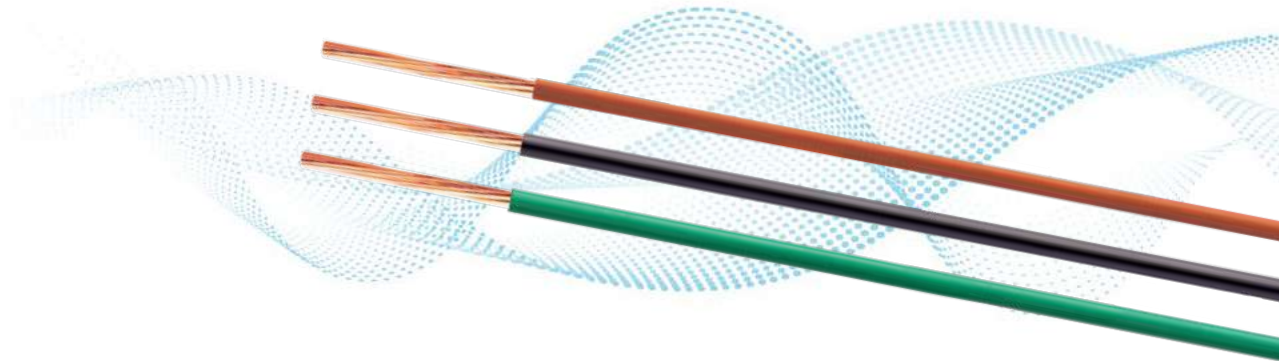
Construction Data*

Nominal Section (mm ²)	Number of wires	Maximum Wire Diameter (mm)	Conductor Diameter (mm)	Maximum Electrical Resistance (Ω/km)	Thickness Insulation		Outer Diameter		Approx mass (kg/km)	Standard Packaging (m)
					Minimum (mm)	Nominal (mm)	Minimum (mm)	Maximum (mm)		
0,35	7	0,27	0,8	54,4	0,20	0,25	1,20	1,30	4,3	4000
0,50	19	0,19	0,9	37,1	0,22	0,28	1,40	1,60	5,9	3000
0,75	19	0,24	1,1	24,7	0,24	0,30	1,70	1,90	8,4	2000
1,00	19	0,27	1,3	18,5	0,24	0,30	1,90	2,10	11,2	1500
1,25	19	0,30	1,4	14,9	0,24	0,30	2,10	2,30	13,5	1400
1,50	19	0,33	1,5	12,7	0,24	0,30	2,20	2,40	15,4	1300
2,00	19	0,38	1,8	9,42	0,28	0,35	2,50	2,70	20,5	1000
2,50	37	0,28	2,0	7,60	0,28	0,35	2,70	3,00	24,5	800
3,00	37	0,34	2,2	6,15	0,32	0,40	3,10	3,40	30,9	700

*Data subject to change without prior notice

Auto Cable FLRY-B T2 300V

ISO 6722-1



Conductor

Formed of electrolytic bare copper wire, soft temper, stranding class B, according to ISO 6722-1.

Insulation

PVC 105 °C - Flame retardant polyvinyl chloride thermoplastic compound, class B (T2), according to ISO 6722-1.

Identification

White, Yellow, Blue, Dark Blue, Green, Red, Black, Brown, Gray, Violet, Pink, Orange, Beige and Dark Green. Note: For sections from 0,35 to 8,00 mm², cables can be manufactured with two color combinations, through longitudinal stripes, where the main color represents at least 70%.

Maximum temperatures at the conductor

- -40 °C to 105 °C in continuous service.

Implementation

Employed in electrical harnesses of motor vehicles, agricultural machinery and implements.

Applicable Standards

ISO 6722-1 - Road vehicles - 60V and 600V single-core cables - Part 1: Dimensions, test methods and requirements for copper conductor cables.

Construction Data*

Nominal crosssection (mm ²)	Minimum Number of Wires	Maximum Wire Diameter (mm)	Conductor Diameter (mm)	Maximum Electrical Resistance (Ω/km)	Thickness Insulation		Outer Diameter		Approx mass (kg/km)	Standard Packaging (m)
					Minimum (mm)	Nominal (mm)	Minimum (mm)	Maximum (mm)		
0,35	12	0,21	0,8	54,4	0,20	0,25	1,20	1,40	4,8	4000
0,50	16	0,21	0,9	37,1	0,22	0,28	1,40	1,60	5,9	3000
0,75	24	0,21	1,1	24,7	0,24	0,30	1,70	1,90	8,4	2000
1,00	32	0,21	1,3	18,5	0,24	0,30	1,90	2,10	10,8	1500
1,25	16	0,33	1,4	14,9	0,24	0,30	2,00	2,20	13,4	1400
1,50	30	0,26	1,5	12,7	0,24	0,30	2,20	2,40	15,3	1300
2,00	28	0,31	1,8	9,42	0,28	0,35	2,50	2,80	20,6	1000
2,50	50	0,26	2,0	7,60	0,28	0,35	2,70	3,00	24,8	800
3,00	44	0,31	2,2	6,15	0,32	0,40	3,00	3,30	32,5	700
4,00	56	0,31	2,5	4,70	0,32	0,40	3,40	3,70	39,8	500
5,00	65	0,33	2,7	3,94	0,32	0,40	3,60	3,90	46,2	400
6,00	84	0,31	3,1	3,14	0,32	0,40	4,00	4,30	58,2	300
8,00	50	0,46	3,5	2,38	0,32	0,40	4,40	4,80	75,6	1500
10,00	80	0,41	4,0	1,82	0,48	0,60	5,10	5,50	103,2	1000
12,00	96	0,41	4,4	1,52	0,48	0,60	5,50	5,90	115,9	1000
16,00	126	0,41	5,3	1,16	0,52	0,65	6,60	7,00	174,7	750
20,00	152	0,41	5,9	0,955	0,52	0,65	7,20	7,60	190,7	600
25,00	196	0,41	6,6	0,743	0,52	0,65	7,90	8,30	236,8	500
30,00	224	0,41	7,1	0,647	0,64	0,80	8,60	9,00	275,0	500
35,00	276	0,41	7,9	0,527	0,64	0,80	9,40	9,80	334,5	500
40,00	308	0,41	8,3	0,473	0,71	0,90	10,00	10,40	373,5	500
50,00	396	0,41	9,4	0,368	0,71	0,90	11,40	11,80	479,2	500
60,00	296	0,51	10,2	0,315	0,80	1,00	12,30	12,70	561,1	500
70,00	360	0,51	11,2	0,259	0,80	1,00	13,40	13,80	678,2	500

*Data subject to change without prior notice

Auto Cable FLY-B T2 300V

ISO 6722-1

Conductor

Formed of electrolytic bare copper wire, soft temper, stranding class B, according to ISO 6722-1.

Insulation

PVC 105 °C - Flame retardant polyvinyl chloride thermoplastic compound, class B (T2), according to ISO 6722-1.

Identification

White, Yellow, Blue, Dark Blue, Green, Red, Black, Brown, Gray, Violet, Pink, Orange, Beige and Dark Green. Note: For sections from 0.35 to 8.00 mm², cables can be manufactured with two color combinations, through longitudinal stripes, where the main color represents at least 70%.

Maximum temperatures at the conductor

- -40 °C to 105 °C in continuous service.

Implementation

Employed in electrical harnesses of motor vehicles, agricultural machinery and implements.

Applicable Standards

ISO 6722-1 - Road vehicles - 60V and 600V single-core cables - Part 1: Dimensions, test methods and requirements for copper conductor cables.

Construction Data*

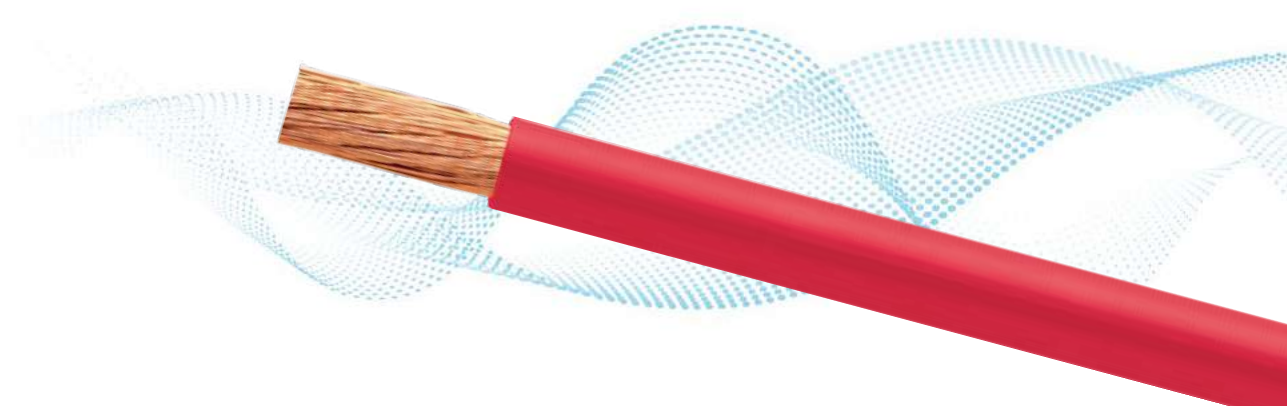
Nominal Section (mm ²)	Minimum Number of Wires	Maximum Wire Diameter (mm)	Conductor Diameter (mm)	Maximum Electrical Resistance (Ω/km)	Thickness Insulation		Outer Nominal Diameter		Approx mass (kg/km)	Standard Packaging (m)
					Minimum (mm)	Nominal (mm)	Minimum (mm)	Maximum (mm)		
0,50	16	0,21	0,9	37,1	0,48	0,60	2,00	2,30	8,3	1400
0,75	24	0,21	1,1	24,7	0,48	0,60	2,20	2,50	10,9	1200
1,00	32	0,21	1,3	18,5	0,48	0,60	2,40	2,70	13,5	1000
1,25	16	0,33	1,4	14,9	0,48	0,60	2,55	2,85	16,3	900
1,50	30	0,26	1,5	12,7	0,48	0,60	2,70	3,00	18,1	800
2,00	28	0,31	1,8	9,42	0,48	0,60	2,90	3,20	23,2	700
2,50	50	0,26	2,0	7,60	0,56	0,70	3,30	3,60	29,0	500
3,00	44	0,31	2,2	6,15	0,56	0,70	3,55	3,85	34,9	500
4,00	56	0,31	2,5	4,70	0,64	0,80	4,00	4,30	45,3	350
5,00	65	0,33	2,7	3,94	0,64	0,80	4,20	4,50	52,0	350
6,00	84	0,31	3,1	3,14	0,64	0,80	4,60	4,90	64,0	300
8,00	50	0,46	3,5	2,38	0,64	0,80	5,00	5,40	82,0	1000
10,00	80	0,41	4,0	1,82	0,80	1,00	5,90	6,30	108,0	1000
12,00	96	0,41	4,4	1,52	0,80	1,00	6,30	6,70	126,6	1000
16,00	126	0,41	5,3	1,16	0,80	1,00	7,20	7,60	184,1	750
20,00	152	0,41	5,9	0,955	0,80	1,10	8,00	8,40	204,3	600
25,00	196	0,41	6,6	0,743	1,04	1,30	9,20	9,60	259,9	500
30,00	224	0,41	7,1	0,647	1,04	1,30	9,70	10,10	295,5	500
35,00	276	0,41	7,9	0,527	1,04	1,30	10,40	10,80	356,7	500
40,00	308	0,41	8,3	0,473	1,20	1,40	11,00	11,40	397,0	500
50,00	396	0,41	9,4	0,368	1,20	1,50	12,40	12,80	505,6	500
60,00	296	0,51	10,2	0,315	1,20	1,50	13,30	13,70	583,8	500
70,00	360	0,51	11,2	0,259	1,20	1,50	14,20	14,60	702,7	500

*Data subject to change without prior notice

Auto Cable FLRY-C T2 300V

ISO 6722-1

Extra flexible



Conductor

Formed of electrolytic bare copper wire, soft temper, stranding class C, according to ISO 6722-1.

Insulation

PVC 105 °C - CFlame retardant polyvinyl chloride thermoplastic compound, class B (T2), according to ISO 6722-1.

Identification

White, Yellow, Blue, Dark Blue, Green, Red, Black, Brown, Gray, Violet, Pink, Orange, Beige and Dark Green.

Note: Cables can be manufactured with two color combinations, through longitudinal stripes, where the main color represents at least 70%.

Maximum temperatures at the conductor

- 40 °C to 105 °C in continuous service.

Implementation

Employed in electrical harnesses of motor vehicles, agricultural machinery and implements.

Applicable Standards

ISO 6722-1 - Road vehicles - 60V and 600V single-core cables - Part 1: Dimensions, test methods and requirements for copper conductor cables.

Construction Data*

Nominal Section (mm ²)	Minimum Number of Wires	Maximum Wire Diameter (mm)	Diameter Conductor (mm)	Maximum Electrical Resistance (Ω/km)	Thickness Insulation		Outer Diameter		Approx mass (kg/km)	Standard Packaging (m)
					Minimum (mm)	Nominal (mm)	Minimum (mm)	Maximum (mm)		
8,00	240	0,21	3,6	2,38	0,32	0,40	4,30	4,70	74,6	1500
10,00	320	0,21	4,1	1,82	0,48	0,60	5,20	5,60	102,2	1000
12,00	380	0,21	4,5	1,52	0,48	0,60	5,60	6,00	119,5	1000
16,00	512	0,21	5,1	1,16	0,52	0,65	6,40	6,80	158,9	750
20,00	610	0,21	5,6	0,955	0,52	0,65	6,90	7,30	186,1	600
25,00	790	0,21	6,4	0,743	0,52	0,65	7,60	8,00	237,9	500
30,00	900	0,21	6,8	0,647	0,64	0,80	8,40	8,80	273,6	500
35,00	1070	0,21	7,6	0,527	0,64	0,80	9,10	9,50	337,6	500
40,00	1200	0,21	8,0	0,473	0,71	0,90	9,80	10,20	377,0	500
50,00	1600	0,21	9,1	0,368	0,71	0,90	10,80	11,30	486,5	500
60,00	1200	0,26	9,8	0,315	0,80	1,00	11,80	12,30	574,8	500
70,00	1427	0,26	10,8	0,259	0,80	1,00	12,70	13,20	684,5	500

*Data subject to change without prior notice

Auto Cable FLY-C T2 300V

ISO 6722-1

Extra flexible



Conductor

Formed of electrolytic bare copper wire, soft temper, stranding class C, according to ISO 6722-1.

Insulation

PVC 105 °C Flame retardant polyvinyl chloride thermoplastic compound, class B (T2), according to ISO 6722-1.

Identification

White, Yellow, Blue, Dark Blue, Green, Red, Black, Brown, Gray, Violet, Pink, Orange, Beige and Dark Green.

Note: Cables can be manufactured with two color combinations, through longitudinal stripes, where the main color represents at least 70%.

Maximum temperatures at the conductor

- 40 °C to 105 °C in continuous service.

Implementation

Employed in electrical harnesses of motor vehicles, machinery and agricultural implements.

Applicable Standards

ISO 6722-1 - Road vehicles - 60V and 600V single-core cables - Part 1: Dimensions, test methods and requirements for copper conductor cables.

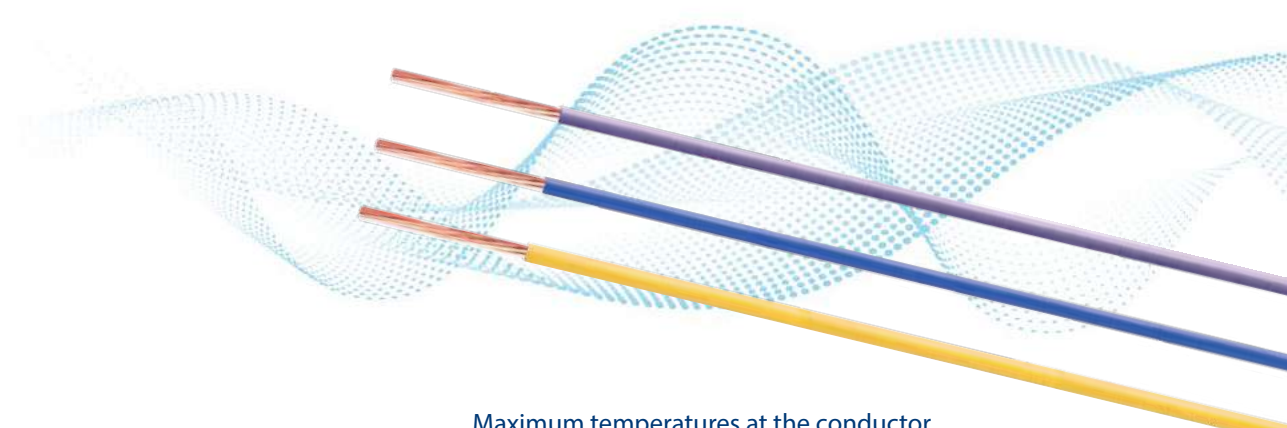
Construction Data*

Nominal Section (mm ²)	Minimum Number of Wires	Maximum Wire Diameter (mm)	Conductor Diameter (mm)	Maximum Electrical Resistance (Ω/km)	Thickness Insulation		Outer Diameter		Approx mass (kg/km)	Standard Packaging (m)
					Minimum (mm)	Nominal (mm)	Minimum (mm)	Maximum (mm)		
8,00	240	0,21	3,6	2,38	0,64	0,80	5,10	5,50	83,7	1500
10,00	320	0,21	4,1	1,82	0,80	1,00	6,00	6,40	112,4	1000
12,00	380	0,21	4,5	1,52	0,80	1,00	6,40	6,80	130,4	1000
16,00	512	0,21	5,1	1,16	0,80	1,00	7,10	7,50	169,5	750
20,00	610	0,21	5,6	0,955	0,88	1,10	7,80	8,20	200,9	600
25,00	790	0,21	6,4	0,743	1,04	1,30	8,90	9,30	262,1	500
30,00	900	0,21	6,8	0,647	1,04	1,30	9,40	9,80	293,4	500
35,00	1070	0,21	7,6	0,527	1,04	1,30	10,10	10,60	360,2	500
40,00	1200	0,21	8,0	0,473	1,12	1,40	10,70	11,20	401,0	500
50,00	1600	0,21	9,1	0,368	1,20	1,50	12,00	12,50	517,3	500
60,00	1200	0,26	9,8	0,315	1,20	1,50	12,80	13,30	602,2	500
70,00	1427	0,26	10,8	0,259	1,20	1,50	13,70	14,20	714,1	500

*Data subject to change without prior notice

Auto Cable FLRYW-B T3 300V

ISO 6722-1



Conductor

Formed of electrolytic bare copper wire, soft temper, stranding class B, according to ISO 6722-1.

Insulation

PVC 125 °C - Flame retardant polyvinyl chloride thermoplastic compound, class C (T3), according to ISO 6722-1.

Identification

White, Yellow, Blue, Dark Blue, Green, Red, Black, Brown, Gray, Violet, Pink, Orange, Beige and Dark Green.

Note: For sections from 0.35 to 8.00 mm², cables can be manufactured with two color combinations, through longitudinal stripes, where the main color represents at least 70%.

Maximum temperatures at the conductor

- 40 °C to 125 °C in continuous service.

Implementation

Employed in electrical harnesses of motor vehicles, agricultural machinery and implements.

Applicable Standards

ISO 6722-1 - Road vehicles - 60V and 600V single-core cables - Part 1: Dimensions, test methods and requirements for copper conductor cables.

Construction Data*

Nominal Section (mm ²)	Minimum Number of Wires	Maximum Wire Diameter (mm)	Conductor Diameter (mm)	Maximum Electrical Resistance (Ω/km)	Thickness Insulation		Outer Diameter		Approx mass (kg/km)	Standard Packaging (m)
					Minimum (mm)	Nominal (mm)	Minimum (mm)	Maximum (mm)		
0,35	12	0,21	0,8	54,4	0,20	0,25	1,20	1,40	4,8	4000
0,50	16	0,21	0,9	37,1	0,22	0,28	1,40	1,60	5,9	3000
0,75	24	0,21	1,1	24,7	0,24	0,30	1,70	1,90	8,4	2000
1,00	32	0,21	1,3	18,5	0,24	0,30	1,90	2,10	10,8	1500
1,25	16	0,33	1,4	14,9	0,24	0,30	2,00	2,20	13,4	1400
1,50	30	0,26	1,5	12,7	0,24	0,30	2,20	2,40	15,3	1300
2,00	28	0,31	1,8	9,42	0,28	0,35	2,50	2,80	20,6	1000
2,50	50	0,26	2,0	7,60	0,28	0,35	2,70	3,00	24,8	800
3,00	44	0,31	2,2	6,15	0,32	0,40	3,00	3,30	30,5	700
4,00	56	0,31	2,5	4,70	0,32	0,40	3,40	3,70	39,8	500
5,00	65	0,33	2,7	3,94	0,32	0,40	3,60	3,90	46,2	400
6,00	84	0,31	3,1	3,14	0,32	0,40	4,00	4,30	58,2	300
8,00	50	0,46	3,5	2,38	0,32	0,40	4,40	4,80	75,6	1500
10,00	80	0,41	4,0	1,82	0,48	0,60	5,10	5,50	98,0	1000
12,00	96	0,41	4,4	1,52	0,48	0,60	5,50	5,90	115,9	1000
16,00	126	0,41	5,3	1,16	0,52	0,65	6,60	7,00	174,7	750
20,00	152	0,41	5,9	0,955	0,52	0,65	7,20	7,60	190,7	600
25,00	196	0,41	6,6	0,743	0,52	0,65	7,90	8,30	236,8	500
30,00	224	0,41	7,1	0,647	0,64	0,80	8,60	9,00	275,0	500
35,00	276	0,41	7,9	0,527	0,64	0,80	9,40	9,80	334,5	500
40,00	308	0,41	8,3	0,473	0,71	0,90	10,00	10,40	373,5	500
50,00	396	0,41	9,4	0,368	0,71	0,90	11,40	11,80	479,2	500
60,00	296	0,51	10,2	0,315	0,80	1,00	12,30	12,70	561,1	500
70,00	360	0,51	11,2	0,259	0,80	1,00	13,40	13,80	678,2	500

*Data subject to change without prior notice

Auto Cable FLYW-B T3 300V

ISO 6722-1

Conductor

Formed of electrolytic bare copper wire, soft temper, stranding class B, according to ISO 6722-1.

Insulation

PVC 125 °C - Flame retardant polyvinyl chloride thermoplastic compound, class C (T3), according to ISO 6722-1.

Identification

White, Yellow, Blue, Dark Blue, Green, Red, Black, Brown, Gray, Violet, Pink, Orange, Beige and Dark Green.

Note: For sections from 0.35 to 8.00 mm², cables can be manufactured with two color combinations, through longitudinal stripes, where the main color represents at least 70%.

Maximum temperatures at the conductor

- 40 °C to 125 °C in continuous service.

Implementation

Employed in electrical harnesses of motor vehicles, agricultural machinery and implements.

Applicable Standards

ISO 6722-1 - Road vehicles - 60V and 600V single-core cables - Part 1: Dimensions, test methods and requirements for copper conductor cables.

Construction Data*

Nominal crosssection (mm ²)	Minimum Number of Wires	Maximum Wire Diameter (mm)	Conductor Diameter (mm)	Maximum Electrical Resistance (Ω/km)	Espessura Insulation		Outer Diameter		Approx mass (kg/km)	Standard Packaging (m)
					Minimum (mm)	Nominal (mm)	Minimum (mm)	Maximum (mm)		
0,50	16	0,21	0,9	37,1	0,48	0,60	2,00	2,30	8,3	1400
0,75	24	0,21	1,1	24,7	0,48	0,60	2,20	2,50	10,9	1200
1,00	32	0,21	1,3	18,5	0,48	0,60	2,40	2,70	13,5	1000
1,25	16	0,33	1,4	14,9	0,48	0,60	2,55	2,85	16,3	900
1,50	30	0,26	1,5	12,7	0,48	0,60	2,70	3,00	18,1	800
2,00	28	0,31	1,8	9,42	0,48	0,60	2,90	3,20	23,2	700
2,50	50	0,26	2,0	7,60	0,56	0,70	3,30	3,60	29,0	500
3,00	44	0,31	2,2	6,15	0,56	0,70	3,55	3,85	34,9	500
4,00	56	0,31	2,5	4,70	0,64	0,80	4,00	4,30	45,3	350
5,00	65	0,33	2,7	3,94	0,64	0,80	4,20	4,50	52,0	350
6,00	84	0,31	3,1	3,14	0,64	0,80	4,60	4,90	64,0	300
8,00	50	0,46	3,5	2,38	0,64	0,80	5,00	5,40	82,0	1000
10,00	80	0,41	4,0	1,82	0,80	1,00	5,90	6,30	108,0	1000
12,00	96	0,41	4,4	1,52	0,80	1,00	6,30	6,70	126,6	1000
16,00	126	0,41	5,3	1,16	0,80	1,00	7,20	7,60	184,1	750
20,00	152	0,41	5,9	0,955	0,80	1,10	8,00	8,40	204,3	600
25,00	196	0,41	6,6	0,743	1,04	1,30	9,20	9,60	259,9	500
30,00	224	0,41	7,1	0,647	1,04	1,30	9,70	10,10	295,5	500
35,00	276	0,41	7,9	0,527	1,04	1,30	10,40	10,80	356,7	500
40,00	308	0,41	8,3	0,473	1,20	1,40	11,00	11,40	397,0	500
50,00	396	0,41	9,4	0,368	1,20	1,50	12,40	12,80	505,6	500
60,00	296	0,51	10,2	0,315	1,20	1,50	13,30	13,70	583,8	500
70,00	360	0,51	11,2	0,259	1,20	1,50	14,20	14,60	702,7	500

*Data subject to change without prior notice

Auto Cable FLR9Y-A T3 300V

ISO 6722-1

Conductor

Formed of electrolytic bare copper wire, soft temper, stranding class A, according to ISO 6722-1.

Insulation

PP 125 °C - Flame retardant thermoplastic polypropylene compound, class C (T3), according to ISO 6722-1.

Identification

White, Yellow, Blue, Dark Blue, Green, Red, Black, Brown, Gray, Violet, Pink, Orange, Beige and Dark Green.

Note: Cables can be manufactured with two color combinations, through longitudinal stripes, where the main color represents at least 70%.

Maximum temperatures at the conductor

- 40 °C to 125 °C in continuous service.

Implementation

Employed in electrical harnesses of motor vehicles, machinery and agricultural implements.

Applicable Standards

ISO 6722-1 - Road vehicles - 60V and 600V single-core cables - Part 1: Dimensions, test methods and requirements for copper conductor cables.

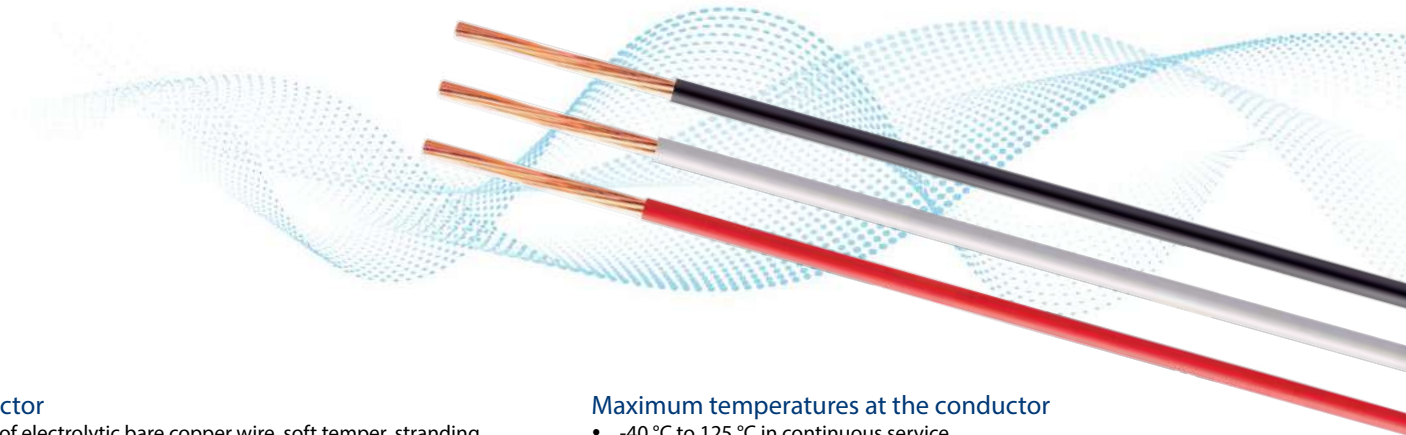
Construction Data*

Nominal Section (mm ²)	Number of wires	Maximum Wire Diameter (mm)	Conductor Diameter (mm)	Maximum Electrical Resistance (Ω/km)	Thickness Insulation		Outer Diameter		Approx mass (kg/km)	Standard Packaging (m)
					Minimum (mm)	Nominal (mm)	Minimum (mm)	Maximum (mm)		
0,35	7	0,27	0,8	54,4	0,20	0,25	1,20	1,30	4,1	4000
0,50	7	0,32	0,9	37,1	0,22	0,28	1,40	1,60	5,7	3000
0,75	19	0,24	1,1	24,7	0,24	0,30	1,70	1,90	8,1	2000
1,00	19	0,27	1,3	18,5	0,24	0,30	1,90	2,10	10,8	1500
1,25	19	0,30	1,4	14,9	0,24	0,30	2,10	2,30	13,0	1400
1,50	19	0,33	1,5	12,7	0,24	0,30	2,20	2,40	14,9	1300
2,00	19	0,38	1,8	9,42	0,28	0,35	2,50	2,70	19,9	1000
2,50	37	0,28	2,0	7,60	0,28	0,35	2,70	3,00	23,9	800
3,00	37	0,34	2,2	6,15	0,32	0,40	3,10	3,40	30,1	700

*Data subject to change without prior notice

Auto Cable FLR9Y-B T3 300V

ISO 6722-1



Conductor

Formed of electrolytic bare copper wire, soft temper, stranding class B, according to ISO 6722-1.

Insulation

PP 125 °C - Flame retardant polypropylene thermoplastic compound, class C (T3), according to ISO 6722-1.

Identification

White, Yellow, Blue, Dark Blue, Green, Red, Black, Brown, Gray, Violet, Pink, Orange, Beige and Dark Green.

Note: Cables can be manufactured with two color combinations, through longitudinal stripes, where the main color represents at least 70%.

Maximum temperatures at the conductor

- 40 °C to 125 °C in continuous service.

Implementation

Employed in electrical harnesses of motor vehicles, machinery and agricultural implements.

Applicable Standards

ISO 6722-1 - Road vehicles - 60V and 600V single-core cables - Part 1: Dimensions, test methods and requirements for copper conductor cables.

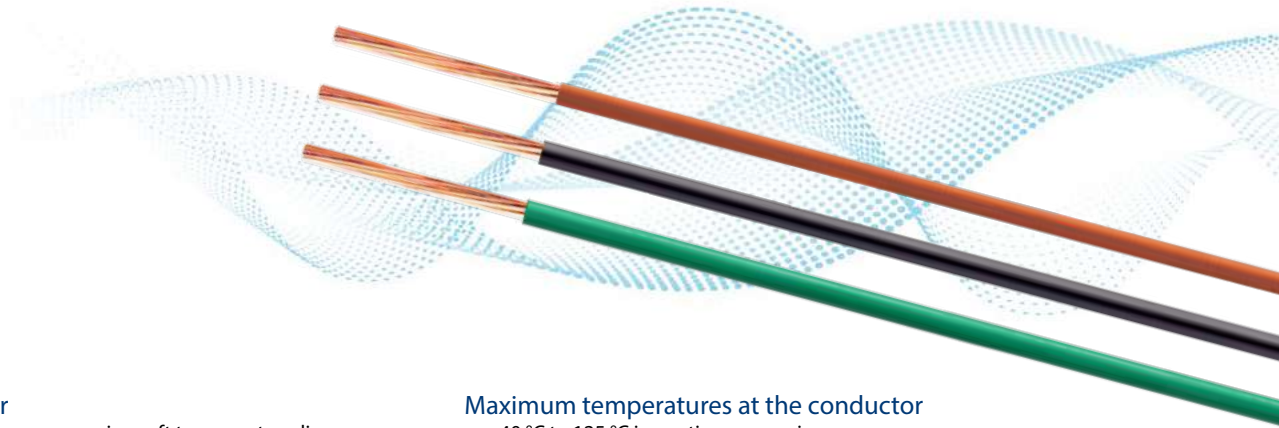
Construction Data*

Nominal crosssection (mm ²)	Minimum Number of Wires	Maximum Wire Diameter (mm)	Conductor Diameter (mm)	Maximum Electrical Resistance (Ω/km)	Thickness Insulation		Outer Diameter		Approx mass (kg/km)	Standard Packaging (m)
					Minimum (mm)	Nominal (mm)	Minimum (mm)	Maximum (mm)		
0,35	12	0,21	0,8	54,4	0,20	0,25	1,20	1,40	4,3	4000
0,50	16	0,21	0,9	37,1	0,22	0,28	1,40	1,60	5,7	3000
0,75	24	0,21	1,1	24,7	0,24	0,30	1,70	1,90	8,1	2000
1,00	32	0,21	1,3	18,5	0,24	0,30	1,90	2,10	10,4	1500
1,25	16	0,33	1,4	14,9	0,24	0,30	2,00	2,20	13,0	1400
1,50	30	0,26	1,5	12,7	0,24	0,30	2,20	2,40	14,8	1300
2,00	28	0,31	1,8	9,42	0,28	0,35	2,50	2,80	20,0	1000
2,50	50	0,26	2,0	7,60	0,28	0,35	2,70	3,00	24,2	800
3,00	44	0,31	2,2	6,15	0,32	0,40	3,00	3,30	29,8	700
4,00	56	0,31	2,5	4,70	0,32	0,40	3,40	3,70	38,9	500
5,00	65	0,33	2,7	3,94	0,32	0,40	3,60	3,90	45,2	400
6,00	84	0,31	3,1	3,14	0,32	0,40	4,00	4,30	57,0	300
8,00	50	0,46	3,5	2,38	0,32	0,40	4,40	4,80	74,1	200

*Data subject to change without prior notice

Auto Cable FL9Y-B T3 300V

ISO 6722-1



Flexible Conductor

Made of electrolytic bare copper wire, soft temper, stranding class B, according to ISO 6722-1.

Insulation

PP 125 °C - Flame retardant polypropylene thermoplastic compound, class C (T3), according to ISO 6722-1.

Identification

White, Yellow, Blue, Dark Blue, Green, Red, Black, Brown, Gray, Violet, Pink, Orange, Beige and Dark Green.

Note: Cables can be manufactured with two color combinations, through longitudinal stripes, where the main color represents at least 70%.

Maximum temperatures at the conductor

- 40 °C to 125 °C in continuous service.

Implementation

Employed in electrical harnesses of motor vehicles, agricultural machinery and implements.

Applicable Standards

ISO 6722-1 - Road vehicles - 60V and 600V single-core cables - Part 1: Dimensions, test methods and requirements for copper conductor cables.

Construction Data*

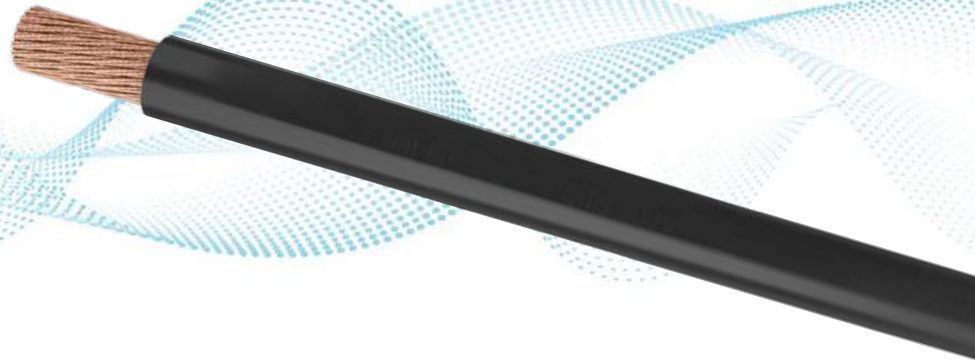
Nominal Section (mm ²)	Minimum Number of Wires	Maximum Wire Diameter (mm)	Conductor Diameter (mm)	Maximum Electrical Resistance (Ω/km)	Thickness Insulation		Outer Diameter		Approx mass (kg/km)	Standard Packaging (m)
					Minimum (mm)	Nominal (mm)	Minimum (mm)	Maximum (mm)		
0,50	16	0,21	0,9	37,1	0,48	0,60	2,00	2,30	7,7	1400
0,75	24	0,21	1,1	24,7	0,48	0,60	2,20	2,50	10,2	1200
1,00	32	0,21	1,3	18,5	0,48	0,60	2,40	2,70	12,7	1000
1,25	16	0,33	1,4	14,9	0,48	0,60	2,55	2,85	15,5	900
1,50	30	0,26	1,5	12,7	0,48	0,60	2,70	3,00	17,3	800
2,00	28	0,31	1,8	9,42	0,48	0,60	2,90	3,20	22,2	700
2,50	50	0,26	2,0	7,60	0,56	0,70	3,30	3,60	27,8	500
3,00	44	0,31	2,2	6,15	0,56	0,70	3,55	3,85	33,6	500
4,00	56	0,31	2,5	4,70	0,64	0,80	4,00	4,30	43,6	350
5,00	65	0,33	2,7	3,94	0,64	0,80	4,20	4,50	50,2	350
6,00	84	0,31	3,1	3,14	0,64	0,80	4,60	4,90	62,0	300
8,00	50	0,46	3,5	2,38	0,64	0,80	5,00	5,40	79,6	1000

*Data subject to change without prior notice

Auto Cable FLR9Y-C T3 300V

ISO 6722-1

Extra flexible



Conductor

Formed of electrolytic bare copper wire, soft temper, class C stranding, according to ISO 6722-1.

Insulation

TPV 125 °C - Flame retardant pre-vulcanized thermoplastic elastomeric compound, class C (T3), according to ISO 6722-1.

Identification

Red, Black and Brown.
Colors combined with longitudinal stripes.

Maximum temperatures at the conductor

- 40 °C to 125 °C in continuous service..

Implementation

Employed in electrical harnesses of motor vehicles, agricultural machinery and implements.

Applicable Standards

ISO 6722-1 - Road vehicles - 60V and 600V single-core cables - Part 1: Dimensions, test methods and requirements for copper conductor cables.

Construction Data*

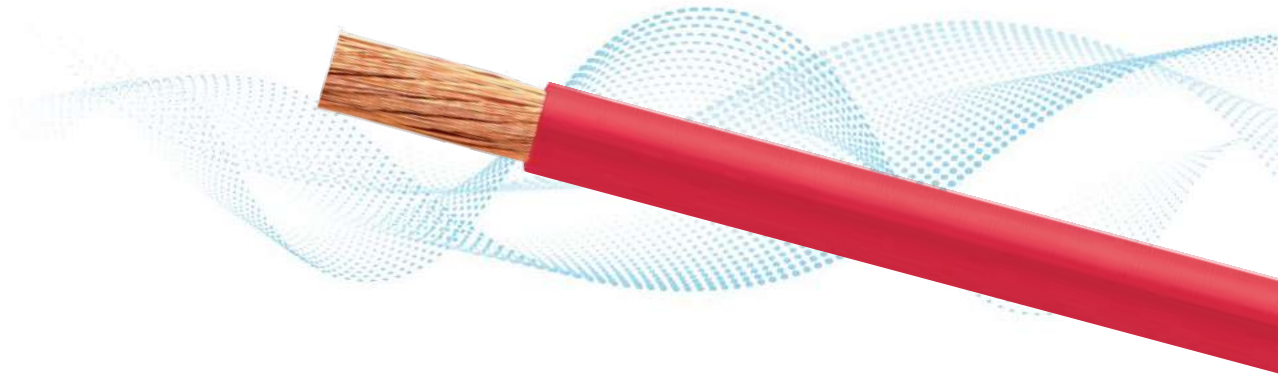
Nominal crosssection (mm ²)	Minimum Number of Wires	Maximum Wire Diameter (mm)	Conductor Diameter (mm)	Maximum Electrical Resistance (Ω/km)	Thickness Insulation		Outer Diameter		Approx mass (kg/km)	Standard Packaging (m)
					Minimum (mm)	Nominal (mm)	Minimum (mm)	Maximum (mm)		
8,00	240	0,21	3,6	2,38	0,32	0,40	4,30	4,70	72,3	1500
10,00	320	0,21	4,1	1,82	0,48	0,60	5,20	5,60	97,1	1000
12,00	380	0,21	4,5	1,52	0,48	0,60	5,60	6,00	115,3	1000
16,00	512	0,21	5,1	1,16	0,52	0,65	6,40	6,80	151,7	750
20,00	610	0,21	5,6	0,955	0,52	0,65	6,90	7,30	180,7	600
25,00	790	0,21	6,4	0,743	0,52	0,65	7,60	8,00	228,7	500
30,00	900	0,21	6,8	0,647	0,64	0,80	8,40	8,80	265,6	500
35,00	1070	0,21	7,6	0,527	0,64	0,80	9,10	9,50	324,1	500
40,00	1200	0,21	8,0	0,473	0,71	0,90	9,80	10,20	365,6	500
50,00	1600	0,21	9,1	0,368	0,71	0,90	10,80	11,30	467,8	500
60,00	1200	0,26	9,8	0,315	0,80	1,00	11,80	12,30	553,1	500
70,00	1427	0,26	10,8	0,259	0,80	1,00	12,70	13,20	667,9	500

*Data subject to change without prior notice

Auto Cable FL9Y-C T3 300V

ISO 6722-1

Extra flexible



Flexible Conductor

Formed of electrolytic bare copper wire, soft temper, class C stranding, according to ISO 6722-1.

Insulation

TPV 125 °C - Flame retardant pre-vulcanized thermoplastic elastomeric compound, class C (T3), according to ISO 6722-1.

Identification

Red, Black and Brown.
Colors combined with longitudinal stripes.

Maximum temperatures at the conductor

- 40 °C to 125 °C in continuous service.

Implementation

Employed in electrical harnesses of motor vehicles, agricultural machinery and implements.

Applicable Standards

ISO 6722-1 - Road vehicles - 60V and 600V single-core cables - Part 1: Dimensions, test methods and requirements for copper conductor cables.

Construction Data*

Nominal Section (mm ²)	Minimum Number of Wires	Maximum Wire Diameter (mm)	Conductor Diameter (mm)	Maximum Electrical Resistance (Ω/km)	Thickness Insulation		Outer Diameter		Approx mass (kg/km)	Standard Packaging (m)
					Minimum (mm)	Nominal (mm)	Minimum (mm)	Maximum (mm)		
8,00	240	0,21	3,6	2,38	0,64	0,80	5,10	5,50	79,3	1500
10,00	320	0,21	4,1	1,82	0,80	1,00	6,00	6,40	106,0	1000
12,00	380	0,21	4,5	1,52	0,80	1,00	6,40	6,80	123,6	1000
16,00	512	0,21	5,1	1,16	0,80	1,00	7,10	7,50	161,5	750
20,00	610	0,21	5,6	0,955	0,88	1,10	7,80	8,20	191,7	600
25,00	790	0,21	6,4	0,743	1,04	1,30	8,90	9,30	249,4	500
30,00	900	0,21	6,8	0,647	1,04	1,30	9,40	9,80	280,2	500
35,00	1070	0,21	7,6	0,527	1,04	1,30	10,10	10,60	344,7	500
40,00	1200	0,21	8,0	0,473	1,12	1,40	10,70	11,20	384,0	500
50,00	1600	0,21	9,1	0,368	1,20	1,50	12,00	12,50	495,9	500
60,00	1200	0,26	9,8	0,315	1,20	1,50	12,80	13,30	578,3	500
70,00	1427	0,26	10,8	0,259	1,20	1,50	13,70	14,20	689,1	500

*Data subject to change without prior notice

Auto Cable FLR2X-B T3 300V

ISO 6722-1



Conductor

Made of electrolytic bare copper wire, soft temper, stranding class B, according to ISO 6722-1.

Insulation

XLPE 125 °C - Flame retardant cross-linked polyethylene thermosetting compound, class C (T3), according to ISO 6722-1.

Identification

Red and Black

Note: other colors, on request.

Maximum temperatures at the conductor

- -40 °C to 125 °C in continuous service.

Implementation

Employed in electrical harnesses of motor vehicles, machinery and agricultural implements.

Applicable Standards

ISO 6722-1 - Road vehicles - 60V and 600V single-core cables - Part 1: Dimensions, test methods and requirements for copper conductor cables.

Construction Data*

Nominal Section (mm ²)	Minimum Number of Wires	Maximum Wire Diameter (mm)	Conductor Diameter (mm)	Maximum Electrical Resistance (Ω/km)	Thickness Insulation		Outer Diameter		Approx mass (kg/km)	Standard Packaging (m)
					Minimum (mm)	Nominal (mm)	Minimum (mm)	Maximum (mm)		
10,00	80	0,41	4,0	1,82	0,48	0,60	5,10	5,50	94,9	1000
12,00	96	0,41	4,4	1,52	0,48	0,60	5,50	5,90	111,6	1000
16,00	126	0,41	5,3	1,16	0,52	0,65	6,60	7,00	148,8	750
20,00	152	0,41	5,9	0,955	0,52	0,65	7,20	7,60	181,2	600
25,00	196	0,41	6,6	0,743	0,52	0,65	7,90	8,30	226,7	500
30,00	224	0,41	7,1	0,647	0,64	0,80	8,60	9,00	264,1	500
35,00	276	0,41	7,9	0,527	0,64	0,80	9,40	9,80	321,8	500
40,00	308	0,41	8,3	0,473	0,71	0,90	10,00	10,40	358,8	500
50,00	396	0,41	9,4	0,368	0,71	0,90	11,40	11,80	461,1	500
60,00	296	0,51	10,2	0,315	0,80	1,00	12,30	12,70	540,4	500
70,00	360	0,51	11,2	0,259	0,80	1,00	13,40	13,80	654,9	500

*Data subject to change without prior notice

Auto Cable FL2X-B T3 300V

ISO 6722-1



Conductor

Made of electrolytic bare copper wire, soft temper, stranding class B, according to ISO 6722-1.

Insulation

XLPE 125 °C - Flame retardant cross-linked polyethylene thermosetting compound, class C (T3), according to ISO 6722-1.

Identification

Red and Black.

Note: other colors, on request.

Maximum temperatures at the conductor

- -40 °C to 125 °C in continuous service.

Implementation

Employed in electrical harnesses of motor vehicles, machinery and agricultural implements.

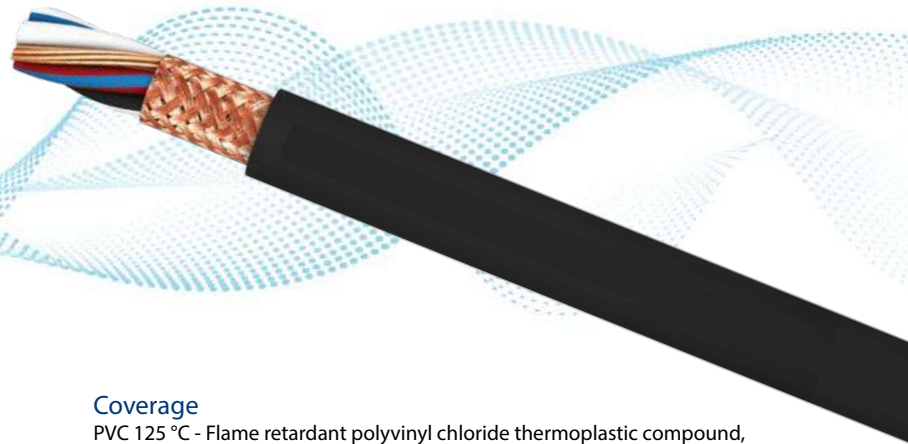
Applicable Standards

ISO 6722-1 - Road vehicles - 60V and 600V single-core cables - Part 1: Dimensions, test methods and requirements for copper conductor cables.

Construction Data*

Nominal crosssection (mm ²)	Minimum Number of Wires	Maximum Wire Diameter (mm)	Conductor Diameter (mm)	Maximum Electrical Resistance (Ω/km)	Thickness Insulation		Outer Diameter		Approx mass (kg/km)	Standard Packaging (m)
					Minimum (mm)	Nominal (mm)	Minimum (mm)	Maximum (mm)		
10,00	80	0,41	4,0	1,82	0,80	1,00	5,90	6,30	99,8	1000
12,00	96	0,41	4,4	1,52	0,80	1,00	6,30	6,70	117,8	1000
16,00	126	0,41	5,3	1,16	0,80	1,00	7,20	7,60	166,8	750
20,00	152	0,41	5,9	0,955	0,80	1,10	8,00	8,40	190,8	600
25,00	196	0,41	6,6	0,743	1,04	1,30	9,20	9,60	242,9	500
30,00	224	0,41	7,1	0,647	1,04	1,30	9,70	10,10	277,3	500
35,00	276	0,41	7,9	0,527	1,04	1,30	10,40	10,80	336,7	500
40,00	308	0,41	8,3	0,473	1,20	1,40	11,00	11,40	374,5	500
50,00	396	0,41	9,4	0,368	1,20	1,50	12,40	12,80	478,8	500
60,00	296	0,51	10,2	0,315	1,20	1,50	13,30	13,70	555,2	500
70,00	360	0,51	11,2	0,259	1,20	1,50	14,20	14,60	671,7	500

*Data subject to change without prior notice



Conductor

Formed of electrolytic bare copper wire, soft temper, stranding class A, according to ISO 6722-1.

Insulation

PP 125 °C (flame retardant polypropylene compound) and PVC 125 °C (flame retardant polyvinyl chloride thermoplastic compound), class C (T3), according to ISO 6722-1.

Identification

Veins colored according to standard.

Drain

Formed of electrolytic bare copper wire, soft temper, stranding class A, according to ISO 6722-1.

Shielding

- BMC - Shielding in mesh of electrolytic bare copper wires, soft temper, with a minimum coating of 80%.
- BFA - Shielding in aluminized polyester tape, applied longitudinally.

Coverage

PVC 125 °C - Flame retardant polyvinyl chloride thermoplastic compound, class C (T3), according to ISO 6722-1

Maximum temperatures at the conductor

- -40 °C to 125 °C in continuous service.

Implementation

Employed in electrical harnesses of motor vehicles, agricultural machinery and implements.

Applicable Standards

ISO 14572 - Road vehicles - Round, sheathed, 60V and 600V screened and unscreened single- or multi-core cables - Test methods and requirements for basic - and high-performance cables.

Construction Data*

Number of Conductors	Section (mm ²)	Conductor/Drain					Veins			Shielding					Compleat Cable				
		Number of Wires	Maximum Wire Diameter (mm)	Conductor Diameter (mm)	Maximum Electrical Resistance (Ω/km)	Minimum Thickness Insulation (mm)	Veins Outer Diameter		Passo Reunião Veias (mm)	Number of Wires	Maximum Wire Diameter (mm)	Coating Mesh (%)	Aluminized Tape		Minimum Thickness Coverage (mm)	Outer Diameter Cable		Approx mass (kg/km)	Standard Packaging (m)
							Minimum (mm)	Nominal (mm)					Width (mm)	Thickness (mm)		Minimum (mm)	Maximum (mm)		
1	0,50	7	0,30	0,9	40,1	0,22	1,5	1,6	35	96	0,13	87	13,2	0,05	0,5	4,3	4,6	30,0	1250
	0,35	7	0,26	0,8	52,0	0,20	1,3	1,4	45	96	0,13	84	13,2	0,05	0,4	4,4	4,6	30,8	1250
2	0,50	7	0,30	0,9	40,1	0,22	1,5	1,6	45	112	0,13	83	13,2	0,05	0,5	4,7	5,1	39,0	1250
	1,00	19	0,26	1,3	19,9	0,24	1,9	2,0	50	144	0,13	85	15,0	0,05	0,5	5,5	5,9	58,4	1000
	1,50	19	0,32	1,5	13,5	0,24	2,2	2,3	50	160	0,13	85	17,0	0,05	0,5	6,2	6,4	73,9	1250
3	0,50	7	0,30	0,9	40,1	0,22	1,5	1,6	45	120	0,13	83	15,0	0,05	0,5	5,0	5,4	47,3	1250
	1,00	19	0,26	1,3	19,9	0,24	1,9	2,0	50	144	0,13	82	17,0	0,05	0,5	5,9	6,2	70,9	1250
4	0,35	7	0,26	0,8	52,0	0,20	1,3	1,4	45	112	0,13	84	13,2	0,05	0,4	4,7	5,1	42,4	1250
	0,50	7	0,30	0,9	40,1	0,22	1,5	1,6	45	128	0,13	81	15,0	0,05	0,6	5,6	6,0	55,8	1000
	1,00	19	0,26	1,3	19,9	0,24	1,9	2,0	55	160	0,13	81	17,0	0,05	0,5	6,4	6,7	84,3	1000
5	0,35	7	0,26	0,8	52,0	0,20	1,3	1,4	45	128	0,104	84	13,2	0,05	0,4	5,3	5,7	51,9	1000

Battery and Power Cables

Cables: PVC, XLPE, HEPR, TPV insulated and non-halogenated

Application: power cables used in automotive, agricultural and heavy vehicles: battery, alternator, starter and motor span. Power cables used in industrial machinery and equipment for connections and/or derivations.



Ropes

In bare copper or tinned copper

Insulated by heat shrink components or without protection

Flat or round Sections

from 5.78 to 50 mm²

Application: Grounding and/or bonding.



NBR 5410 establishes the conditions that low-voltage electrical installations must meet in order to ensure the safety of people and animals, the proper functioning of the installation and the conservation of goods.

Applies to installations:

- a) residential, commercial, industrial electrical;
- b) in uncovered areas of properties, external to buildings;
- c) of camping trailers, camping sites, marinas and similar facilities;
- d) construction sites, fairs, exhibitions and other temporary facilities.
- e) of circuits supplied with a rated voltage of 1000 V or less in alternating current, with frequencies below 400 Hz, or 1500 V in direct current;
- f) electrical circuits, other than those internal to the equipment, operating at a voltage exceeding 1000 V and supplied from an installation with a voltage of 1000 V or less in alternating current, e.g. discharge lamp circuits, electrostatic precipitators, etc;
- g) all wiring and electrical lines not covered by the standards for user equipment;
- h) to fixed electrical signal lines (with the exception of internal equipment circuits);
- i) new installations and renovations to existing installations.

Not applicable in:

- a) electric traction installations;
- b) electrical installations of motor vehicles;
- c) electrical installations of ships and aircraft;
- d) equipment for suppressing radio disturbances, insofar as it does not compromise the safety of installations;
- e) street lighting installations;
- f) public electricity distribution networks;
- g) installations for protection against direct lightning strikes. However, this Standard considers the consequences of atmospheric phenomena on installations (e.g. selection of surge protective devices);
- h) installations in mines;
- i) installations of electrified fences.

CRITERIA

For the perfect sizing of a circuit in a low-voltage electrical installation (supply, distribution or terminal circuits), the following criteria must be followed:

- a) Determination of the design current (I_p);
- b) Choice of power line type - ways to install (Chart 05);
- c) Application of the current carrying capacity criterion, where the current of the conductors must be equal to or greater than the design current (I_p);
- d) Voltage drop limits (item 6.2.7 NBR 5410/2004);
- e) Choice of overload protection devices (item 5.3.4 NBR 5410/2004);
- f) Choice of protection devices against short circuits and thermal stress (item 5.3.5 NBR 5410/2004);
- g) Protection against electric shock by automatic power supply disconnection (item 5.1.2.2.4 NBR 5410/2004);
- h) Minimum cross-sections of phase conductors (Chart 01);
- i) Minimum cross-sections of neutral conductors (Chart 02);
- j) Minimum cross-sections of protective conductors (Chart 03).

CHARTS MINIMUM SECTION (Phase, Neutral and Earth conductors)

Chart 01 - Minimum Conductor Section Phase

Line Type		Use of the Circuit	Conductor cross-section (mm ²) – Copper
Fixed installations in general	Insulated conductors and cables	Lighting circuits	1,5
		Power circuit	2,5
		Signaling circuits and control circuits	0,5
	Bare conductors	Power circuits	10
		Signaling circuits and control circuits	4
Flexible lines with insulated cables		For specific equipment	As specified in the equipment standard
		For any other application	0,75
		Extra-low voltage circuits for special applications	0,75

According to Chart 47 - NBR 5410/2004

Notes

- 1) Plug circuits are considered as power circuits.
- 2) Bare conductors should only be used in overhead lines and on insulators.

Chart 02 - Neutral Conductor Section

Phase conductor cross-section (mm ²)	Minimum cross-section of neutral conductor (mm ²)
S ≤ 25	S
35	25
50	25
70	35
95	50
120	70
150	70
185	95
240	120
300	150
400	185

According to Chart 48 - NBR 5410/2004

Chart 03 - Minimum Section of the Protective Conductor

S Phase Conductor Section (mm ²)	Minimum cross-section of the corresponding protective conductor (mm ²)
S ≤ 16	S
16 < S ≤ 35	16
S > 35	S/2

According to Chart 58 - NBR 5410/2004

Chart 04 - Characteristic Conductor Temperatures

Type of Insulation	Maximum Temperature for Continuous Service (conductor) °C	Temperature Overload Limit (conductor) °C	Short Circuit Limit Temperature (conductor) °C
Polyvinyl chloride (PVC) up to 300 mm ²	70	100	160
Polyvinyl chloride (PVC) larger than 300 mm ²	70	100	140
Ethylene-propylene rubber (HEPR)	90	130	250
Cross-linked polyethylene (XLPE)	90	130	250

According to Chart 35 - NBR 5410/2004

CHART OF WAYS TO INSTALL

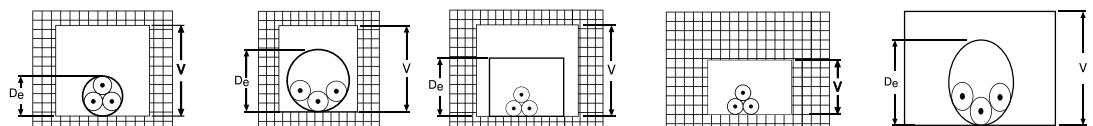
Chart 05 - Ways to Install

Type of Installation	Installation Method (number)	How to Install	Bare Cables	Insulated Conductor	Unipolar cable	Multipole cable
			Reference Method			
Built-in	1 e 2	Thermally insulated wall conduit	-	A1	A1	A2
	7 e 8	Conduit (circular section) embedded in masonry	-	B1	B1	B2
	26	Conduit (non-circular section) - $1.5 D_e \leq V < 5 D_e$	-	B2	-	-
	26	Conduit (non-circular section) - $5 D_e \leq V < 50 D_e$	-	B1	-	-
	27	Conduit (non-circular section) embedded in masonry	-	-	B2	B2
	41	Conduit in closed channel - $1.5 D_e \leq V < 20 D_e$	-	B2	B2	-
	41	Conduit in closed channel - $V \geq 20 D_e$	-	B1	B1	-
	42 e 43	Electrical conduit in conduit embedded in the floor	-	B1	B1	B1
	33 e 34	Closed channel embedded in the floor	-	B1	B1	B2
	75 e 75A	Closed channel embedded in the wall	-	B1	B1	B2
	51	Insulated wall (conductor/cable directly embedded)	-	-	-	A1
	52 e 53	Masonry with or without mechanical protection	-	-	C	C
	73	Door or window frame	-	A1	A1	A1
Apparent	3 e 4	Conduit (circular section)	-	B1	B1	B2
	5 e 6	Conduit (non-circular section)	-	B1	B1	B2
	13	Perforated wire mesh - horizontal or vertical	-	-	F	E
	14	Wired wire mesh - horizontal	-	-	F	E
	12	Non-perforated wire mesh - horizontal	-	-	C	C
	31 e 32	Non-perforated cable tray with cover - horizontal or vertical	-	B1	B1	B2
	12	Non-perforated profile - horizontal	-	-	C	C
	12	Shelf	-	-	C	C
	16	Horizontal or vertical beds (cable ladder)	-	-	F	E
	17	Hanging brackets	-	-	F	E
	11	Wall (direct fixing) - distance $< 0.30 \times \varnothing$ cable	-	-	C	C
	15	Wall (direct fixing) - distance $> 0.30 \times \varnothing$ cable	-	-	F	E
	11A	Ceiling (direct fixing)	-	-	C	C
11B	Ceiling (direct fixing) - distance $> 0.30 \times \varnothing$ cable	-	-	C	C	
71	Frame	-	A1	A1	-	
Underground	61 e 61A	Conduit (circular section or not)	-	-	D	D
	63	Directly buried	-	-	D	D
	72 e 72A	Closed channel with separations (e.g. plastic channels)	-	B1	B1	B2
Aerial or Suspended	18	Insulators	G	G	-	-
		Conduit (fixed by means of brackets)	-	B1	B1	B2
	35 e 36	Electrical cable tray (fixed by means of brackets)	-	B1	B1	B2
	35 e 36	Profiled (fixed by means of brackets)	-	B1	B1	B2
Building Space	21	Direct, brackets, cable trays or beds - $1.5 D_e \leq V < 5 D_e$	-	-	B2	B2
	21	Direct, brackets, cable trays or beds - $5 D_e \leq V < 50 D_e$	-	-	B1	B1
	22 e 24	Conduit (circular section or not) - $1.5 D_e \leq V < 20 D_e$	-	B2	-	-
	22 e 24	Conduit (circular section or not) - $V \geq 20 D_e$	-	B1	-	-
	23 e 25	Conduit (circular section or not)	-	-	B2	B2

According to Chart 33 - NBR 5410/2004

Notes

- 1) Insulated cable - cable with insulation (e.g. flameproof cable, Flex flameproof cable, Maxlink R, etc.).
- 2) Single core cable - cable consisting of a single insulated conductor with a cover (e.g. Maxvinil cable, Maxlink, Maxlink G-Flex).
- 3) Multipole cable - cable with two or more insulated conductors and with a cover (e.g. Maxvinil cable, Maxvinil Flex, Maxlink, Maxlink G-Flex).
- 4) Ways to install (building spaces and embedded in masonry and conduit embedded in ducts).



DRIVING CAPACITY AND SIZING CHART

70 °C

Chart 06 - Current carrying capacities, in Amperes, for reference methods A1, A2, B1, B2, C and D

**Conductors: Copper / Aluminum Insulation: PVC Conductor Temperature 70 °C
Ambient Reference Temperatures: 30 °C (air), 20 °C (ground)**

Nominal crosssection (mm ²)	Reference Methods Indicated in Chart 05											
	A1		A2		B1		B2		C		D	
	Number of Conductors Charged											
	2	3	2	3	2	3	2	3	2	3	2	3
Copper												
0,5	7	7	7	7	9	8	9	8	10	9	12	10
0,75	9	9	9	9	11	10	11	10	13	11	15	12
1	11	10	11	10	14	12	13	12	15	14	18	15
1,5	14,5	13,5	14	13	17,5	15,5	16,5	15	19,5	17,5	22	18
2,5	19,5	18	18,5	17,5	24	21	23	20	27	24	29	24
4	26	24	25	23	32	28	30	27	36	32	38	31
6	34	31	32	29	41	36	38	34	46	41	47	39
10	46	42	43	39	57	50	52	46	63	57	63	52
16	61	56	57	52	76	68	69	62	85	76	81	67
25	80	73	75	68	101	89	90	80	112	96	104	86
35	99	89	92	83	125	110	111	99	138	119	125	103
50	119	108	110	99	151	134	133	118	168	144	148	122
70	151	136	139	125	192	171	168	149	213	184	183	151
95	182	164	167	150	232	207	201	179	258	223	216	179
120	210	188	192	172	269	239	232	206	299	259	246	203
150	240	216	219	196	309	275	265	236	344	299	278	230
185	273	245	248	223	353	314	300	268	392	341	312	258
240	321	286	291	261	415	370	351	313	461	403	361	297
300	367	328	334	298	477	426	401	358	530	464	408	336
400	438	390	398	355	571	510	477	425	634	557	478	394
500	502	447	456	406	656	587	545	486	729	642	540	445
630	578	514	526	467	758	678	626	559	843	743	614	506
800	669	593	609	540	881	788	723	645	978	865	700	577
1000	767	679	698	618	1012	906	827	738	1125	996	792	652
Aluminum												
16	48	43	44	41	60	53	54	48	66	59	62	52
25	63	57	58	53	79	70	71	62	83	73	80	66
35	77	70	71	65	97	86	86	77	103	90	96	80
50	93	84	86	78	118	104	104	92	125	110	113	94
70	118	107	108	98	150	133	131	116	160	140	140	117
95	142	129	130	118	181	161	157	139	195	170	166	138
120	164	149	150	135	210	186	181	160	226	197	189	157
150	189	170	172	155	241	214	206	183	261	227	213	178
185	215	194	195	176	275	245	234	208	298	259	240	200
240	252	227	229	207	324	288	274	243	352	305	277	230
300	289	261	263	237	372	331	313	278	406	351	313	260
400	345	311	314	283	446	397	372	331	488	422	366	305
500	396	356	360	324	512	456	425	378	563	486	414	345
630	456	410	416	373	592	527	488	435	653	562	471	391
800	529	475	482	432	687	612	563	502	761	654	537	446
1000	607	544	552	495	790	704	643	574	878	753	607	505

According to Chart 36 - NBR 5410/2004

Notes to Charts 06, 07, 08 e 09

1) The current-carrying capacities indicated in Charts 06, 07, 08, 09 have been calculated according to IEC 60364-5-52 and installation methods indicated below:

- A1: insulated conductors in circular section conduit embedded in thermally insulating wall;
- A2: multipolar cable in circular section conduit embedded in thermally insulating wall;
- B1: insulated conductors in circular conduit on wooden wall;
- B2: multipolar cable in circular conduit on wooden wall;
- C: unipolar cables or multipolar cable on wooden wall;
- D: multi-pole cable in conduit buried in the ground;
- E: outdoor multi-pole cable;
- F: single core cables juxtaposed (horizontally, vertically or in trefoil) in the open air;
- G: single core cables spaced outdoors.

2) The current carried by any conductor, during long periods in normal operation, shall not be greater than the maximum values for continuous duty as shown in Chart 04.

Continued on next page.

CHART OF CONDUCTION CAPACITY AND SIZING

90 °C

Chart 07 - Current carrying capacities, in Amperes, for the methods reference A1, A2, B1, B2, C and D

Conductors: Copper / Aluminum Insulation: HEPR ou XLPE Conductor temperature: 90 °C
Ambient Reference Temperatures: 30 °C (air), 20 °C (ground)

Nominal crosssection (mm²)	Reference Methods Indicated in Chart 05											
	A1		A2		B1		B2		C		D	
	Number of Conductors Charged											
	2	3	2	3	2	3	2	3	2	3	2	3
Copper												
0,5	10	9	10	9	12	10	11	10	12	11	14	12
0,75	12	11	12	11	15	13	15	13	16	14	18	15
1	15	13	14	13	18	16	17	15	19	17	21	17
1,5	19	17	18,5	16,5	23	20	22	19,5	24	22	26	22
2,5	26	23	25	22	31	28	30	26	33	30	34	29
4	35	31	33	30	42	37	40	35	45	40	44	37
6	45	40	42	38	54	48	51	44	58	52	56	46
10	61	54	57	51	75	66	69	60	80	71	73	61
16	81	73	76	68	100	88	91	80	107	96	95	79
25	106	95	99	89	133	117	119	105	138	119	121	101
35	131	117	121	109	164	144	146	128	171	147	146	122
50	158	141	145	130	198	175	175	154	209	179	173	144
70	200	179	183	164	253	222	221	194	269	229	213	178
95	241	216	220	197	306	269	265	233	328	278	252	211
120	278	249	253	227	354	312	305	268	382	322	287	240
150	318	285	290	259	407	358	349	307	441	371	324	271
185	362	324	329	295	464	408	395	348	506	424	363	304
240	424	380	386	346	546	481	462	407	599	500	419	351
300	486	435	442	396	628	553	529	465	693	576	474	396
400	579	519	527	472	751	661	628	552	835	692	555	464
500	664	595	604	541	864	760	718	631	966	797	627	525
630	765	685	696	623	998	879	825	725	1122	923	711	596
800	885	792	805	721	1158	1020	952	837	1311	1074	811	679
1000	1014	908	923	826	1332	1173	1088	957	1515	1237	916	767
Aluminum												
16	64	58	60	55	79	71	72	64	84	76	73	61
25	84	76	78	71	105	93	94	84	101	90	93	78
35	103	94	96	87	130	116	115	103	126	112	112	94
50	125	113	115	104	157	140	138	124	154	136	132	112
70	158	142	145	131	200	179	175	156	198	174	163	138
95	191	171	175	157	242	217	210	188	241	211	193	164
120	220	197	201	180	281	251	242	216	280	245	220	186
150	253	226	230	206	323	289	277	248	324	283	249	210
185	288	256	262	233	368	330	314	281	371	323	279	236
240	338	300	307	273	433	389	368	329	439	382	322	272
300	387	344	352	313	499	447	421	377	508	440	364	308
400	462	409	421	372	597	536	500	448	612	529	426	361
500	530	468	483	426	687	617	573	513	707	610	482	408
630	611	538	556	490	794	714	658	590	821	707	547	464
800	708	622	644	566	922	830	760	682	958	824	624	529
1000	812	712	739	648	1061	955	870	780	1108	950	706	598

According to Chart 37 - NBR 5410/2004

Notes to Charts 06, 07, 08 and 09

- 3) The ways of installation in Chart 05 are used for the following conductors:
- Single-pole and multi-pole cables 0.6/1 kV 70 °C, according to NBR 7288 (PVC-A / PVC-ST1);
 - Single-pole and multi-pole cables 0.6/1 kV 90 °C, according to NBR 7286 (HEPR / PVC-ST2);
 - Single-pole and multi-pole cables 0.6/1 kV 90 °C, according to NBR 7287 (XLPE / PVC-ST2);
 - Multipole cables, according to 450/750 V 70 °C, NBR 8661 (PVC-A / PVC-ST1);
 - Single-pole and multi-pole/multiplexed cables 0.6/1 kV 90 °C, according to NBR 7285 (XLPE);
 - Insulated conductors 450/750 V 70 °C, according to NBR NM 247-3 (PVC-A);

Continued on next page.

CHART OF CONDUCTION CAPACITY AND SIZING

70 °C

Charge 08 - Current carrying capacities in Amperes for reference methods E, F and G
Conductors: Copper Insulation: PVC Conductor temperature: 70 °C
Ambient Reference Temperatures: 30 °C

Nominal cross-section of conductors (mm ²)	Reference Methods Indicated in Chart 05						
	Multipole Cables		Insulated Conductors, Unipolar Cables				
	Two Conductors Loaded	Three Conductors Loaded	Two Conductors Loaded, Juxtaposed	Three Conductors Loaded, in Trifolio	Three Loaded Conductors, on the same Plane		
					Juxtaposed	Spaced	
	E	E	F	F		F	Horizontal G
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Copper						
0,5	11	9	11	8	9	12	10
0,75	14	12	14	11	11	16	13
1	17	14	17	13	14	19	16
1,5	22	18,5	22	17	18	24	21
2,5	30	25	31	24	25	34	29
4	40	34	41	33	34	45	39
6	51	43	53	43	45	59	51
10	70	60	73	60	63	81	71
16	94	80	99	82	85	110	97
25	119	101	131	110	114	146	130
35	148	126	162	137	143	181	162
50	180	153	196	167	174	219	197
70	232	196	251	216	225	281	254
95	282	238	304	264	275	341	311
120	328	276	352	308	321	396	362
150	379	319	406	356	372	456	419
185	434	364	463	409	427	521	480
240	514	430	546	485	507	615	569
300	593	497	629	561	587	709	659
400	715	597	754	656	689	852	795
500	826	689	868	749	789	982	920
630	958	798	1005	855	905	1138	1070
800	1118	930	1169	971	1119	1325	1251
1000	1292	1073	1346	1079	1296	1528	1448

According to Chart 38 - NBR 5410/2004

Notes to Charts 06, 07, 08 and 09

4) Cables according to NBR 13249 should only be used for equipment connection and are not allowed in the installation methods provided in Table 05.

5) Any insulated conductor, single core cable or strand of multi-core cable used as a neutral conductor shall be identified according to this function. In case of identification by color, the light blue color shall be used on the insulation of the insulated conductor or the vein of the multipole cable, or on the covering of the single-pole cable.

The light blue insulated core of a multi-core cable may be used for functions other than neutral conductor if the circuit has no neutral conductor or if the cable has a peripheral conductor used as neutral.

Continued on next page.

CHART OF CONDUCTION CAPACITY AND SIZING

70 °C

Charge 08 - Current-carrying capacities in Amperes for reference methods E, F and G
Conductors: Copper Insulation: PVC Conductor temperature: 70 °C
Ambient Reference Temperatures: 30 °C

Reference Methods Indicated in Chart 05							
Nominal crosssection of conductors (mm ²)	Multipole Cables		Insulated Conductors, Unipolar Cables				
	Two Conductors Loaded	Three Conductors Loaded	Two Conductors Loaded, Juxtaposed	Three Conductors Loaded, in Trifolio	Three Loaded Conductors, on the same Plane		
					Juxtaposed	Spaced	
	E	E	F	F		F	Horizontal G
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Aluminum							
16	73	61	73	62	65	84	73
25	89	78	98	84	87	112	99
35	111	96	122	105	109	139	124
50	135	117	149	128	133	169	152
70	173	150	192	166	173	217	196
95	210	183	235	203	212	265	241
120	244	212	273	237	247	308	282
150	282	245	316	274	287	356	327
185	322	280	363	315	330	407	376
240	380	330	430	375	392	482	447
300	439	381	497	434	455	557	519
400	528	458	600	526	552	671	629
500	608	528	694	610	640	775	730
630	705	613	808	711	640	775	730
800	822	714	944	832	875	1050	1000
1000	948	823	1092	965	1015	1213	1161

According to Chart 38 - NBR 5410/2004

Notes to Charts 06, 07, 08 and 09

- 6) Any insulated conductor, single core cable or multi-core cable strand used as a protective conductor (PE) shall be identified according to this function. In case of identification by color, the double green-yellow color or the green color (colors exclusive of the protective function) shall be used, on the insulation of the insulated conductor or the vein of the multipole cable, or on the covering of the single-pole cable.
- 7) Any insulated conductor, single core cable or strand of multi-core cable used as a PEN conductor shall be identified according to this function. In case of color identification, light blue color shall be used, with yellow-green washers at visible or accessible points, on the insulation of the insulated conductor or the vein of the multipole cable, or on the covering of the single-pole cable.

Continued on next page.

CHART OF CONDUCTION CAPACITY AND SIZING

90 °C

Chart 09 - Current-carrying capacities, in Amperes, for reference methods E, F and G
 Insulation: EPR ou XLPE Conductor temperature: 90 °C
 Ambient Reference Temperatures: 30 °C

Nominal crosssection of conductors (mm²)	Reference Methods Indicated in Chart 05						
	Multipole Cables		Insulated Conductors, Unipolar Cables				
	Two Conductors Loaded	Three Conductors Loaded	Two Conductors Loaded, Juxtaposed	Three Conductors Loaded, in Trifolio	Three Loaded Conductors, on the same Plane	Spaced	
						Juxtaposed	Horizontal
	E	E	F	F	F	G	G
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Copper							
0,5	13	12	13	10	10	15	12
0,75	17	15	17	13	14	19	16
1	21	18	21	16	17	23	19
1,5	26	23	27	21	22	30	25
2,5	36	32	37	29	30	41	35
4	49	42	50	40	42	56	48
6	63	54	65	53	55	73	63
10	86	75	90	74	77	101	88
16	115	100	121	101	105	137	120
25	149	127	161	135	141	182	161
35	185	158	200	169	176	226	201
50	225	192	242	207	216	275	246
70	289	246	310	268	279	353	318
95	352	298	377	328	342	430	389
120	410	346	437	383	400	500	454
150	473	399	504	444	464	577	527
185	542	456	575	510	533	661	605
240	641	538	679	607	634	781	719
300	741	621	783	703	736	902	833
400	892	745	940	823	868	1085	1008
500	1030	859	1083	946	998	1253	1169
630	1196	995	1254	1088	1151	1454	1362
800	1396	1159	1460	1252	1328	1696	1595
1000	1613	1336	1683	1420	1511	1958	1849

According to Chart 39 - NBR 5410/2004

Notes to Charts 06, 07, 08 and 09

- 8) Any insulated conductor, single core cable or strand of multi-core cable used as a phase conductor shall be identified according to this function. In the case of identification by color, any color may be used, subject to the restrictions set out in Notes 5, 6 and 7.
- 9) For safety reasons, the exclusively yellow insulation color should not be used where there is a risk of confusion with the double green-yellow coloration, colors exclusive to the protective . conductor

Continued on next page.

CHART OF CONDUCTION CAPACITY AND SIZING

90 °C

Chart 09 - Current-carrying capacities in Amperes for reference methods E, F and G
Conductors: Copper Insulation: EPR ou XLPE Conductor temperature: 90 °C
Ambient Reference Temperatures: 30 °C

Nominal crosssection of conductors (mm²)	Reference Methods Indicated in Chart 05						
	Multipole Cables		Insulated Conductors, Unipolar Cables				
	Two Conductors Loaded	Three Conductors Loaded	Two Conductors Loaded, Juxtaposed	Three Conductors Loaded, in Trifolio	Three Loaded Conductors, on the same Plane	Spaced	
					Juxtaposed	Horizontal	Vertical
	E	E	F	F	F	G	G
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Aluminum							
16	91	77	90	76	79	103	90
25	108	97	121	103	107	138	122
35	135	120	150	129	135	172	153
50	164	146	184	159	165	210	188
70	211	187	237	206	215	271	244
95	257	227	289	253	264	332	300
120	300	263	337	296	308	387	351
150	346	304	389	343	358	448	408
185	397	347	447	395	413	515	470
240	470	409	530	471	492	611	561
300	543	471	613	547	571	708	652
400	654	566	740	663	694	856	792
500	756	652	856	770	806	991	921
630	879	755	996	899	942	1154	1077
800	1026	879	1164	1056	1106	1351	1266
1000	1186	1012	1347	1226	1285	1565	1472

According to Chart 39 - NBR 5410/2004

Chart 10 - Correction factors for ambient temperatures other than 30 °C for non-underground lines and 20 °C (ground temperature) for underground lines

Temperature (°C)	Insulation			
	PVC		HEPR ou XLPE	
	Environment		Soil	
10	1,22	1,15	1,10	1,07
15	1,17	1,12	1,05	1,04
20	1,12	1,08	1,00	1,00
25	1,06	1,04	0,95	0,96
30	1,00	1,00	0,89	0,93
35	0,94	0,96	0,84	0,89
40	0,87	0,91	0,77	0,85
45	0,79	0,87	0,71	0,80
50	0,71	0,82	0,63	0,76
55	0,61	0,76	0,55	0,71
60	0,50	0,71	0,45	0,65
65	-	0,65	-	0,60
70	-	0,58	-	0,53
75	-	0,5	-	0,46
80	-	0,41	-	0,38

According to Chart 40 - NBR 5410/2004

CHART OF CONDUCTION CAPACITY AND SIZING

Chart 11 - Correction factors for underground lines in soil with thermal resistivity other than 2.5 Km/W

Thermal Resistivity K.m/W	1	1,5	2	3
Correction Factor	1,18	1,1	1,05	0,96

According to Chart 41 - NBR 5410/2004

Notes

- 1) The correction factors given are average values for the nominal sections covered in Charts 36 and 38, with a dispersion generally less than 5%.
- 2) The correction factors are applicable to cables in conduits buried up to 0.8 m deep.
- 3) Correction factors for directly buried cables are higher for thermal resistivities below 2.5 K.m/W and can be calculated by the methods given in NBR 11301.

Chart 12 - Correction factors applicable to conductors bundled (in open or closed lines) and to conductors bundled in a single plane, in a single layer

Ref.	Form of bundling of conductors	Number of Circuits or Multipole Cables												Reference Methods
		1	2	3	4	5	6	7	8	9 a 11	12 a 15	16 a 19	≥20	
1	Bundled, open-air or above ground; embedded; in closed conduit	1,00	0,80	0,70	0,65	0,60	0,57	0,54	0,52	0,50	0,45	0,41	0,38	Methods A to F
2	Single layer on wall, floor or in tray non-perforated or shelf	1,00	0,85	0,79	0,75	0,73	0,72	0,72	0,71	0,70				Method C
3	Single layer on the ceiling	0,95	0,81	0,72	0,68	0,66	0,64	0,63	0,62	0,61				
4	Single layer in perforated tray	1,00	0,88	0,82	0,77	0,75	0,73	0,73	0,72	0,72				Methods E and F
5	Single layer in bed, support	1,00	0,87	0,82	0,80	0,80	0,79	0,79	0,78	0,78				

According to Chart 42 - NBR 5410/2004

Notes

- 1) These factors are applicable to homogeneous groups of cables, uniformly loaded.
- 2) When the horizontal distance between adjacent cables is more than twice their outer diameter, no reduction factor needs to be applied.
- 3) The number of circuits or cables with which the Chart is consulted refers:
 - the number of groups of two or three insulated conductors or single core cables, each group constituting a circuit (assuming a single conductor per phase, i.e. no conductors in parallel); and/or
 - the number of multipole cables making up the bundle, whatever the composition (only insulated conductors, only single core cables, only multipole cables or any combination).
- 4) If the grouping consists of two-pole and three-pole cables at the same time, the total number of cables should be taken as the number of circuits and, once the resulting grouping factor has been applied, the determination of the current carrying capacities in Charts 33 to 36 should then be carried out:
 - in the column of two loaded conductors, for bipolar cables; and
 - in the loaded three-conductor column for three-core cables.
- 5) A grouping with N insulated conductors, or N single-core cables, can be considered to consist of either N/2 circuits with two loaded conductors or N/3 circuits with three loaded conductors.
- 6) The values given are averages for the usual range of nominal cross-sections, with scatter generally less than 5%.

CHART OF CONDUCTION CAPACITY AND SIZING

Chart 13 - Multipliers to be used for obtaining correction factors applicable to bundles consisting of more than one layer of conductors - Reference Methods C, E and F (Charts 06, 07, 08, 09)

	Number of Three-Phase Circuits or Multipolar Cables				
	2	3	4 ou 5	6 a 8	9 e mais
Layout in a Horizontal Plane	0,85	0,78	0,75	0,72	0,70
Arrangement in a Vertical Plane	0,80	0,73	0,70	0,68	0,66

According to Chart 43 – NBR 5410/2004

Notes

1) The correction factor is obtained by multiplying the number of three-phase circuits or multipole cables contained in each layer, whether the layer is in the horizontal or vertical plane, by the number of layers (arrangement in the opposite plane). The result will be the same for the same combination of numbers, that is:

$$m \text{ circuits} \times n \text{ layers} = n \text{ circuits} \times m \text{ layers}$$

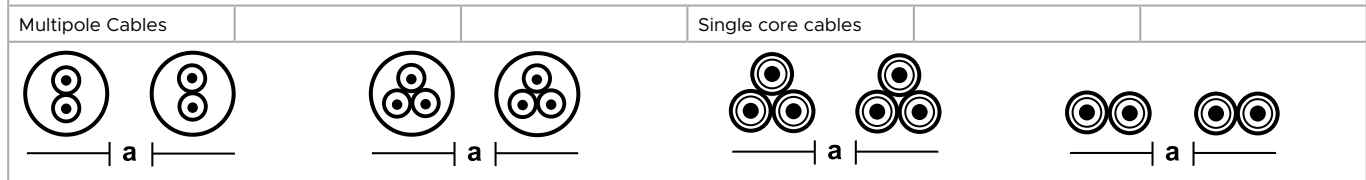
2) The values corresponding to the arrangement in a horizontal plane or in a vertical plane cannot be used alone as grouping factors for circuits or multipole cables arranged in a single layer, horizontal or vertical respectively. For cables arranged in a single layer, see rows 2 to 5 of Chart 40.

3) If more precise values are required, reference should be made to NBR 11301.

Chart 14 - Grouping factors for lines with directly buried cables

Number of Circuits	Distances between cables (a)				
	Nil	One Cable Diameter	0,125 m	0,25 m	0,5 m
2	0,75	0,80	0,85	0,90	0,90
3	0,65	0,70	0,75	0,80	0,85
4	0,60	0,60	0,70	0,75	0,80
5	0,55	0,55	0,65	0,70	0,80
6	0,50	0,55	0,60	0,70	0,80

1)



According to Chart 44 – NBR 5410/2004

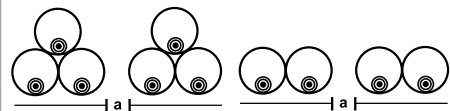
Note

1) The values given are applicable for a depth of 0.7 m and a soil thermal resistivity of 2.5 K.m/W. They are average values for the cable sizes covered in Charts 34 and 35. Rounded average values may present errors of up to ± 10% in certain cases. If more precise values are required, NBR 11301 should be used.

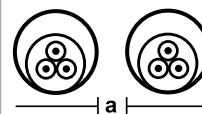
Chart 15 - Grouping factors for lines in buried conduits

Number of Circuits	Multipole Cables in Conduit - One Cable per Conduit				Insulated Conductors or Unipolar Cables in Conduit - One Conductor per Conduit			
	Conduit spacing (a)							
	Nulo	0,25 m	0,5 m	1,0 m	Nulo	0,25 m	0,5 m	1,0 m
2	0,85	0,9	0,95	0,95	0,8	0,9	0,9	0,95
3	0,75	0,85	0,9	0,95	0,7	0,8	0,85	0,9
4	0,7	0,8	0,85	0,9	0,65	0,75	0,8	0,9
5	0,65	0,8	0,85	0,9	0,6	0,7	0,8	0,9
6	0,6	0,8	0,8	0,8	0,6	0,7	0,8	0,9

SINGLE CORE CABLES



MULTIPOLE CABLES



Notes

1) The values given are applicable for a depth of 0.7 m and a soil thermal resistivity of 2.5 K.m/W. They are average values for the conductor sections in Charts 34 and 35. They are average values for the conductor sections given in Charts 34 and 35. Rounded average values may present errors of up to ± 10% in certain cases. If more precise values are required, NBR 11301 should be used.

2) Attention should be paid to the restrictions and problems surrounding the use of insulated conductors or single core cables in metallic conduits when having a single conductor per conduit.

According to Chart 45 – NBR 5410/2004

CHART OF CONDUCTION CAPACITY AND SIZING

Notes to charts 12, 13, 14 e 15

- The grouping factors given in Charts 12 to 15 are valid for groups of similar, equally loaded conductors. "Similar" conductors are those whose current-carrying capacities are based on the same maximum temperature for continuous service and whose nominal cross-sections are contained within the range of three successive normalized cross-sections. Where conductors in a group do not meet this condition, the applicable grouping factors shall be obtained by using either of the following two alternatives:
 - case-by-case calculation using, for example, NBR 11301; or,
 - if a more specific calculation is not feasible, adoption of the F factor from the expression

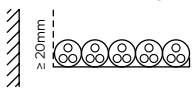
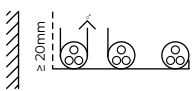
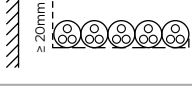
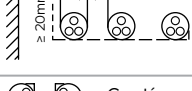
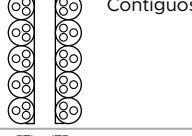
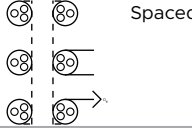
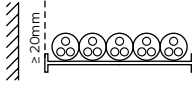
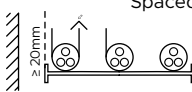
where:

F is the correction factor;
n is the number of circuits or multipole cables.

$$F = \frac{1}{\sqrt{n}}$$

- The calculation of correction factors for groups containing conductors of the most different nominal cross-sections depends on the total number of conductors and the combination of cross-sections, which makes it virtually impossible to draw up Charts of practical use, so many would be the variables involved.
- The expression given in point b) is in favor of safety and reduces the dangers of overload in conductors of smaller nominal cross-section. It may, however, result in the oversizing of conductors of higher cross-sections.

Chart 16 - Correction factors for bundling one more multipole cable in cable tray, cable ladder, rack or support (apply values in columns 2 and 3 of Charts 08 and 09).

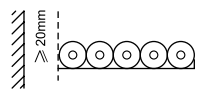
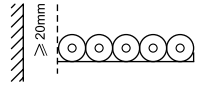
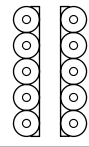
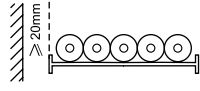
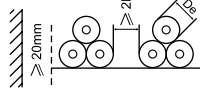
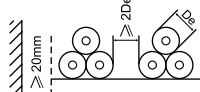
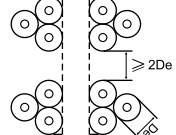
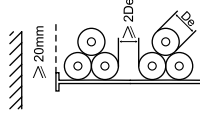
		N° of Trays, Shelves or Layers of Supports	Number of Cables					
			1	2	3	4	5	6
Non-Perforated Trays or Shelves	 <p>Contíguos</p>	1	0,95	0,85	0,8	0,75	0,7	0,7
		2	0,95	0,85	0,75	0,75	0,7	0,65
		3	0,95	0,85	0,75	0,7	0,65	0,6
	 <p>Spaced</p>	1	1,0	0,95	0,95	0,95	0,9	-
		2	0,95	0,95	0,9	0,9	0,85	-
		3	0,95	0,95	0,9	0,9	0,85	-
Perforated Trays	 <p>Contíguos</p>	1	1,0	0,9	0,8	0,7	0,75	0,75
		2	1,0	0,85	0,8	0,75	0,75	0,7
		3	1,0	0,85	0,8	0,75	0,7	0,65
	 <p>Spaced</p>	1	1,0	1,0	1,0	0,95	0,9	-
		2	1,0	1,0	0,95	0,9	0,85	-
		3	1,0	1,0	0,95	0,9	0,85	-
Trays Vertical Perforated	 <p>Contíguos</p>	1	1,0	0,9	0,8	0,75	0,75	0,7
		2	1,0	0,9	0,8	0,75	0,7	0,7
	 <p>Spaced</p>	1	1,0	0,9	0,9	0,9	0,85	-
		2	1,0	0,9	0,9	0,85	0,85	-
Cables or Stairs to Support	 <p>Contíguos</p>	1	1,0	0,85	0,8	0,8	0,8	0,8
		2	1,0	0,85	0,8	0,8	0,75	0,75
		3	1,0	0,85	0,8	0,75	0,75	0,7
	 <p>Spaced</p>	1	1,0	1,0	1,0	1,0	1,0	-
		2	1,0	1,0	1,0	0,95	0,95	-
		3	1,0	1,0	0,95	0,95	0,95	-

Notes

- The factors apply to cables bundled in a single layer as shown above and do not apply where cables are installed in multiple layers abutting each other. The values for such arrangements may be appreciably lower and should be determined by a suitable method.
- A vertical spacing of 300 mm between trays, shelves or supports is considered. For lower spacings, the factors should be reduced.
- A horizontal spacing of 225 mm between trays is considered, with the trays mounted bottom to bottom. For smaller spacings, the factors should be reduced.

CHART OF CONDUCTION CAPACITY AND SIZING

Chart 17 - Correction factors for grouping more than one circuit with single core cables

	Contiguos	Nº of Trays, Shelves or Layers of Supports	Nº of Three-Phase Circuits			Use as Multiplier for:
			1	2	3	
Non-Perforated Trays or Shelves		1	0,95	0,9	0,85	Column 6 of Charts 08 and 09
		2	0,92	0,85	0,8	
		3	0,9	0,8	0,75	
Perforated Trays		1	0,95	0,9	0,85	Column 6 of Charts 08 and 09
		2	0,95	0,85	0,8	
		3	0,9	0,85	0,8	
Vertical Perforated Trays		1	0,95	0,85	-	Column 6 of Charts 08 and 09
		2	0,9	0,85	-	
Ladders for Cables or Supports		1	1,0	0,95	0,95	Column 5 of Charts 08 and 09
		2	0,95	0,9	0,9	
		3	0,95	0,9	0,85	
Non-Perforated Trays or Shelves		1	1,0	0,95	0,95	Coluna 5 das Tabelas 08 e 09
		2	0,95	0,9	0,85	
		3	0,95	0,9	0,85	
Perforated Trays		1	1,0	1,0	0,95	Column 5 of Charts 08 and 09
		2	0,95	0,95	0,9	
		3	0,95	0,9	0,85	
Vertical Perforated Trays		1	1,0	0,9	0,9	Column 5 of Charts 08 and 09
		2	1,0	0,9	0,85	
Ladders for Cables or Supports		1	1,0	1,0	1,0	Column 5 of Charts 08 and 09
		2	0,95	0,95	0,95	
		3	0,95	0,95	0,9	

Notes

- 1) The factors apply to cables grouped in a single layer (or group of trefoils) as shown above. They do not apply where cables are installed in multiple layers abutting each other. The values for such arrangements may be appreciably lower and should be determined by a suitable method.
- 2) A vertical spacing of 300 mm between trays, shelves or supports was considered. For lower spacings, the factors should be reduced.
- 3) A horizontal spacing of 225 mm between trays was considered, with the trays mounted bottom to bottom. For smaller spacings, the factors should be reduced.
- 4) For circuits that have more than one cable per phase (in parallel), each group of cables must be considered as a circuit for the application of this Chart.

VOLTAGE DROP CALCULATION

The determination of the power supply is essential for the economic and safe design of an installation, within appropriate limits of temperature rise and voltage drop.

For the calculation of the voltage drop in a circuit, the design current (I_p) must be used.

Precautions shall be taken to prevent a voltage drop or a total voltage failure and subsequent restoration of voltage from causing danger to persons or damage to part of the installation, to user equipment or to property in general.

At any point of use of the installation, the verified voltage drop shall not exceed the following values, given in relation to the nominal voltage value of the installation:

- a) 7%, calculated from the secondary terminals of the MV/LV transformer, in the case of a transformer owned by the consumer unit(s);
- b) 7%, calculated from the secondary terminals of the MV/LV transformer of the electricity distribution company, when the delivery point is located there;
- c) 5%, calculated from the delivery point, in other cases of delivery point with supply at secondary distribution voltage;
- d) 7%, calculated from the generator output terminals in the case of own generator set.

Notes

- 1) These voltage drop limits are valid when the nominal voltage of the intended user equipment coincides with the nominal voltage of the installation.
- 2) In cases (a), (b) and (d), where the main lines of the installation are longer than 100 m, the voltage drops may be increased by 0.005% per meter of line longer than 100 m, but not by more than 0.5%.
- 3) In no case may the voltage drop in the terminal circuits exceed 4%.

Charts 19, 20 and 21 of voltage drop in V/A.km was obtained from the electrical parameters of the cables (AC resistance and inductive reactance), considering the different ways of installing and the power factors 0.80 and 0.95.

We remind you that, for the proper sizing of the cables, in addition to the the criterion of maximum current-carrying capacity and maximum voltage drop, the maximum short-circuit current criterion, the correction factors depending on the cable grouping and the reference ambient temperature must be taken into account.

Calculation of voltage drop from a known conductor section and determined percentage voltage drop

$$\Delta V(\%) = \frac{\Delta V \cdot \ell \cdot I \cdot 100}{V} \left[\frac{V}{A \cdot \text{km}} \right]$$

$\Delta V(\%)$ = Percentage voltage drop

ΔV = Unit voltage drop taken from Charts 19, 20 and 21 from

ℓ = known conductor section

I = Current to be carried (A)

ℓ = Length of circuit from supply point to load (km)

V = Nominal line voltage (V)

Calculation of voltage drop from a known conductor section

In the case of installations whose cable arrangements are different from those provided for in Charts 19, 20 and 21, the voltage drop may be calculated using the expressions below as well as the electrical parameters contained in Charts 16 and 17.

Direct current

$$\Delta V = 2 \cdot I \cdot \ell \cdot R_{cc}$$

Alternating current

a) Single-phase system

$$\Delta V = 2 \cdot I \cdot \ell (R_{cat} \cdot \cos \phi + X_L \cdot \sin \phi)$$

b) Three-phase system

$$\Delta V = \sqrt{3} \cdot I \cdot \ell (R_{cat} \cdot \cos \phi + X_L \cdot \sin \phi)$$

ΔV = Voltage drop

I = Current to be carried (A)

R_{cc} = Direct current resistance at 20°C (Ω/km)

R_{cat} = AC resistance at operating temperature t°C (W/km)

ϕ = Phase angle

$\cos \phi$ = Load power factor

X_L = Inductive reactance of the line (Ω/km)

ℓ = Length of circuit from supply point to load (km)

AGE DROP LIMITS

Facilities		Lighting	Other Uses
A	Installations fed directly by a low-voltage branch from a public low-voltage distribution network.	4%	4%
B	Installations fed directly by transformer substation or transformer from a high voltage installation.	7%	7%
C	Facilities with their own source.	7%	7%

Notes

1) In cases B and C, the voltage drops in the circuits must not be greater than the values given in A.

2) In cases B and C, where lines are longer than 100 m, voltage drops may be increased by 0.005% per meter of line longer than 100 m, but not by more than 0.5%.

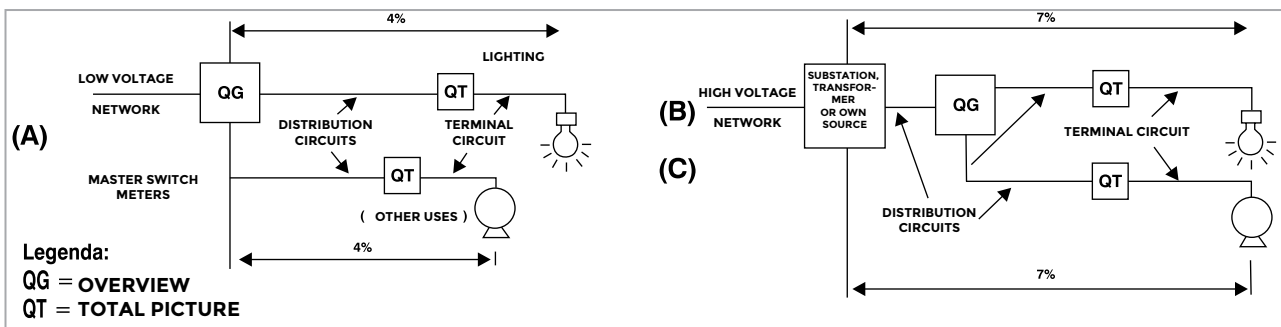
VOLTAGE DROP CALCULATION VOLTA-GE DROP

70 °C

Chart 19 - Voltage Drop in V/A.km Flameproof Wire, Flameproof Cables and Flex Flameproof Cables

Nominal Section (mm ²)	Installation (magnetic material)		Installation (non-magnetic material)			
	Single-phase and three-phase circuits		Single Phase Circuit		Three Phase Circuit	
	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95
1,5	23	27,4	23,3	27,6	20,2	23,9
2,5	14	16,8	14,3	16,9	12,4	14,7
4	9,0	10,5	8,96	10,6	7,79	9,15
6	5,87	7,00	6,03	7,07	5,25	6,14
10	3,54	4,20	3,63	4,23	3,17	3,67
16	2,27	2,70	2,32	2,68	2,03	2,33
25	1,50	1,72	1,51	1,71	1,33	1,49
35	1,12	1,25	1,12	1,25	0,98	1,09
50	0,86	0,95	0,85	0,94	0,76	0,82
70	0,64	0,67	0,62	0,67	0,55	0,59
95	0,50	0,51	0,48	0,50	0,43	0,44
120	0,42	0,42	0,40	0,41	0,36	0,36
150	0,37	0,35	0,35	0,34	0,31	0,30
185	0,32	0,30	0,30	0,29	0,27	0,25
240	0,29	0,25	0,26	0,24	0,23	0,21
300	0,27	0,22	0,23	0,20	0,21	0,18
400	0,24	0,20	0,21	0,17	0,19	0,15
500	0,23	0,19	0,19	0,16	0,17	0,14

Note
1) The values in the Chart assume a conductor temperature of 70 °C.



VOLTAGE DROP CALCULATION

70 °C

**Chart 20 - Voltage Drop in V/A.km (70 °C)
Maxvinyl Cable and Maxvinyl Flex Cable**

Nominal Section (mm ²)	Single core cables												Uni and Bipolar Cables		Tri and Tetrapolar cables			
	Circuito Monofásico						Circuito Trifásico						Threephase circuit (Trifolium)	Single Phase Circuit		Three Phase Circuit		
	S = 10 cm		S = 20 cm		S = 2 D		S = 10 cm		S = 20 cm		S = 2 D							
	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95
1,5	23,6	27,8	23,7	27,8	23,4	27,6	20,5	24,0	20,5	24,1	20,3	24,0	20,2	23,9	23,3	27,6	20,2	23,9
2,5	14,6	17,1	14,7	17,1	14,4	17,0	12,7	14,8	12,7	14,8	12,5	14,7	12,4	14,7	14,3	16,9	12,4	14,7
4	9,3	10,7	9,3	10,7	9,1	10,6	8,0	9,3	8,1	9,3	7,9	9,2	7,8	9,2	9,0	10,6	7,8	9,1
6	6,3	7,2	6,4	7,2	6,1	7,1	5,5	6,3	5,5	6,3	5,3	6,2	5,2	6,1	6,0	7,1	5,2	6,1
10	3,9	4,4	3,9	4,4	3,7	4,3	3,4	3,8	3,4	3,8	3,2	3,7	3,2	3,7	3,6	4,2	3,1	3,7
16	2,6	2,8	2,6	2,8	2,4	2,7	2,2	2,4	2,3	2,5	2,1	2,4	2,0	2,3	2,3	2,7	2,0	2,3
25	1,73	1,83	1,80	1,86	1,55	1,76	1,52	1,59	1,57	1,62	1,40	1,53	1,32	1,49	1,50	1,71	1,31	1,48
35	1,33	1,36	1,39	1,39	1,20	1,29	1,17	1,19	1,22	1,22	1,06	1,13	0,98	1,09	1,12	1,25	0,97	1,08
50	1,05	1,04	1,11	1,07	0,93	0,97	0,93	0,91	0,98	0,94	0,82	0,85	0,75	0,82	0,85	0,93	0,74	0,81
70	0,81	0,76	0,87	0,80	0,70	0,71	0,72	0,67	0,77	0,70	0,63	0,62	0,55	0,59	0,62	0,67	0,54	0,58
95	0,65	0,59	0,71	0,62	0,56	0,54	0,58	0,52	0,64	0,55	0,50	0,47	0,43	0,44	0,48	0,50	0,42	0,43
120	0,57	0,49	0,63	0,52	0,48	0,44	0,51	0,43	0,56	0,46	0,43	0,39	0,36	0,36	0,40	0,41	0,35	0,35
150	0,50	0,42	0,56	0,45	0,42	0,38	0,45	0,37	0,51	0,40	0,38	0,34	0,31	0,30	0,35	0,34	0,30	0,30
185	0,44	0,36	0,51	0,39	0,37	0,32	0,40	0,32	0,46	0,35	0,34	0,29	0,27	0,25	0,30	0,29	0,26	0,25
240	0,39	0,30	0,45	0,33	0,33	0,27	0,35	0,27	0,41	0,30	0,30	0,24	0,23	0,21	0,26	0,24	0,22	0,20
300	0,35	0,26	0,41	0,29	0,30	0,23	0,32	0,23	0,37	0,26	0,28	0,21	0,21	0,18	0,23	0,20	0,20	0,18
400	0,32	0,22	0,37	0,26	0,27	0,21	0,29	0,20	0,34	0,23	0,25	0,19	0,19	0,15	----	----	----	----
500	0,28	0,20	0,34	0,23	0,25	0,18	0,26	0,18	0,32	0,21	0,24	0,17	0,17	0,14	----	----	----	----
630	0,26	0,17	0,32	0,21	0,24	0,16	0,24	0,16	0,29	0,19	0,22	0,15	0,16	0,12	----	----	----	----
800	0,23	0,15	0,29	0,18	0,22	0,15	0,22	0,14	0,27	0,17	0,21	0,14	0,15	0,11	----	----	----	----
1000	0,21	0,14	0,27	0,17	0,21	0,14	0,20	0,13	0,25	0,16	0,20	0,13	0,14	0,10	----	----	----	----

Notes

- 1) The values in the Chart assume a conductor temperature of 70 °C.
- 2) Applicable to direct fixing to wall or ceiling, or open, ventilated or closed cable tray, building space, tray, shelf, supports on directly buried insulators and non-magnetic conduits.
- 3) Also applicable to Flameproof Wire, Flameproof Cable and Flameproof Flex.

VOLTAGE DROP CALCULATION

90 °C

Chart 21 - Voltage Drop in V/A.km (90°C) Maxlink, Maxlink G-Flex, Maxlink R and SafetyMax Cable

Nominal crosssection (mm ²)	Single core cables												Uni- and Bipolar Cables		Tri and Tetrapolar cables			
	Single Phase Circuit						Three Phase Circuit						Threephase circuit (Trifolium)		Single Phase Circuit		Three Phase Circuit	
	S = 10 cm		S = 20 cm		S = 2 D		S = 10 cm		S = 20 cm		S = 2 D							
	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95	FP = 0,80	FP = 0,95
1,5	23,8	28,0	23,9	28,0	23,6	27,9	20,7	24,3	20,5	24,1	20,4	24,1	20,4	24,1	23,5	27,8	20,3	24,1
2,5	14,9	17,4	15,0	17,5	14,7	17,3	12,9	15,1	13,0	15,1	12,8	15,0	12,7	15,0	14,6	17,3	12,7	15,0
4	9,4	10,9	9,5	10,9	9,2	10,8	8,2	9,5	8,2	9,5	8,0	9,4	7,9	9,3	9,1	10,8	7,9	9,3
6	6,4	7,3	6,4	7,3	6,2	7,2	5,5	6,3	5,6	6,3	5,4	6,2	5,3	6,2	6,1	7,1	5,3	6,2
10	3,9	4,4	4,0	4,4	3,7	4,3	3,4	3,8	3,5	3,8	3,3	3,7	3,2	3,7	3,6	4,2	3,2	3,7
16	2,58	2,83	2,64	2,86	2,42	2,74	2,25	2,46	2,31	2,48	2,12	2,39	2,05	2,35	2,34	2,70	2,03	2,34
25	1,74	1,85	1,81	1,88	1,61	1,77	1,53	1,61	1,58	1,64	1,41	1,55	1,34	1,51	1,52	1,73	1,32	1,50
35	1,34	1,37	1,40	1,41	1,21	1,30	1,18	1,20	1,23	1,23	1,06	1,14	0,99	1,10	1,15	1,26	0,98	1,09
50	1,06	1,05	1,12	1,09	0,94	0,99	0,94	0,92	0,99	0,95	0,83	0,87	0,76	0,83	0,86	0,95	0,75	0,82
70	0,81	0,77	0,88	0,80	0,70	0,71	0,72	0,68	0,78	0,70	0,63	0,63	0,56	0,59	0,63	0,67	0,54	0,58
95	0,66	0,59	0,72	0,62	0,56	0,54	0,59	0,52	0,64	0,55	0,50	0,48	0,43	0,44	0,48	0,50	0,42	0,44
120	0,57	0,49	0,63	0,53	0,48	0,45	0,51	0,44	0,56	0,46	0,43	0,40	0,36	0,36	0,40	0,41	0,35	0,35
150	0,50	0,42	0,57	0,46	0,42	0,38	0,45	0,38	0,51	0,41	0,39	0,34	0,32	0,31	0,35	0,35	0,30	0,30
185	0,44	0,36	0,51	0,39	0,38	0,32	0,40	0,32	0,46	0,35	0,34	0,29	0,27	0,26	0,30	0,29	0,26	0,25
240	0,39	0,30	0,45	0,33	0,33	0,27	0,35	0,27	0,41	0,30	0,30	0,24	0,23	0,21	0,26	0,24	0,22	0,21
300	0,35	0,26	0,41	0,29	0,30	0,24	0,32	0,24	0,37	0,26	0,28	0,21	0,21	0,18	0,23	0,20	0,20	0,18
400	0,31	0,23	0,38	0,26	0,27	0,21	0,29	0,21	0,34	0,23	0,25	0,19	0,19	0,16	----	----	----	----
500	0,28	0,20	0,34	0,23	0,25	0,18	0,26	0,18	0,32	0,21	0,24	0,17	0,17	0,14	----	----	----	----
630	0,26	0,17	0,32	0,21	0,24	0,16	0,24	0,16	0,29	0,19	0,22	0,15	0,16	0,12	----	----	----	----
800	0,23	0,15	0,29	0,18	0,22	0,15	0,22	0,14	0,27	0,17	0,21	0,14	0,15	0,11	----	----	----	----
1000	0,21	0,14	0,27	0,17	0,21	0,14	0,21	0,13	0,25	0,16	0,20	0,13	0,14	0,10	----	----	----	----

Notes

- 1) The values in the Chart assume a conductor temperature of 90°C.
- 2) Applicable to direct fixing to wall or ceiling, or open, ventilated or closed cable tray, building space, tray, shelf, supports on directly buried insulators and non-magnetic conduits.

CONDUCTOR RESISTANCE CALCULATION IN DIRECT CURRENT

The direct current resistance at 20 °C of the conductor (R_{cc20}) is calculated according to the formula:

$$R_{cc20} = \frac{\rho_{20}}{A} \cdot K_1 \cdot K_2 \cdot K_3$$

being:

- for standard round conductors

$$A = \frac{n \cdot \pi \cdot d^2}{4} \text{ in mm}^2$$

- for compacted round conductors A = nominal cross-section in mm^2

where:

ρ_{20} = rstandard resistivity in $\Omega\text{mm}^2/\text{km}$ at 20 °C

For Copper $\rho_{20} = 17,241$ in $\Omega\text{mm}^2/\text{km}$

For aluminum $\rho_{20} = 28,264$ in $\Omega\text{mm}^2/\text{km}$

n = number of elementary wires forming the conductor

d = diameter of the elementary wires forming the conductor, in mm

K_1 = factor depending on the diameter of the elementary wires, the type of metal and whether the copper is bare or clad.

Diameter Elementary Wires (mm)		K_1			
		Solid or Compacted Conductor		Non-Compacted Stranded Conductor	
>	≤	Bare Copper	Clad Copper or Bare Aluminum	Bare Copper	Clad Copper or Bare Aluminum
—	0,10	—	—	1,07	1,12
0,10	0,31	—	—	1,04	1,07
0,31	0,91	1,03	1,05	1,02	1,04
0,91	3,60	1,03	1,04	1,02	1,03
3,60	—	1,03	1,04	—	—

K_2 = factor depending on the type of stranding

Type Stringing	Elemental Wire Diameter (mm)	K_2
Solid or compacted conductor	—	1,00
Normal round	< 60 ≤60	1,02 1,04
Flexible	<60 ≤60	1,03 1,04

K_3 = factor depending on how the isolated veins are brought together

Form of Meeting	K_3
Unipolar or multipolar cables, with parallel (non-twisted) veins	1,00
Multipole cables, with twisted veins (non-flexible)	1,02
Multipole cables, with twisted (flexible) veins	1,05

CALCULATION OF CONDUCTOR RESISTANCE IN ALTERNATING CURRENT

The alternating current resistance of the conductor (R_{Ca}) is calculated according to the formula:

$$R_{Ca} = R_{Cct} (1 + Y_s + Y_p), \text{ em } \Omega/\text{km}$$

where: $R_{Cct} = R_{cc20} [1 + \alpha_{20} (t - 20)]$

$$Y_s = \frac{X_s^4}{192 + 0,8 X_s} \quad X_s^2 = \frac{8\pi f}{R_{Rcct}} 10^{-7} K_s$$

- for 3 single core cables or cable with 3 conductors

$$Y_p = \frac{X_p^4}{192 + 0,8 X_p^4} \left(\frac{d_c}{S} \right)^2 \left[0,312 \left(\frac{d_c}{S} \right)^2 + \frac{1,18}{\frac{X_p^4}{192 + 0,8 X_p^4} + 0,27} \right]$$

- for 2-conductor cable we have

$$Y_p = \frac{X_p^4}{192 + 0,8 X_p^4} \left(\frac{d_c}{S} \right)^2 2,9$$

$$X_p^2 = \frac{8\pi f}{R_{Rcct}} 10^{-7} K_p$$

where: R_{cct} = direct current resistance of the conductor at operating temperature, in Ω/km

R_{cc20} = direct current resistance at 20°C of the conductor, in Ω/km

α_{20} = 0,00393 for copper

α_{20} = 0,00403 for aluminum

t = conductor temperature in °C

Y_s = factor due to the skin effect

Y_p = factor due to proximity effect

f = frequency, in Hz

d_c = conductor diameter in mm

S = distance between conductor axes, in mm

K_p and K_s = are experimental

For cables with round conductors and having extruded solid insulation: $K_p = K_s = 1$.

CALCULATION OF INDUCTANCE AND REACTANCE

a) Inductance

The inductance L of a polyphase line is equal to the ratio between the flux Φ around a conductor and the current flowing in the conductor in a balanced polyphase regime.

It is one of the products that determines the e.m.f. induced and produced by the variation of the flux Φ .

$$\Phi = LI$$

$$e = - \frac{L \, di}{dt}$$

In electrical cables, the inductance depends:

d_c = conductor diameter in mm.

DMG = geometric mean distance, in mm (see some examples below).

K_L = factor depending on the number of elementary wires forming the conductor (see Chart below).

$$L = K_L + 0,46 \log \frac{2DMG}{d_c} \text{ , em mH/km}$$

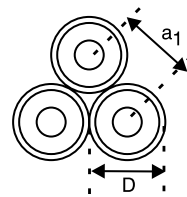
K_L values	
Number of Elementary Wires forming the Conductor	K_L
Solid or Compacted Conductor	0,0500
7	0,6400
11	0,0588
12	0,0581
14	0,0571
16	0,0563
19	0,0554
20	0,0551
24	0,0543
27	0,0539
28	0,0537
30	0,0535
32	0,0532
37	0,0528
42	0,0523
49	0,0519
50	0,0518
56	0,0516
61 or more	0,0515

Notes

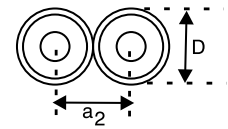
1) D = outer diameter of the cable in mm.

2) DV = diameter of the isolated vein, in mm.

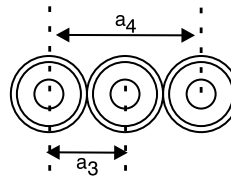
Geometric Mean Distance



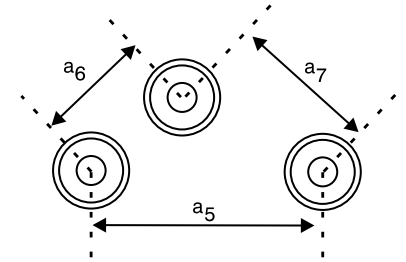
$$DMG = a_1 = D$$



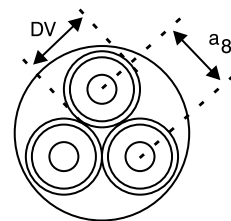
$$DMG = a_2 = D$$



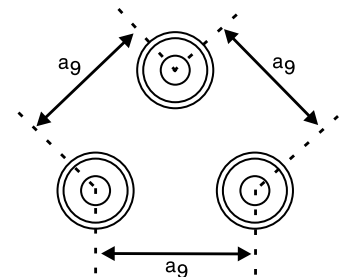
$$DMG = \sqrt[3]{a_3^2 \cdot a_4}$$



$$DMG = \sqrt[3]{a_5 \cdot a_6 \cdot a_7}$$



$$DMG = a_8 = DV$$



$$DMG = a_9$$

b) Inductive reactance

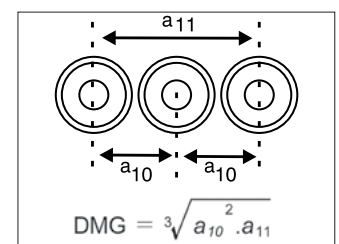
$$X_L = 2 \cdot \pi \cdot f \cdot L \cdot 10^{-3}$$

being:

X_L = inductive reactance in Ω/km

f = system frequency in Hz

L = inductance, in mH/km



$$DMG = \sqrt[3]{a_{10}^2 \cdot a_{11}}$$

INDUCTIVE REACTANCES

The values of electrical resistances and inductive reactances given in the following Chart are average values and are intended for approximate calculations of electrical circuits, using the following formula:

$$Z = R \cos \phi + X_L \sin \phi$$






Chart 22 - Electrical resistances and inductive reactances of PVC, HEPR and XLPE insulated wires and cables in closed conduits (values in Ω/km)

Section (mm ²)	R _{cc} (A)	Non-Magnetic Conduits ^(B) Circuits FN / FF / 3F	
		R _{ca}	XL
1,5	12,1	14,48	0,16
2,5	7,41	8,87	0,15
4	4,61	5,52	0,14
6	3,08	3,69	0,13
10	1,83	2,19	0,13
16	1,15	1,38	0,12
25	0,73	0,87	0,12
35	0,52	0,63	0,11
50	0,39	0,47	0,11
70	0,27	0,32	0,10
95	0,19	0,23	0,10
120	0,15	0,19	0,10
150	0,12	0,15	0,10
185	0,099	0,12	0,094
240	0,075	0,094	0,098
300	0,060	0,078	0,097
400	0,047	0,063	0,096
500	0,037	0,052	0,095
630	0,028	0,043	0,093
800	0,022	0,037	0,089
1000	0,018	0,033	0,088

Notes

- 1) (A) - DC electrical resistance calculated at 70°C in the conductor.
- 2) (B) - Valid for insulated conductors, single core and multi-core cables installed in non-magnetic closed conduits.

Chart 23 - Electrical resistances and inductive reactances of PVC, HEPR and XLPE insulated wires and cables outdoors (values in Ω/km)

Section (mm ²)	R _{cc} (A)	Insulated Conductors - Single core outdoor cables ^(B)									
		Circuitos FN / FF									
		S = from 		S = 2 from 		S = 10 cm 		S = 20 cm 		Trypho 	
R _{ca}	XL	R _{ca}	XL	R _{ca}	XL	R _{ca}	XL	R _{ca}	XL	R _{ca}	XL
1,5	12,1	14,48	0,16	14,48	0,21	14,48	0,39	14,48	0,44	14,48	0,16
2,5	7,41	8,87	0,15	8,87	0,2	8,87	0,37	8,87	0,42	8,87	0,15
4	4,61	5,52	0,14	5,52	0,2	5,52	0,35	5,52	0,4	5,52	0,14
6	3,08	3,69	0,14	3,69	0,19	3,69	0,33	3,69	0,39	3,69	0,14
10	1,83	2,19	0,13	2,19	0,18	2,19	0,32	2,19	0,37	2,19	0,13
16	1,15	1,38	0,12	1,38	0,17	1,38	0,30	1,38	0,35	1,38	0,12
25	0,73	0,87	0,12	0,87	0,17	0,87	0,28	0,87	0,34	0,87	0,12
35	0,52	0,63	0,11	0,63	0,17	0,63	0,27	0,63	0,32	0,63	0,11
50	0,39	0,46	0,11	0,46	0,16	0,46	0,26	0,46	0,31	0,46	0,11
70	0,27	0,32	0,10	0,32	0,16	0,32	0,25	0,32	0,30	0,32	0,10
95	0,19	0,23	0,10	0,23	0,16	0,23	0,24	0,23	0,29	0,23	0,10
120	0,15	0,19	0,10	0,18	0,15	0,18	0,23	0,19	0,28	0,19	0,10
150	0,12	0,15	0,10	0,15	0,15	0,15	0,22	0,15	0,27	0,15	0,10
185	0,099	0,12	0,10	0,12	0,15	0,12	0,21	0,12	0,26	0,12	0,10
240	0,075	0,09	0,10	0,09	0,15	0,09	0,20	0,09	0,25	0,09	0,10
300	0,060	0,08	0,10	0,07	0,15	0,07	0,19	0,08	0,24	0,08	0,10
400	0,047	0,06	0,10	0,06	0,15	0,06	0,18	0,06	0,23	0,06	0,10
500	0,037	0,05	0,10	0,05	0,15	0,05	0,17	0,05	0,23	0,05	0,10
630	0,028	0,04	0,09	0,04	0,15	0,04	0,16	0,04	0,22	0,04	0,09
800	0,022	0,04	0,09	0,03	0,14	0,03	0,15	0,04	0,20	0,04	0,09
1000	0,018	0,03	0,09	0,03	0,14	0,03	0,14	0,03	0,19	0,03	0,09

Notes

- 1) (A) - DC electrical resistance calculated at 70 °C in the conductor.
- 2) (B) - Valid for outdoor electrical lines, trays, supports and cable trays.

INDUCTIVE REACTANCES

The values of electrical resistances and inductive reactances indicated in the following Chart are average values and are intended for approximate calculations of electrical circuits, using the following formula:

$$Z = R \cos \Phi + X_L \sin \Phi$$

Chart 24 - Electrical resistances and inductive reactances of PVC, HEPR and XLPE insulated wires and cables outdoors (values in Ω/km)

Section (mm ²)	R _{cc} (A)	Insulated Conductors - Single core outdoor cables (B)										Bi- and Three-Pole Cables (B)		Tetrapolar cable (B)	
		3F circuits										FN / FF / 3F		3F + N / 3F + PE	
		S = de		S = 2 de		S = 10 cm		S = 20 cm		Trifólio					
		Rca	XL	Rca	XL	Rca	XL	Rca	XL	Rca	XL	Rca	XL	Rca	XL
1,5	12,1	14,48	0,17	14,48	0,23	14,48	0,4	14,48	0,46	14,48	0,16	14,48	0,12	14,48	0,14
2,5	7,41	8,87	0,16	8,87	0,22	8,87	0,38	8,87	0,44	8,87	0,15	8,87	0,12	8,87	0,13
4	4,61	5,52	0,16	5,52	0,22	5,52	0,37	5,52	0,42	5,52	0,14	5,52	0,12	5,52	0,13
6	3,08	3,69	0,15	3,69	0,2	3,69	0,35	3,69	0,4	3,69	0,14	3,69	0,11	3,69	0,12
10	1,83	2,19	0,14	2,19	0,2	2,19	0,34	2,19	0,39	2,19	0,13	2,19	0,10	2,19	0,12
16	1,15	1,38	0,14	1,38	0,19	1,38	0,32	1,38	0,37	1,38	0,12	1,38	0,10	1,38	0,11
25	0,73	0,87	0,13	0,87	0,18	0,87	0,3	0,87	0,35	0,87	0,11	0,87	0,10	0,87	0,11
35	0,52	0,63	0,13	0,63	0,18	0,63	0,29	0,63	0,34	0,63	0,11	0,63	0,09	0,63	0,11
50	0,39	0,46	0,13	0,46	0,18	0,46	0,28	0,46	0,33	0,46	0,11	0,46	0,09	0,46	0,11
70	0,27	0,32	0,12	0,32	0,17	0,32	0,27	0,32	0,32	0,32	0,10	0,32	0,09	0,32	0,10
95	0,19	0,23	0,12	0,23	0,17	0,23	0,25	0,23	0,3	0,23	0,10	0,23	0,09	0,23	0,10
120	0,15	0,19	0,12	0,18	0,17	0,18	0,24	0,18	0,29	0,19	0,10	0,19	0,09	0,19	0,10
150	0,12	0,15	0,12	0,15	0,17	0,15	0,23	0,15	0,29	0,15	0,10	0,15	0,09	0,15	0,10
185	0,099	0,12	0,12	0,12	0,17	0,12	0,23	0,12	0,28	0,12	0,10	0,12	0,09	0,12	0,10
240	0,075	0,09	0,12	0,09	0,17	0,09	0,22	0,09	0,27	0,09	0,10	0,10	0,09	0,09	0,10
300	0,060	0,08	0,11	0,07	0,17	0,07	0,21	0,07	0,26	0,08	0,10	0,08	0,09	0,09	0,10
400	0,047	0,06	0,11	0,06	0,17	0,06	0,2	0,06	0,25	0,06	0,10	—	—	—	—
500	0,037	0,05	0,11	0,05	0,16	0,05	0,19	0,05	0,24	0,05	0,10	—	—	—	—
630	0,028	0,04	0,11	0,04	0,16	0,04	0,18	0,04	0,23	0,04	0,09	—	—	—	—
800	0,022	0,04	0,11	0,03	0,16	0,03	0,16	0,03	0,22	0,04	0,09	—	—	—	—
1000	0,018	0,03	0,11	0,03	0,16	0,03	0,16	0,03	0,21	0,03	0,09	—	—	—	—

Notes

- 1) (A) - DC electrical resistance calculated at 70°C in the conductor.
- 2) (B) - Valid for outdoor electrical lines, trays, supports and cable trays.

CHARTS OF CONDUCTOR CHARACTERISTICS

(NBR NM 280 e NBR 6524)

Chart 25 - Soft Bare Copper Cables

Section (mm ²)	Solid Wire		Rigid Cables			Flexible Cables			
	Class 1		Class 2		R Máx (Ohm/km)	Class 4	Class 5	Class 6	R Máx (Ohm/km)
	Nº of wires	R Máx (Ohm/km)	Minimum number of wires						
Round			Compact						
0,50	1	36,000	7	—	36,000	0,310	0,210	0,160	39,000
0,75	1	24,500	7	—	24,500	0,310	0,210	0,160	26,000
1,00	1	18,100	7	—	18,100	0,310	0,210	0,160	19,500
1,50	1	12,100	7	6	12,100	0,410	0,260	0,160	13,300
2,50	1	7,410	7	6	7,410	0,410	0,260	0,160	7,980
4,00	1	4,610	7	6	4,610	0,510	0,310	0,160	4,950
6,00	1	3,080	7	6	3,080	0,510	0,310	0,210	3,300
10,00	1	1,830	7	6	1,830	0,510	0,410	0,210	1,910
16,00	1	1,150	7	6	1,150	0,510	0,410	0,210	1,210
25,00	—	—	7	6	0,727	0,510	0,410	0,210	0,780
35,00	—	—	7	6	0,524	0,680	0,410	0,210	0,554
50,00	—	—	19	6	0,387	0,680	0,410	0,310	0,386
70,00	—	—	19	12	0,268	0,680	0,510	0,310	0,272
95,00	—	—	19	15	0,193	0,680	0,510	0,310	0,206
120,00	—	—	37	18	0,153	0,680	0,510	0,310	0,161
150,00	—	—	37	18	0,124	0,860	0,510	0,310	0,129
185,00	—	—	37	30	0,0991	0,860	0,510	0,410	0,1060
240,00	—	—	61	34	0,0754	0,860	0,510	0,410	0,0801
300,00	—	—	61	34	0,0601	0,860	0,510	0,410	0,0641
400,00	—	—	61	53	0,0470	0,860	0,510	—	0,0486
500,00	—	—	61	53	0,0366	0,860	0,610	—	0,0384

According to NBR NM 280

Chart 26 - Bare Copper Cables - Medium Hard and Hard

Section (mm ²)	Class 1A			Class 2A					Class 3A				
	Ø Nom Wires (mm)	R Máx (Ohm/km)		Training		Ø Cable (mm)	R Máx (Ohm/km)		Training		Ø Cable (mm)	R Máx (Ohm/km)	
		Half Hard	Hard	Nº of wires	Ø Yarn		Half Hard	Hard	Nº of wires	Ø Yarn		Half Hard	Hard
4,0	2,240	4,62	4,62	—	—	—	—	—	—	—	—	—	—
6,0	2,800	2,95	2,97	—	—	—	—	—	—	—	—	—	—
10,0	3,550	1,84	1,85	7	1,36	4,08	1,820	1,830	—	—	—	—	—
16,0	4,500	1,14	1,15	7	1,70	5,10	1,170	1,180	—	—	—	—	—
25,0	5,600	0,739	0,742	7	2,06	6,18	0,795	0,799	—	—	—	—	—
35,0	6,700	0,516	0,519	7	2,50	7,50	0,538	0,541	—	—	—	—	—
50,0	8,000	0,362	0,364	7	3,00	9,00	0,375	0,377	—	—	—	—	—
70,0	9,500	0,254	0,255	7	3,45	10,35	0,283	0,284	19	2,12	10,60	0,276	0,278
95,0	10,900	0,193	0,194	7	4,12	12,36	0,199	0,200	19	2,50	12,50	0,198	0,199
120,0	—	—	—	19	2,90	14,50	0,148	0,149	37	2,06	14,42	0,15	0,151
150,0	—	—	—	19	3,25	16,25	0,118	0,118	37	2,24	15,68	0,127	0,128
185,0	—	—	—	19	3,55	17,75	0,0990	0,0995	37	2,50	17,50	0,102	0,102
240,0	—	—	—	19	4,00	20,00	0,0777	0,0782	37	2,90	20,30	0,076	0,0764
300,0	—	—	—	19	4,50	22,50	0,0613	0,0616	37	3,25	22,75	0,0604	0,0607
400,0	—	—	—	37	3,75	26,25	0,0455	0,0457	61	2,90	26,10	0,0461	0,0463
500,0	—	—	—	37	4,12	28,84	0,0376	0,0378	61	3,25	29,25	0,0366	0,0368

According to NBR 6524

CALCULATION OF SHORT-CIRCUIT CURRENT

SHORT-CIRCUIT CURRENT IN THE CONDUCTOR

The factor that limits the current carrying capacity of a cable under short-circuit conditions is the maximum temperature that the conductor can reach during the short-circuit without causing damage to the insulation and connections. Chart 01 shows the maximum permissible temperatures for the most commonly used insulating materials and connection types.

Chart 27 - Maximum permissible temperatures

Material or Component	PVC	XLPE	HEPR	Welded Fittings	Pressed Connections
Temperature °C	160	250	250	160	250

For the calculation of the short-circuit current capacity, two formulas are applied:

- for copper conductor

$$I_{cc} = 340,1.A. \left[\frac{1}{t} \cdot \log \left(\frac{\theta_1 + 234}{\theta_0 + 234} \right) \right]^{\frac{1}{2}}$$

- for aluminum conductor

$$I_{cc} = 220,7.A. \left[\frac{1}{t} \cdot \log \left(\frac{\theta_1 + 228}{\theta_0 + 228} \right) \right]^{\frac{1}{2}}$$

where:

I_{cc} = short-circuit current, in Amperes

A = nominal conductor section in mm²

t = duration of the short circuit in seconds

θ_1 = conductor temperature during the short circuit, in °C

θ_0 = conductor temperature at steady state in °C

The above equations as well as the following graphs can be used in the following situations:

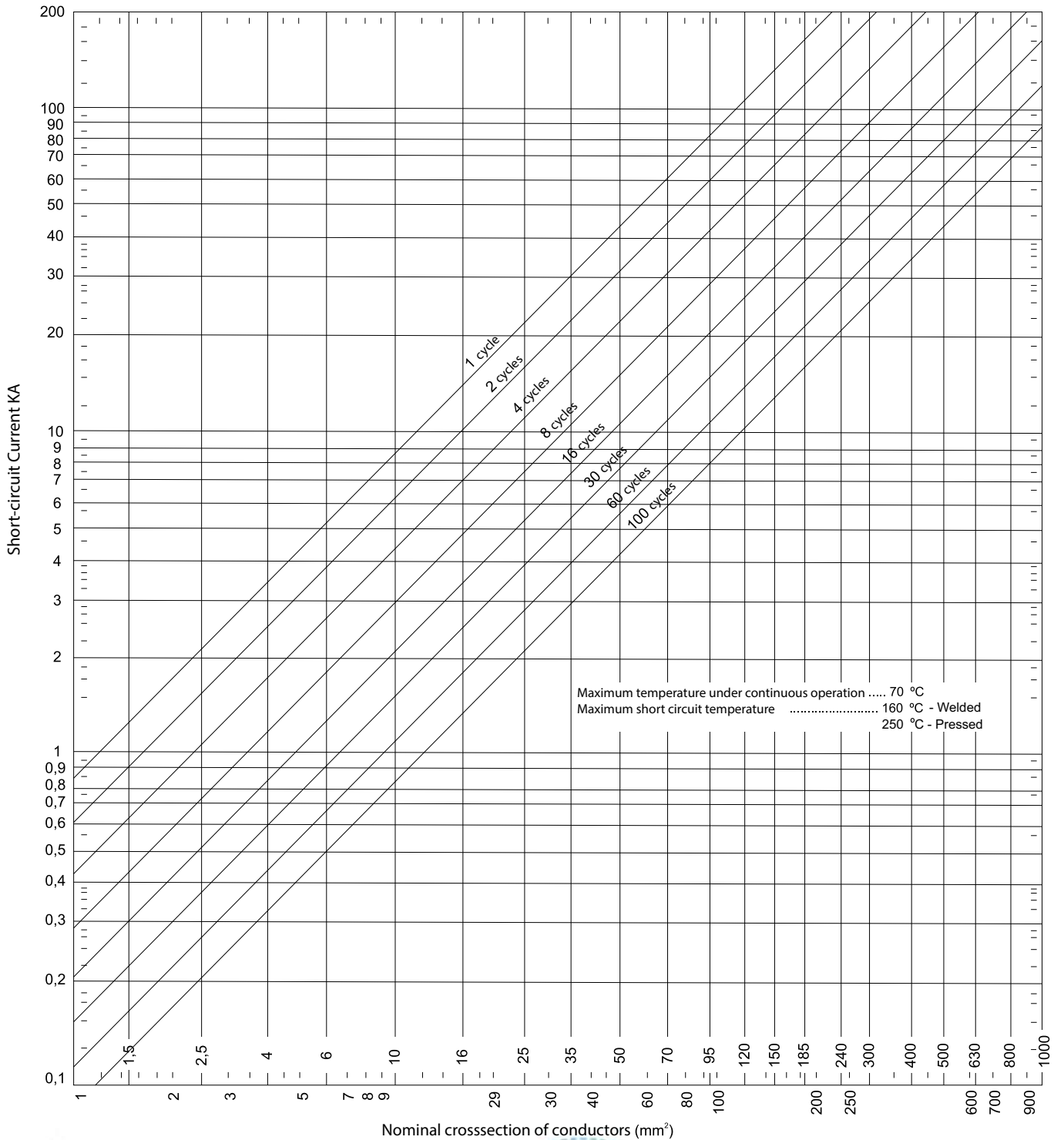
- to determine the maximum short-circuit current that the cable can withstand;
- to determine the conductor section required to withstand a particular short-circuit condition;
- to determine the maximum time a cable can operate with a particular short-circuit current.

MAXIMUM SHORT-CIRCUIT CURRENT

70 °C

CONDUCTOR - COPPER

PRESSED OR SOLDERED CONNECTIONS

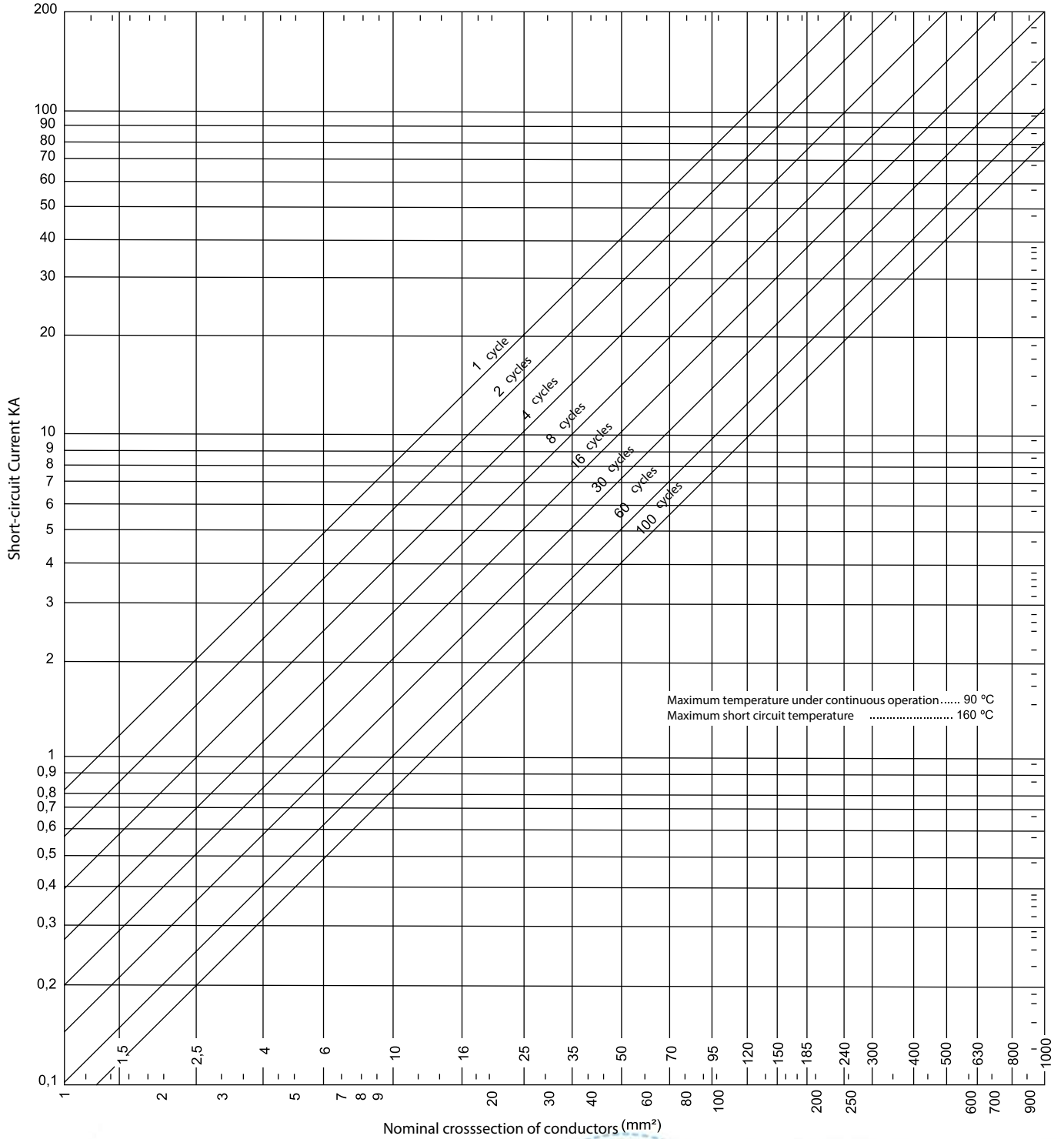


MAXIMUM SHORT-CIRCUIT CURRENT

90 °C Chart 29 - MaxLink, MaxLink G-Flex, MaxLink R Cables

CONDUCTOR - COPPER

SOLDERED CONNECTIONS



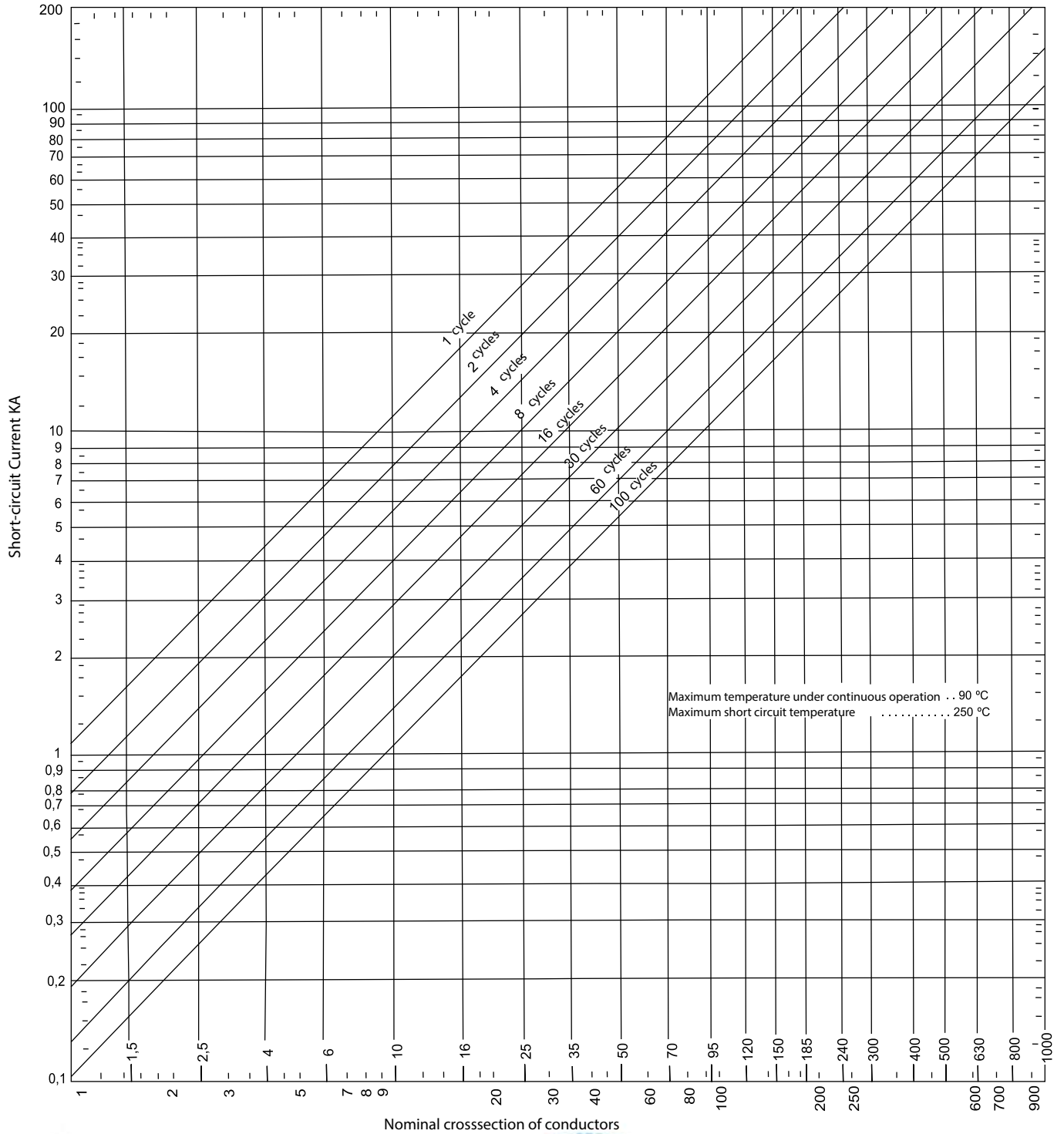
MAXIMUM SHORT-CIRCUIT CURRENT

90 °C

Chart 30 - MaxLink, MaxLink G-Flex, MaxLink R Cables

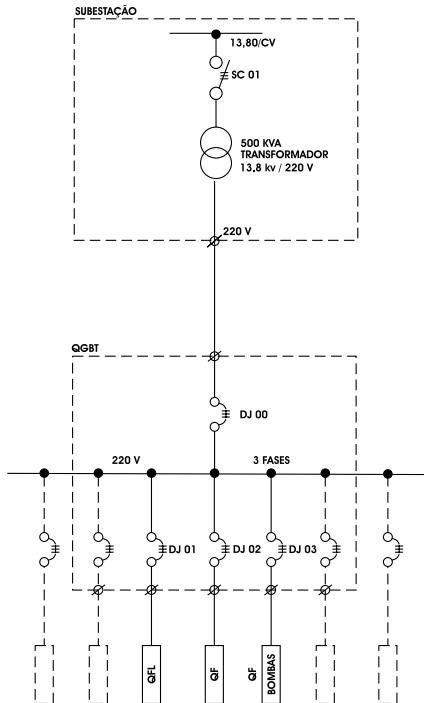
CONDUCTOR - COPPER

PRESSED CONNECTIONS



APPLICATION EXAMPLE

In a small industry, it is desired to install, from the substation, cables to supply the following circuits, as shown in the diagram:



- SUBSTACAO → QGBT (50 m in beds)
- QGBT → QFL (50 m in perforated cable tray)
- QGBT → Pumps (200 m in pvc conduit)

Installed Power Ratio
 - Transformer: 500 kVA (13.8/200 V)
 - QFL (Lighting/Power Board) - 40 kW
 - QF - Pumps - 1 x 10 hp and 1 x 20 hp
 Low voltage operating voltage - 220 V Power factor - $\cos\phi = 0,95$

In accordance with the recommendations of NBR 5410, the maximum voltage drop between the origin of the installation and the furthest point from the load must not exceed 7% for various uses and 7% for lighting circuits.

We consider the following percentages of voltage drop:

- 1) Substation 2% QGBT
- 2) QGBT 1% QFL
- 3) QGBT 3% QF
- 4) QGBT 2% QF

QGBT → QFL

Having already defined the installation method (Chart 05), we will calculate the circuit design current (I_B):

$$I_B = \frac{40.000}{\sqrt{3} \times 220 \times 0,95} = 110,5 \text{ A}$$

a) Design using the maximum current carrying capacity criterion

If the ambient temperature of the location where the cables are to be installed is 40 °C, a temperature correction factor of 0.87 according to Chart 10 is required for PVC insulated cables.

$$I_B' = \frac{110,5}{0,87} = 127 \text{ A}$$

According to Chart 05, the installation type "perforated cable tray" meets the reference method (installation methods F). Following Chart 08 column (F-5) loaded conductors, or trefoil, we find the 35 mm² section cable, which meets a current of up to 137 A.

b) Design by the voltage drop criterion Let the

voltage drop be unity:

$$\Delta V_{P.U} = \frac{1 \times 220}{0,05 \times 127,0 \times 100} = 0,35 \text{ V/A.km}$$

According to Chart 20, single-core cables in three-phase circuit and trefoil arrangement, $\cos = 0,95$, the 150 mm² section meets a p.u. voltage drop of up to 0.30.

Conclusion

The 150 mm² section should be used as it meets both criteria (35 mm² would imply a higher voltage drop than specified).

Solution (see notes 1 and 2)

- Maxvinil Flex Cable 1kV - 150 mm² - phase
- Maxvinil Flex Cable 1kV - 70 mm² - neutral (according to Chart 02)
- Maxvinil Flex Cable 1kV - 70 mm² - earth (protection) - (according to Chart 03)
- QGBT → QF (Pumps)

Motor circuit current (I_{N1} and I_{N2}):

- 10 CV 220 V 3-phase 1800 rpm 60 Hz 4 poles $I_{N1} = 28 \text{ A}$
- 20 CV 220 V 3-phase 1200 rpm 60 Hz 6 poles $I_{N2} = 56 \text{ A}$

Total design current (I_B):

$$I_B = I_{N1} + I_{N2} = 28 + 56 = 84 \text{ A}$$

a) Design using the maximum current carrying capacity criterion

If the ambient temperature of the location where the cables will be installed is 40 °C, a temperature correction factor of 0.87 must be applied according to Chart 10.

$$I_B' = \frac{84}{0,87} = 97 \text{ A}$$

APPLICATION EXAMPLE

According to Chart 05, installation type "buried conduit" meets reference method D. Following Chart 06, column (D - 3) loaded conductors, we find the 35 mm² section cable that meets a current of up to 103 A.

b) Dimensioning by the voltage drop criterion: Let the voltage drop be unit:

$$\Delta V_{p.u.} = \frac{3 \times 220}{0,200 \times 97 \times 100} = 0,34 \text{ V/A.km}$$

According to Chart 20, single-core cables in three-phase circuit and trefoil arrangement, cos = 0.95, the 150 mm² section meets a p.u. voltage drop of up to 0.30.

Conclusion

The 150 mm² section should be used as it meets both criteria.

Solution (see notes 1 and 2)

Maxvinil Flex Cable 1kV - 150 mm² - phase
Maxvinil Flex Cable 70 mm² (neutro) - if required
Maxvinil Flex Cable 1kV - 95 mm² - protection (earth)

Substation - QGBT

Total Design Current (I_B):

$$I_B' = \frac{500.000}{\sqrt{3 \times 220}} \cong 1300A$$

As the circuit current is high, 3 cables per phase will be considered, therefore:

$$I_B' = \frac{1300}{3} = 438A$$

a) Design using the maximum current carrying capacity criterion

If the ambient temperature of the location where the cables are to be installed is 40 °C, a temperature correction factor of 0.87 must be applied according to Chart 10.

$$I_B' = \frac{438}{0,87} = 504A$$

According to Chart 05, the installation type "beds" meets the reference method F. According to Chart 08, column (F - 5) horizontally arranged loaded conductors, we find the cable section 300 mm², which meets a current of up to 561 A.

b) Design by the voltage drop criterion Let the voltage drop be unity:

$$\Delta V_{p.u.} = \frac{2 \times 220}{0,05 \times 438 \times 100} = 0,20 \text{ V/A.km}$$

According to Chart 20, single-core cables in three-phase circuit in trefoil and contiguous arrangement, cos = 0.95, the 300 mm² section meets the p.u. voltage drop of up to 0.18.

Conclusion

The 300 mm² section should be used as it meets both criteria.

Solution (see notes 1 and 2)

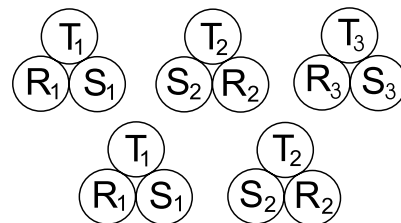
Maxvinil Flex cable 0,6/1 kV - 300 mm² - phase
Maxvinil Flex cable 0,6/1 kV - 150 mm² - neutral
Maxvinil Flex cable 0,6/1 kV - 150 mm² - protection

Notes

- 1) For this type of installation, NBR 5410 requires that the cables have insulation and coverage - uni/multipolar.
- 2) When installing single core cables in parallel, it is essential to adopt phase arrangements that allow the currents to be balanced as much as possible. In general, the trefoil arrangement is the one that most allows this balance.

Cables should never be grouped by phase in arrangements other than those shown opposite:

In Trifolio



In horizontal arrangement, contiguous



CONDUIT SIZING

Conduit occupancy

In the same conduit, circuit conductors can only be installed when they belong to the same installation. The sum of the total areas of the conductors contained in a conduit may not exceed 53%, 31% and 40% of the useful area of the conduit, respectively for 1, 2, 3 or more conductors.

What is conduit sizing?

Sizing conduit is determining the nominal size of the conduit for each section of the installation.

Nominal conduit size is the outer diameter of the conduit expressed in mm, standardized by norm.

The size of the conduits should be of a diameter such that the conductors can be easily installed or removed.

It is therefore recommended that the conductors do not occupy more than 40% of the useful area of the conduits.

Considering this recommendation, there are Charts that directly provide the size of the conduits.

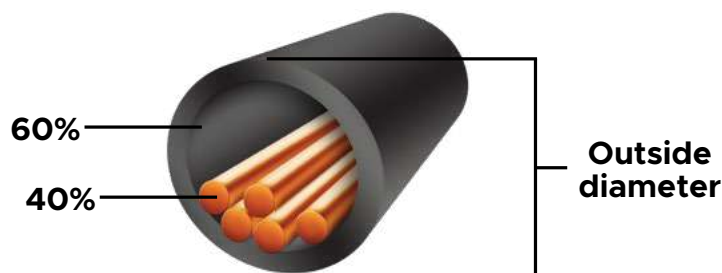
To size the conduits of an electrical project, it is necessary to have: the plan with the graphical representation of the wiring with the conductor sections indicated; and the specific Chart that gives the size of the conduit.

Procedure

In the project plan, for each section of conduit you must:

- 1) Count the number of conductors contained in the section;
- 2) Check which is the largest cross-section of these conductors.

Once these data are available, the specific Chart must be consulted to obtain the nominal size of the conduit suitable for this section.



CONVERSION CHART (AWG-MCM/mm²)

AWG/MCM ----> mm² conversion Chart

Section		Wire Diameter	Copper Area	Resistance	Section		Wire Diameter	Copper Area	Resistance
AWG/MCM	(mm ²)	(mm)	(mm ²)	(Ohm/km)	AWG/MCM	(mm ²)	(mm)	(mm ²)	(Ohm/km)
22		0,643	0,32	53,095		35,00	6,472	32,90	0,524
21		0,724	0,41	41,879	2		6,544	33,63	0,513
	0,50	0,781	0,48	36,000	1		7,348	42,41	0,407
20		0,812	0,52	33,310		50,00	7,531	44,55	0,387
19		0,912	0,65	26,416	1/0		—	53,50	0,322
	0,75	0,947	0,70	24,500		70,00		64,09	0,269
18		1,024	0,82	20,935	2/0		—	67,40	0,256
	1,00	1,101	0,95	18,100	3/0		—	85,01	0,203
17		1,150	1,04	16,599		95,00		89,33	0,193
16		1,291	1,31	13,171	4/0		—	107,20	0,161
	1,50	1,347	1,42	12,100		120,00		112,69	0,153
15		1,450	1,65	10,441	250		—	127,00	0,136
	2,00	1,551	1,89	9,130		150,00		139,04	0,124
14		1,628	2,08	8,283	300		—	152,00	0,1130
	2,50	1,721	2,33	7,410		185,00		173,98	0,0991
13		1,828	2,62	6,569	350		—	177,00	0,0974
12		2,053	3,31	5,208	400		—	203,00	0,0849
	4,00	2,182	3,74	4,610	450		—	228,00	0,0756
11		2,305	4,17	4,132		240,00		228,66	0,0754
10		2,588	5,26	3,278	500		—	253,00	0,0681
	6,00	2,670	5,60	3,080	550		—	279,00	0,0618
9		2,906	6,63	2,599		300,00		286,0	0,0601
8		3,264	8,37	2,06	600		—	304,00	0,0567
	10,00	3,463	9,42	1,830	650		—	329,00	0,0524
7		3,665	10,55	1,634	700		—	355,00	0,0486
6		4,115	13,30	1,296		400,00		366,83	0,0470
	16,00	4,369	14,99	1,150	750		—	380,00	0,0454
5		4,621	16,77	1,028	800		—	405,00	0,0426
4		5,189	21,15	0,815	900		—	456,00	0,0378
	25,00	5,495	23,72	0,727		500,00		471,07	0,0366
3		5,827	26,67	0,647	1000		—	507,00	0,0340

Notes

- 1) The maximum electrical resistances of the sections in mm² were based on in NBR NM 2 80 - Chart 2 (Conductors - Class 2).
- 2) The copper areas of the sections in mm² were calculated using the respective maximum electrical resistances of each section and a resistivity of 17.241 Ohm x mm²/km.
- 3) The Rmax (Ohm/km) for the AWG/MCM sections were based on ASTM B8 - Chart 1 and 2.



FOR ELECTRICAL WIRES AND CABLES, WE RECOMMEND INCESA ELECTRICAL CONNECTORS AND COMPONENTS

CONDUMAX CUSTOMER SERVICE

AUTOMOTIVE INDUSTRIES AND SUBMERGED PUMP INDUSTRIES
marcio.togneri@condumax.com.br
paulo.fossalussa@condumax.com.br
(17) 32793702

DISTRIBUTORS, GENERAL INDUSTRIES, AGRIBUSINESS, RENEWABLE ENERGY, CONSTRUCTION
paulo.silva@condumax.com.br
(17) 32793701

ELECTRICITY UTILITIES
wandir.forti@incesa.com.br
lucas.novo@condumax.com.br
(17) 32792603 / (17) 32793749

CONDUMAX RELATIONSHIP CENTER
0800 701 37 01
ccr@condumax.com.br



CONDUMAX - ELETRO METALÚRGICA CIAFUNDI LTDA.CNPJ 53.224.127/0005-84 - Insc.Est. 487.021.356.116
Rod. Wilquem Manoel Neves, km 3,5 - CEP 15400-000 - Olímpia - SP - Brazilian Industry
Phone (17) 3279-3700 - Fax (17) 3279-3716 - www.condumax.com.br - condumax@condumax.com.br