

**ELECTRICAL CHARACTERISTICS OF UNARMoured PVC INSULATED,  
PVC SHEATHED 0.6/1 KV POWER CABLES**

(Conforming to IEC 60502-1)

Nominal cross-section	DC Resistance at 20°C		Voltage Drop		Current Carrying Capacity			
	Copper	Alu	Cos Ø = 0.8		Underground cable		Cable in air	
			Copper	Alu	Copper	Alu	Copper	Alu
mm <sup>2</sup>	Ω/km	Ω/km	V/A x Km	V/A x Km	Amp	Amp	Amp	Amp
1.5	12.1	-	23.3	-	30	-	22	-
2.5	7.41	-	14.2	-	41	-	30	-
4	4.61	-	9.0	-	53	-	40	-
6	3.08	-	6.1	-	67	-	52	-
10	1.83	3.08	3.7	6.1	91	67	71	55
16	1.15	1.91	2.3	3.8	115	90	96	75
25	0.727	1.20	1.5	2.4	146	114	127	99
35	0.524	0.868	1.1	1.7	176	137	157	125
50	0.387	0.641	0.9	1.4	212	165	190	151
70	0.268	0.443	0.6	1.0	261	204	242	192
95	0.193	0.320	0.5	0.7	313	244	293	232
120	0.153	0.253	0.4	0.6	358	279	339	269
150	0.124	0.206	0.4	0.5	400	312	390	309
185	0.0991	0.164	0.3	0.4	451	352	444	353
240	0.0754	0.125	0.3	0.3	522	407	522	415
300	0.0601	0.100	0.2	0.3	590	460	595	472
400	0.0470	0.0778	0.2	0.2	680	530	695	552
500	0.0366	0.0605	0.2	0.2	769	599	780	618
630	0.0283	0.0469	0.2	0.2	870	678	885	705

**NOTE**

**1. DC Resistance:**

At different operating T(°C) :  $R = R_{20°C} \{ 1 + \alpha (T°C - 20) \}$

$\alpha$  = Temperature coefficient at 20°C = 0.00393 for copper & 0.00403 for aluminium

**2. Voltage Drop:**

In three phase system, decrease above listed voltage drop by 15%

**3.Current Carrying Capacity:**

(a) Laying Conditions: - Underground: Temperature of the soil 20°C - Thermal resistivity 100°C cm/w  
- In Air: Ambient temperature 30°C

(b) In three phase system, decrease above listed current ratings by 10%.

**4. Current Ratings of PVC insulated, copper cables (No Sheath)**

CROSS SECTION mm <sup>2</sup>	DIAMETER mm	SINGLE CORE PVC INSULATED CABLE	
		Amps	
		In pipes	In air
1.5	1 x 1.38	13	21
2.5	1 x 1.78	17	28
4.0	1 x 2.25	22	37
6.0	1 x 2.76	29	48
6.0	7 x 1.04	29	48
10.0	7 x 1.35	39	64
16.0	7 x 1.70	53	85
25.0	7 x 2.14	72	112
35.0	7 x 2.52	90	138
50.0	19 x 1.78	115	172
70.0	19 x 2.14	144	213
95.0	19 x 2.52	172	254
120.0	37 x 2.03	205	300
150.0	37 x 2.25	-	340
185.0	37 x 2.52	-	390
240.0	37 x 2.88	-	460
300	37 x 3.20	-	530
400	37 x 3.70	-	631
500	37 x 4.15	-	722

## **HOUSE WIRING CABLES APPLICATIONS**

Conduit Cables – This is designed for use in dry rooms.

**NCY - 1.5RW**

For domestic lighting purpose approx. 15AMPS.

**NCY - 2.5RW**

For socket outlets for electric irons, refrigerators, T.V. sets etc. approx. 20AMPS.

**NCY - 4.0RW**

For electric cookers, water heater, air conditioners, etc. 25AMPS.

**NCY - 6.0RW**

For electric cookers, water heaters, air conditioners etc. 33AMPS.

**NCY - 10.0RS**

For motors of higher capacities and switchboards approx. 45AMPS.

Surface Cables – This is designed for indoor and outdoor applications.

**NCY - 1.5RW**

For lighting purposes approx. 19AMPS.

**NCY - 2.5RW**

For socket outlets for electric irons, refrigerators, etc. approx. 25 AMPS.

**NCY - 4.0RW**

For electric cookers, water heaters, air conditioners, etc. approx. 34 AMPS.

**NCY - 10.0RW**

For motors of higher capacities, 61AMPS.

Service Connection Cables – Specially made for use in outdoor inaccessible situations from the transm

**NCYQ - 6.0RS** – For houses with loads of approx. 53 AMPS.

**NCYQ - 10.0RS** - For houses with loads of approx. 73 AMPS.

**For Earthing Purposes**

**CEC 2.5RW** – (Bare Copper)

**NCY 2.5RW** – (Green/Yellow) Insulated Earth Wire.

## **1. CONDUCTING MATERIALS**

The commonly used conductors are copper and aluminium meeting the requirement of IEC 60228.

Theoretical characteristics of copper and aluminium are as follows:

	Annealed Copper	Annealed Aluminium
Specific Gravity (kg/dm <sup>3</sup> )	8.9	2.7
Resistivity at 20°C (ohm. Mm <sup>2</sup> /m)	17.241 x 10 <sup>-3</sup>	28.264 x 10 <sup>-3</sup>
Breaking Load (daN/mm <sup>2</sup> )	23 to 25	12 to 15
Elongation at break (%)	20 to 40	1 to 4

Equivalent standardized cross sectional area at equal voltage drop

Copper (mm <sup>2</sup> )	Aluminium (mm <sup>2</sup> )
6	10
10	16
16	25
25	35
35	50
50	70
70	95
95	150
120	185
150	240
185	300

## **2. PROPERTIES OF INSULATING MATERIALS**

MATERIAL	PVC	PE	XLPE
Specific gravity (kg/dm <sup>3</sup> )	1.3 - 1.5	0.92 - 0.97	0.92 - 1.18
Dielectric constant	5 - 8'	2.3	2.5
Breaking load (bars) min.	100 - 200	100	125 - 150
Elongation at break min.	150%	350%	200%
Max. continuous operating temperature (°C)	70 - 105	70	90
Max. short circuit temperature (°C)	160	150	250
Moisture proof	Good	Very good	Very good
Flame proof	Very good	Poor	Poor
Flexibility	Good	Poor	Poor
Insulation resistance constant, Ki at 20°C (Megohm x km)	5000	> 20.000	> 20.000

## **3. SELECTION OF A CABLE SIZE FOR A PARTICULAR APPLICATION**

The determination of the cross sectional area of a cable for a particular application depends on the:

- \* Current carrying capacity in continuous loading,
- \* Voltage drop in continuous loading
- \* Permissible short-circuit current,
- \* Conditions of installation (temperature, spacing,.....).