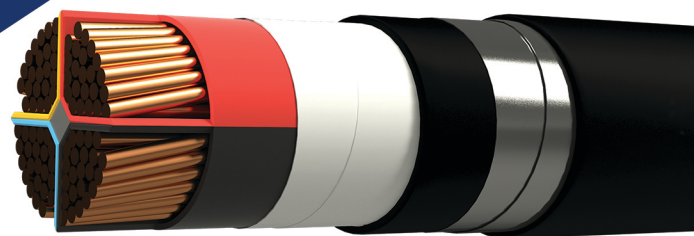
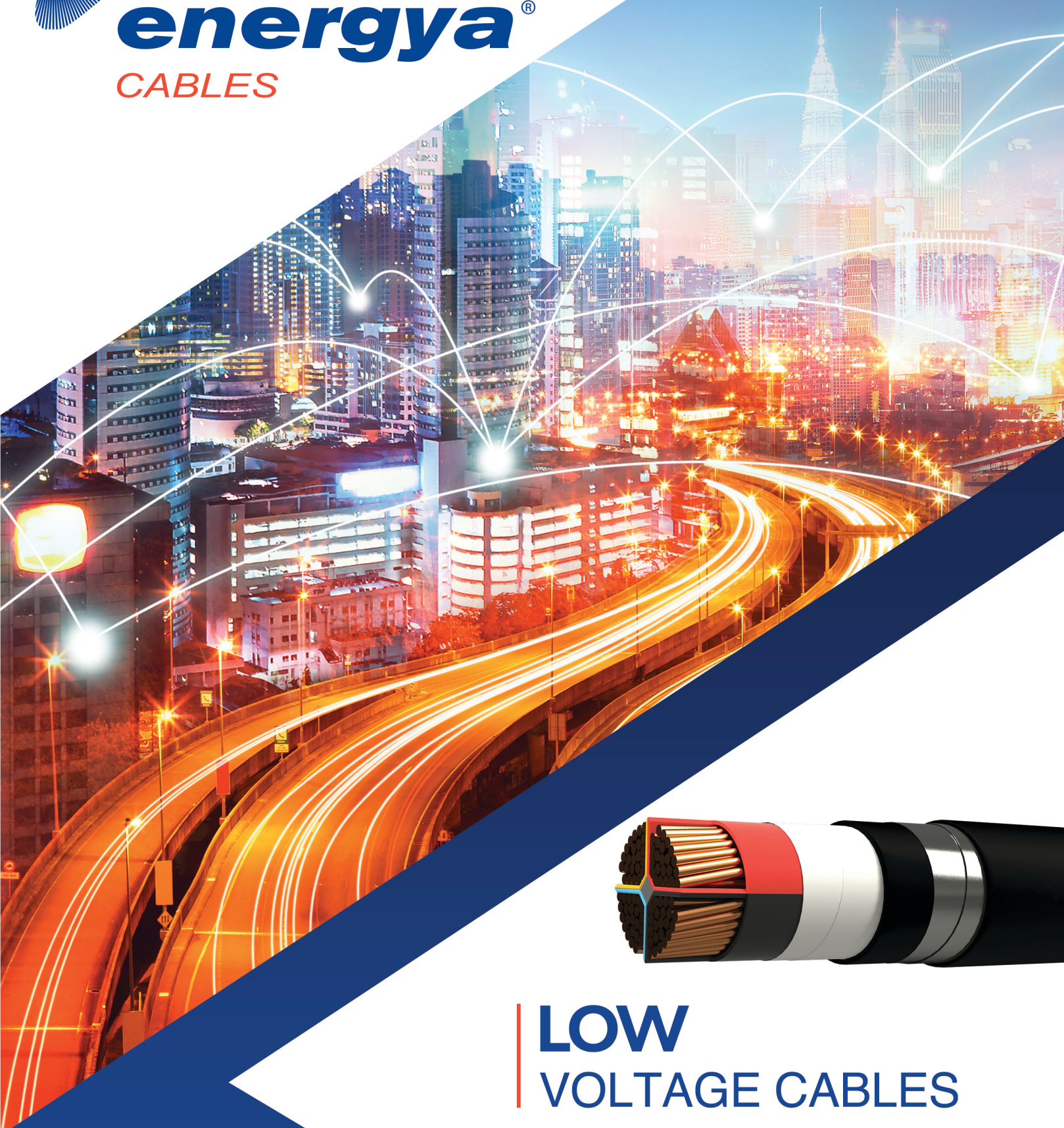




**energyya**<sup>®</sup>  
CABLES



**LOW**  
VOLTAGE CABLES

**elsewedy HELAL**



## Corporate Profile :

Energyya Industries is a multi-disciplined business group with diversified business operations in:-

- Manufacturing.
- Distribution.
- Turn key projects in Electromechanical and Telecommunication fields.

Energyya Industries is one of the largest players in the field of electricity in the Middle East and Africa with operations in Egypt, Algeria, Libya, Sudan, Saudi Arabia, UAE, Qatar, Bahrain and Lebanon.

Energyya Industries has a total turnover exceeding US\$ 1 Billion and has total manpower above 7,000. Energyya Industries started business during the early 1930s in which:

1937s :Electrical products distribution in Egypt.

1960s :Electrical products distribution in Saudi Arabia.

1980s :Manufacturing our own brands in Egypt and Saudi Arabia.

1990s :Manufacturing our own components Copper, PVC, Lighting.

2000s :Regional expansion in core business with strong background integration.

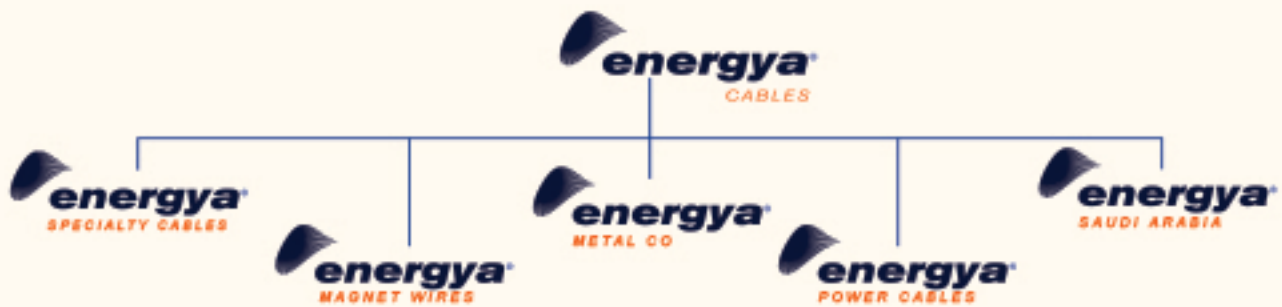
**Energyya Industries consists of 13 diversified divisions:**





## About Us :

As a company Energya Cables, is considered one of the largest manufactures of low, medium, high and extra high voltage power cables in Egypt since 1988.



Our range of products is very wide and includes low, medium, high voltage, and extra high voltage cables with Copper or Aluminum conductors, PVC or XLPE insulated, Steel or Aluminum, tape or wires armored, PVC or PE sheathed, and because we believe in the continuous enhancement of our products range, which is one of our strategic goals, we recently started to produce submarine cables and extra high voltage cables up to 220KV with a lead sheath that provides high level of protection to the cable. At the same time, we qualified our management system to fully achieve ISO 2015 :9001 & EH&S requirements in order to delight our customers and gain their confidence, we believe that we are partners in success with our customers.







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1

Low Voltage Power Cables.



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1

Low Voltage Power Cables.



## -1.1 Single Core Cables, PVC Insulation

- Single Core Cables Copper, PVC Insulation and PVC Sheathed.
- Single Core Cables Aluminum, PVC Insulation and PVC Sheathed.
- Single Core Cables Copper, PVC Insulation, Tape Armored and PVC Sheathed.
- Single Core Cables Aluminum, PVC Insulation, Tape Armored and PVC Sheathed.
- Single Core Cables Copper, PVC Insulation, Wires Armored and PVC Sheathed.
- Single Core Cables Aluminum, PVC Insulation, Wires Armored and PVC Sheathed.

### 0.6/1 (1.2) kV



#### (a) Description

- Soft annealed stranded Copper conductor, insulated with a PVC compound rated 70 ° C and sheathed with a PVC compound layer.
- Cables are produced according to IEC 60502.

#### (b) Application







- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, industrial plants, as well as in thermopower and hydropower stations.

#### (c) Technical data

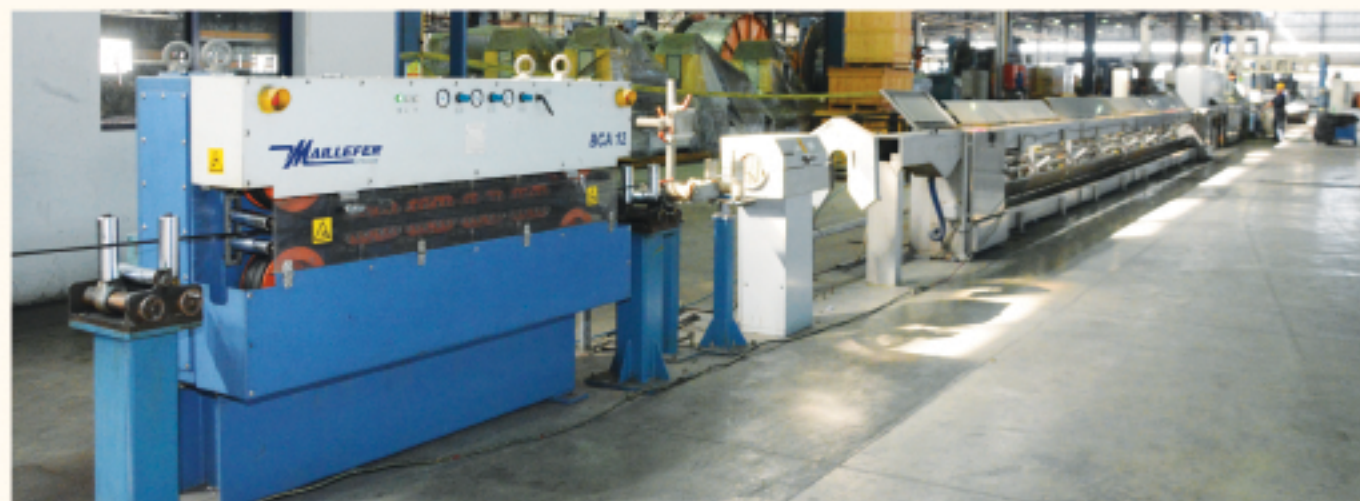
Relevant Standard:	IEC 60502 Part 1.
Conductor :	Plain Copper, Class 2 according to IEC 60228.
Insulation :	PVC.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 70 °C during operation.
Minimum Bending Radius :	8 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.

# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating						Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	AC at 70 °C	Laid in Ground			Laid in Free Air				
										
mm²	Ω/km	Ω/km	A	A	A	A	A	A	mm	kg/km
4	4.6100	5.5100	47	45	36	43	38	33	7.0	86
6	3.0800	3.6800	59	57	45	55	48	44	7.9	115
10	1.8300	2.1700	79	76	59	76	67	59	8.9	165
16	1.1500	1.3700	102	96	73	92	86	75	9.9	231
25	0.7270	0.8600	130	124	96	121	109	104	11.6	343
35	0.5240	0.6300	153	147	119	150	144	127	12.7	445
50	0.3870	0.4600	181	175	141	184	173	155	14.6	600
70	0.2680	0.3200	226	215	175	230	219	196	16.3	805
95	0.1930	0.2300	266	254	209	288	276	242	18.7	1085
120	0.1530	0.1900	305	288	237	328	316	282	20.4	1350
150	0.1240	0.1500	339	322	266	380	368	322	22.6	1654
185	0.0991	0.1200	390	367	305	437	426	368	24.9	2030
240	0.0754	0.0920	452	424	350	552	529	443	28.3	2675
300	0.0601	0.0750	509	475	396	633	610	518	31.1	3280
400	0.0470	0.0590	582	537	441	725	707	598	35.3	4350
500	0.0366	0.0480	655	593	492	828	805	690	38.8	5355
630	0.0283	0.0390	746	667	559	955	932	782	42.7	6685
800	0.0221	0.0290	836	735	627	1081	1058	891	47.2	8600
1000	0.0176	0.0250	927	802	684	1185	1162	989	52.0	10500

The above data is approximate and subjected to manufacturing tolerance.





**0.6/1 (1.2) kV**



### (a) Description

- Soft stranded Aluminum conductor, insulated with a PVC compound rated 90°C and sheathed with a PVC compound layer.
- Cables are produced according to IEC 60502.

### (b) Application







- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, industrial plants, as well as in thermopower and hydropower stations.

### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Aluminum, Class 2 according to IEC 60228.
Insulation :	PVC.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 70 °C during operation.
Minimum Bending Radius:	8 x cable outer diameter (Ø).
Packing Condition :	On non-returnable wooden drum.

# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating						Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	*AC at 70 °C*	Laid in Ground			Laid in Free Air				
										
mm²	Ω/km	Ω/km	A	A	A	A	A	A	mm	kg/km
16	1.9100	2.2900	73	71	57	75	69	52	9.9	132
25	1.2000	1.4400	96	94	73	98	92	75	11.6	185
35	0.8680	1.0430	119	115	90	121	115	98	12.7	250
50	0.6410	0.7700	141	136	107	144	138	121	14.6	295
70	0.4430	0.5330	175	164	136	190	178	144	16.3	375
95	0.3200	0.3850	209	198	153	236	224	184	18.7	500
120	0.2530	0.3050	237	226	186	270	259	213	20.4	605
150	0.2060	0.2480	266	254	203	305	293	242	22.6	725
185	0.1640	0.1980	299	288	232	357	345	282	24.8	900
240	0.1250	0.1510	350	333	271	420	408	334	28.3	1150
300	0.1000	0.1220	401	379	305	483	466	385	31.1	1420
400	0.0778	0.0954	463	429	350	575	552	449	35.3	1750
500	0.0605	0.0751	525	486	401	667	644	529	38.8	2220
630	0.0469	0.0595	605	554	458	782	759	615	42.7	2750
800	0.0367	0.0470	678	599	509	880	857	713	47.2	3450
1000	0.0291	0.0370	751	661	559	966	943	794	52.0	4230

The above data is approximate and subjected to manufacturing tolerance.



## Single Core Cables, with Stranded Circular Copper Conductors, PVC Insulated, Armored by Aluminium Tape and PVC Sheathed

**0.6/1 (1.2) kV**



### (a) Description

- Soft annealed stranded Copper conductor, insulated with a PVC compound rated 70 °C, armored by Aluminum tape and sheathed with a PVC compound layer.
- Cables are produced according to IEC 60502.

### (b) Application

- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, industrial plants, as well as in thermopower and hydropower stations.

### (c) Technical data







Relevant Standard:	IEC 60502 Part 1.
Conductor :	Plain annealed Copper, Class 2 according to IEC 60228.
Insulation :	PVC.
Bedding :	PVC.
Aarmor :	Aluminium Tape Armor.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 70 °C during operation.
Minimum Bending Radius:	15 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.





# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating						Approx. Overall Diameter	Approx. Weight
			Laid in Ground			Laid in Free Air				
	DC at 20 °C	AC at 70 °C								
mm²	Ω/km	Ω/km	A	A	A	A	A	A	mm	kg/km
120	0.1530	0.1900	290	274	225	312	300	268	23.2	1525
150	0.1240	0.1500	322	306	253	361	350	306	25.2	1835
185	0.0991	0.1200	371	349	290	415	405	350	27.3	2240
240	0.0754	0.0920	429	403	333	524	503	421	30.3	2850
300	0.0601	0.0750	484	451	376	601	580	492	33.1	3505
400	0.0470	0.0590	553	510	419	689	672	568	36.5	4475
500	0.0366	0.0480	622	563	467	787	765	656	40.5	5605
630	0.0283	0.0390	709	634	531	907	885	743	44	6875
800	0.0221	0.0290	794	698	596	1027	1005	846	48.9	8710

The above data is approximate and subjected to manufacturing tolerance.



## Single Core Cables, with Stranded Circular Aluminum Conductors, PVC Insulated, Armored by Aluminum Tape and PVC Sheathed

**0.6/1 (1.2) kV**



### (a) Description

- Soft stranded Aluminum conductor, insulated with a PVC compound rated 90°C, armored by Aluminum tape and sheathed with a PVC compound layer.
- Cables are produced according to IEC 60502.

### (b) Application

- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, industrial plants, as well as in thermopower and hydropower stations.







### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Aluminum, Class 2 according to IEC 60228.
Insulation :	PVC.
Bedding :	PVC.
Aarmor :	Aluminium Tape Armor.
OuterJacket :	PVC.
Temperature Range :	15- °C up to + 70 °C during operation.
Minimum Bending Radius:	15 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.



# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating						Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	*AC at 70 °C*	Laid In Ground			Laid In Free Air				
										
			A	A	A	A	A	A		
mm²	Ω/km	Ω/km	A	A	A	A	A	A		
120	0.2530	0.3050	225	215	177	257	246	202	23.2	790
150	0.2060	0.2480	253	241	193	290	278	230	25.2	935
185	0.1640	0.1980	284	274	220	339	328	268	27.3	1105
240	0.1250	0.1510	333	316	257	399	388	317	30.2	1365
300	0.1000	0.1220	381	360	290	459	443	366	33	1640
400	0.0778	0.0954	440	408	333	546	524	427	36.5	2015
500	0.0605	0.0751	499	462	381	634	612	503	40.4	2465
630	0.0469	0.0595	575	526	435	743	721	584	43.9	3000
800	0.0367	0.0470	644	569	484	836	814	677	49.3	3760

The above data is approximate and subjected to manufacturing tolerance.





## Single Core Cables, with Stranded Circular Copper Conductors, PVC Insulated, Armored by Aluminium Wires and PVC Sheathed

**0.6/1 (1.2) kV**



### (a) Description

- Soft annealed stranded Copper conductor, insulated with a PVC compound rated 70 °C, armored by Aluminum wires and sheathed with a PVC compound layer.
- Cables are produced according to IEC 60502.

### (b) Application







- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, industrial plants, as well as in thermopower and hydropower stations.

### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Plain annealed Copper, Class 2 according to IEC 60228.
Insulation :	PVC.
Bedding :	PVC.
Aarmor :	Aluminum Wires Armor.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 70 °C during operation.
Minimum Bending Radius:	10 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.

# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating						Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	AC at 70 °C <sup>a</sup>	Laid in Ground			Laid in Free Air				
										
mm <sup>2</sup>	Ω/km	Ω/km	A	A	A	A	A	A	mm	kg/km
120	0.1530	0.1900	290	274	225	312	300	268	25.3	1650
150	0.1240	0.1500	322	306	253	361	350	306	27.1	1960
185	0.0991	0.1200	371	349	290	415	405	350	29.2	2375
240	0.0754	0.0920	429	403	333	524	503	421	32.2	3000
300	0.0601	0.0750	484	451	376	601	580	492	35.7	3730
400	0.0470	0.0590	553	510	419	689	672	568	38.9	4715
500	0.0366	0.0480	622	563	467	787	765	656	42.9	5860
630	0.0283	0.0390	709	634	531	907	885	743	46.6	7175
800	0.0221	0.0290	794	698	596	1027	1005	846	52.5	9210

The above data is approximate and subjected to manufacturing tolerance.



## **0.6/1 (1.2) kV**



### **(a) Description**

- Soft stranded Aluminum conductor, insulated with a PVC compound rated 90°C, armored by Aluminum wires and sheathed with a PVC compound layer.
- Cables are produced according to IEC 60502.

### **(b) Application**

- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, industrial plants, as well as in thermopower and hydropower stations.







### **(c) Technical data**

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Aluminum, Class 2 according to IEC 60228.
Insulation :	PVC.
Bedding :	PVC.
Aarmor :	Aluminum Wires Armor.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 70 °C during operation.
Minimum Bending Radius:	10 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.



# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating						Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	*AC at 70 °C*								
			Laid in Ground			Laid in Free Air				
										
mm²	Ω/km	Ω/km	A	A	A	A	A	A	mm	kg/km
120	0.2530	0.3050	225	215	177	257	246	202	25.3	915
150	0.2060	0.2480	253	241	193	290	278	230	27.1	1060
185	0.1640	0.1980	284	274	220	339	328	268	29.2	1240
240	0.1250	0.1510	333	316	257	399	388	317	32.1	1515
300	0.1000	0.1220	381	360	290	459	443	366	35.6	1865
400	0.0778	0.0954	440	408	333	546	524	427	38.9	2255
500	0.0605	0.0751	499	462	381	634	612	503	42.8	2725
630	0.0469	0.0595	575	526	435	743	721	584	46.5	3300
800	0.0367	0.0470	644	569	484	836	814	677	52.9	4260

The above data is approximate and subjected to manufacturing tolerance.







1

Low Voltage Power Cables.

## -1.2 Single Core Cables, XLPE Insulation

- Single Core Cables Copper, XLPE Insulation and PVC Sheathed.
- Single Core Cables Aluminum, XLPE Insulation and PVC Sheathed.
- Single Core Cables Copper, XLPE Insulation, Tape Armored and PVC Sheathed.
- Single Core Cables Aluminum, XLPE Insulation, Tape Armored and PVC Sheathed.
- Single Core Cables Copper, XLPE Insulation, Wires Armored and PVC Sheathed.
- Single Core Cables Aluminum, XLPE Insulation, Wires Armored and PVC Sheathed.

**0.6/1 (1.2) kV**



### (a) Description

- Soft annealed stranded Copper conductor, insulated with a XLPE compound covered with a layer of PVC compound to form the overall jacket.
- Cables are produced according to IEC 60502.

### (b) Application

- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, in industrial plants, as well as in thermopower and hydropower stations.

### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Plain annealed Copper, Class 2 according to IEC 60228.
Insulation :	Cross Linked Polyethylene Compound (XLPE).
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 90 °C during operation.
Minimum Bending Radius:	10 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.

# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating						Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	*AC at 90 °C*	Laid in Ground			Laid in Free Air				
										
mm²	Ω/km	Ω/km	A	A	A	A	A	A	mm	Kg/km
10	1.830	2.3300	107	94	74	92	87	75	8.3	150
16	1.150	1.4700	126	121	95	128	121	105	9.3	210
25	0.7270	0.9270	164	155	120	157	151	133	11	315
35	0.5240	0.6690	195	187	149	197	190	167	12.1	410
50	0.3870	0.4940	229	218	178	243	231	202	13.8	555
70	0.2680	0.3430	287	269	218	306	295	260	15.7	760
95	0.1930	0.2480	338	320	264	382	370	318	17.7	1015
120	0.1530	0.1970	389	366	298	444	433	375	19.6	1280
150	0.1240	0.1600	429	407	338	503	491	428	21.8	1570
185	0.0991	0.1290	493	463	384	583	572	485	23.9	1920
240	0.0754	0.0990	567	532	440	716	705	590	27.1	2530
300	0.0601	0.0810	641	595	498	906	832	682	29.7	3105
400	0.0470	0.0638	732	676	561	982	959	785	33.9	4135
500	0.0366	0.0517	829	755	623	1109	1086	895	37.4	5110
630	0.0283	0.0425	950	847	710	1271	1247	1052	41.9	6455
800	0.0221	0.0292	1043	938	801	1444	1421	1201	46.8	8260

The above data is approximate and subjected to manufacturing tolerance.





**0.6/1 (1.2) kV**



### (a) Description

- Soft stranded Aluminium conductor, insulated with a XLPE compound covered with a layer of PVC compound to form the overall jacket.
- Cables are produced according to IEC 60502.

### (b) Application

- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, in industrial plants, as well as in thermopower and hydropower stations.

### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Aluminium, Class 2 according to IEC 60228.
Insulation :	Cross Linked Polyethylene Compound (XLPE).
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 90 °C during operation.
Minimum Bending Radius:	10 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.

# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating						Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	*AC at 90 °C*	Laid in Ground			Laid in Free Air				
										
mm²	Ω/km	Ω/km	A	A	A	A	A	A	mm	Kg/km
16	1.9100	2.4500	97	95	72	98	92	69	9.3	115
25	1.2000	1.5400	123	120	92	128	121	105	11.0	165
35	0.8680	1.1130	149	143	114	156	151	133	12.1	205
50	0.6410	0.8220	178	169	132	190	185	162	13.8	260
70	0.4430	0.5690	218	206	166	243	237	197	15.7	340
95	0.3200	0.4110	257	246	195	312	300	237	17.7	450
120	0.2530	0.3250	303	287	234	359	347	266	19.6	550
150	0.2060	0.2650	338	320	257	410	398	329	21.8	670
185	0.1640	0.2120	384	366	291	480	462	370	23.9	830
240	0.1250	0.1630	447	424	343	567	549	439	27.1	1050
300	0.1000	0.1310	509	475	389	636	624	508	29.7	1300
400	0.0778	0.1000	590	549	447	762	745	595	33.9	1610
500	0.0605	0.0870	664	618	509	890	867	693	37.4	2000
630	0.0469	0.0620	761	704	584	1040	1016	821	41.9	2520
800	0.0367	0.0560	859	767	653	1178	1155	936	46.8	3150

The above data is approximate and subjected to manufacturing tolerance.



**0.6/1 (1.2) kV**



### **(a) Description**

- Soft annealed stranded Copper conductor, insulated with a XLPE compound rated 90 ° C, armored by Aluminum tape and sheathed with a PVC compound layer.
- Cables are produced according to IEC 60502.

### **(b) Application**

- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, industrial plants, as well as in thermopower and hydropower stations.







### **(c) Technical data**

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Plain annealed Copper, Class 2 according to IEC 60228.
Insulation :	Cross Linked Polyethylene Compound (XLPE).
Bedding :	PVC.
Aarmor :	Aluminium Tape Armor.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 90 °C during operation.
Minimum Bending Radius:	15 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.



# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating						Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	*AC at 90 °C**	Laid in Ground			Laid in Free Air				
										
mm²	Ω/km	Ω/km	A	A	A	A	A	A	mm	kg/km
120	0.1530	0.1970	370	348	283	422	411	356	22.4	1440
150	0.1240	0.1600	408	387	321	478	466	407	24.4	1740
185	0.0991	0.1290	468	440	365	554	543	461	26.5	2125
240	0.0754	0.0990	539	505	418	680	670	561	29.1	2685
300	0.0601	0.0810	609	565	473	861	790	648	31.9	3320
400	0.0470	0.0638	695	642	533	933	911	746	35.1	4245
500	0.0366	0.0517	788	717	592	1054	1032	850	39.1	5330
630	0.0283	0.0425	903	805	675	1207	1185	999	43.2	6620
800	0.0221	0.0292	991	891	761	1372	1350	1141	48.5	8460

The above data is approximate and subjected to manufacturing tolerance.





## Single Core Cables, with Stranded Circular Aluminum Conductors, XLPE Insulated, Armored by Aluminum Tape and PVC Sheathed

**0.6/1 (1.2) kV**



### (a) Description

- Soft stranded Aluminum conductor, insulated with a XLPE compound rated 90°C, armored by Aluminum tape and sheathed with a PVC compound layer.
- Cables are produced according to IEC 60502.

### (b) Application







- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, industrial plants, as well as in thermopower and hydropower stations.

### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Aluminum, Class 2 according to IEC 60228.
Insulation :	Cross Linked Polyethylene Compound (XLPE).
Bedding :	PVC.
Aarmor :	Aluminium Tape Armor.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 90 °C during operation.
Minimum Bending Radius:	15 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.

# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating						Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	"AC at 90 °C"	Laid In Ground			Laid In Free Air				
										
mm²	Ω/km	Ω/km	A	A	A	A	A	A	mm	kg/km
120	0.2530	0.3250	288	273	222	341	330	253	22.4	705
150	0.2060	0.2650	321	304	244	390	378	313	24.4	840
185	0.1640	0.2120	365	348	276	456	439	352	26.5	990
240	0.1250	0.1630	425	403	326	539	522	417	29	1205
300	0.1000	0.1310	484	451	370	604	593	483	31.8	1455
400	0.0778	0.1000	561	522	425	724	708	565	35.1	1785
500	0.0605	0.0870	631	587	484	846	824	658	39	2195
630	0.0469	0.0620	723	669	555	988	965	780	43.1	2745
800	0.0367	0.0560	816	729	620	1119	1097	889	48.9	3505

The above data is approximate and subjected to manufacturing tolerance.



**0.6/1 (1.2) kV**



### **(a) Description**

- Soft annealed stranded Copper conductor, insulated with a XLPE compound rated 90 °C, armored by Aluminum wires and sheathed with a PVC compound layer.
- Cables are produced according to IEC 60502.

### **(b) Application**

- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, industrial plants, as well as in thermopower and hydropower stations.







### **(c) Technical data**

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Plain annealed Copper, Class 2 according to IEC 60228.
Insulation :	Cross Linked Polyethylene Compound (XLPE).
Bedding :	PVC.
Aarmor :	Aluminium Wires Armor.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 90 °C during operation.
Minimum Bending Radius:	10 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.



# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating						Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	"AC at 90 °C"	Laid in Ground			Laid in Free Air				
										
mm²	Ω/km	Ω/km	A	A	A	A	A	A	mm	kg/km
120	0.1530	0.1970	370	348	283	422	411	356	24.5	1560
150	0.1240	0.1600	408	387	321	478	466	407	26.3	1855
185	0.0991	0.1290	468	440	365	554	543	461	28.4	2255
240	0.0754	0.0990	539	505	418	680	670	561	31.2	2845
300	0.0601	0.0810	609	565	473	861	790	648	34	3490
400	0.0470	0.0638	695	642	533	933	911	746	37.7	4490
500	0.0366	0.0517	788	717	592	1054	1032	850	41.7	5600
630	0.0283	0.0425	903	805	675	1207	1185	999	45.6	6900
800	0.0221	0.0292	991	891	761	1372	1350	1141	52.1	8950

The above data is approximate and subjected to manufacturing tolerance.



## **0.6/1 (1.2) kV**



### **(a) Description**

- Soft annealed stranded Aluminum conductor, insulated with a XLPE compound rated 90 °C, armored by Aluminum wires and sheathed with a PVC compound layer.
- Cables are produced according to IEC 60502.

### **(b) Application**

- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, industrial plants, as well as in thermopower and hydropower stations.







### **(c) Technical data**

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Aluminum, Class 2 according to IEC 60228.
Insulation :	Cross Linked Polyethylene Compound (XLPE).
Bedding :	PVC.
Aarmor :	Aluminium Wires Armor.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 90 °C during operation.
Minimum Bending Radius:	10 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.



# Low Voltage Power Cables

## (d) Product Data

Aluminum wire not tape	Max. Conductor Resistance		Current Rating						Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	"AC at 90 °C"	Laid in Ground			Laid in Free Air				
										
mm²	Ω/km	Ω/km	A	A	A	A	A	A	mm	kg/km
120	0.2530	0.3250	288	273	222	341	330	253	24.5	825
150	0.2060	0.2650	321	304	244	390	378	313	26.3	955
185	0.1640	0.2120	365	348	276	456	439	352	28.4	1120
240	0.1250	0.1630	425	403	326	539	522	417	31.1	1360
300	0.1000	0.1310	484	451	370	604	593	483	33.9	1625
400	0.0778	0.1000	561	522	425	724	708	565	37.7	2030
500	0.0605	0.0870	631	587	484	846	824	658	41.6	2460
630	0.0469	0.0620	723	669	555	988	965	780	45.5	3025
800	0.0367	0.0560	816	729	620	1119	1097	889	52.5	4005

The above data is approximate and subjected to manufacturing tolerance.







# 1

**Low Voltage Power Cables.**

## -1.3 Multicore Cables, PVC Insulation

- Multicore Cables Copper, PVC Insulation and PVC Sheathed.
- Multicore Cables Aluminum, PVC Insulation and PVC Sheathed.
- Multicore Cables Copper, PVC Insulation, Tape Armored and PVC Sheathed.
- Multicore Cables Aluminum, PVC Insulation, Tape Armored and PVC Sheathed.
- Multicore Cables Copper, PVC Insulation, Wires Armored and PVC Sheathed.
- Multicore Cables Aluminum, PVC Insulation, Wires Armored and PVC Sheathed.

### 0.6/1 (1.2) Kv



#### (a) Description

- Multicore cables of stranded Copper conductors are insulated with a PVC compound rated 70°C, assembled together and covered with an overall jacket of a PVC compound.
- Cables are produced according to IEC 60502.

#### (b) Application

- For outdoor and indoor installations in damp and wet locations.

#### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Plain annealed Copper, Class 2 according to IEC 60228.
Insulation :	PVC.
Colour Code :	Two cores : Red and Black. Three cores : Red, Yellow and Blue. Four cores : Red, Yellow, Blue and Black.
Laying up :	Cores twisted together with filling elements if necessary.
Wrapping :	At least 1 layer of Polypropylene Tape.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 70 °C during operation.
Minimum Bending Radius:	10 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.



# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating			Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	"AC at 70 °C"	"Laid Direct in Ground"	Laid in Ducts	Laid in Free Air		
mm <sup>2</sup>	Ω/km	Ω/km	A	A	A	mm	kg/km
<b>Two Core Cables</b>							
1.5 r	12.1000	14.6000	27	21	23	10.1	120
2.5 r	7.4100	8.870	34	28	32	10.9	145
4 r	4.6100	5.540	45	36	45	12.9	205
6 r	3.0800	3.690	57	45	58	13.9	255
10 r	1.8300	2.190	73	62	76	15	425
16 r	1.1500	1.390	96	73	101	17	580
25 r	0.7270	0.870	124	96	133	20	845
35 r	0.5240	0.628	147	119	164	22.2	1090
<b>Three Core Cables</b>							
1.5 r	12.1000	14.6000	24	20	21	10.6	145
2.5 r	7.4100	8.870	31	26	25	11.5	190
4 r	4.6100	5.540	40	34	36	13.6	270
6 r	3.0800	3.690	51	41	45	14.7	340
10 r	1.8300	2.190	68	54	61	16.4	485
16 r	1.1500	1.390	85	68	83	18.6	685
25 r	0.7270	0.870	113	90	108	21.8	995
35 r	0.5240	0.628	136	107	127	24.2	1300
<b>Four Core Cables</b>							
1.5 r	12.1000	14.6000	24	20	21	11.4	180
2.5 r	7.4100	8.8700	31	26	25	12.4	230
4 r	4.6100	5.5400	40	34	36	14.8	335
6 r	3.0800	3.6900	51	41	45	16	425
10 r	1.8300	2.1900	68	54	61	17.9	635
16 r	1.1500	1.3900	85	68	83	20.3	880
25 r	0.7270	0.8700	113	90	108	23.9	1295
35 r	0.5240	0.6280	136	107	127	26.6	1700
50 s	0.3870	0.4640	164	130	159	29.3	2225
70 s	0.2680	0.3220	198	164	197	32.9	3065
95 s	0.1930	0.2320	237	186	240	37.8	4175
120 s	0.1530	0.1850	271	220	278	41.2	5205
150 s	0.1240	0.1510	305	249	316	45.9	6400
185 s	0.0991	0.1210	339	277	361	50.7	7960
240 s	0.0754	0.0840	390	328	430	57	10330
300 s	0.0601	0.0770	441	362	506	63.3	12915
400 s	0.0470	0.0606	512	425	583	70.1	16500
500 s	0.0366	0.0491	576	485	651	77.6	21085
<b>Four Core Cables with Reduced Neutral</b>							
35 r + 16 r	0.5240/1.1500	0.6280/1.3900	136	107	127	25	1505
50 s + 25 r	0.3870/0.7270	0.4640/0.8700	164	130	159	28.1	2115
70 s + 35 r	0.2680/0.5240	0.3220/0.6280	198	164	197	31.4	2725
95 s + 50 s	0.1930/0.3870	0.2320/0.4640	237	186	240	36.1	3690
120 s + 70 s	0.1530/0.2680	0.1850/0.3220	271	220	278	39.5	4675
150 s + 70 s	0.1240/0.2680	0.1510/0.3220	305	249	316	43.5	5580
185 s + 95 s	0.0991/0.1930	0.1210/0.2320	339	277	361	48.2	7025
240 s + 120 s	0.0754/0.1530	0.0840/0.1850	390	328	430	54.2	9060
300 s + 150 s	0.0601/0.1240	0.0770/0.1510	441	362	506	60	11280
400 s + 240 s	0.0470/0.0754	0.0606/0.084	512	425	583	66	15270

The above data is approximate and subjected to manufacturing tolerance.

r : round, Stranded  
s : Sector, Stranded



### 0.6/1 (1.2) kV



#### (a) Description

- Multicore cables of stranded Aluminium conductors are insulated with a PVC compound rated 70°C, assembled together and covered with an overall jacket of a PVC compound.
- Cables are produced according to IEC 60502.

#### (b) Application

- For outdoor and indoor installations in damp and wet locations.

#### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Aluminium, Class 2 according to IEC 60228.
Insulation :	PVC.
Colour Code :	Two cores : Red and Black. Three cores : Red, Yellow and Blue. Four cores : Red, Yellow, Blue and Black.
Laying up :	Cores twisted together with filling elements if necessary.
Wrapping :	At least 1 layer of Polypropylene Tape.
Outer Jacket :	PVC.
Temperature Range :	- 15 °C up to + 70 °C during operation.
Minimum Bending Radius:	10 x cable outer diameter (Ø).
Packing Condition :	On non-returnable wooden drum.

# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating			Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	"AC at 70 °C"	"Laid Direct in Ground"	Laid in Ducts	Laid in Free Air		
mm <sup>2</sup>	Ω/km	Ω/km	A	A	A	mm	kg/km
<b>Two Core Cables</b>							
16 r	1.910	2.290	68	52	71	17	385
25 r	1.200	1.440	87	68	93	20	540
35 r	0.868	1.0430	116	94	131	22.2	670
<b>Three Core Cables</b>							
16 r	1.910	2.290	60	47	58	18.6	400
25 r	1.200	1.440	79	63	76	21.8	550
35 r	0.868	1.0430	107	85	101	24.2	680
<b>Four Core Cables</b>							
16 r	1.9100	2.2900	60	47	58	20.3	495
25 r	1.2000	1.4400	79	63	76	23.9	700
35 r	0.8680	1.0430	107	85	101	26.6	870
50 s	0.6410	0.7710	130	96	121	29.3	1060
70 s	0.4430	0.5330	153	124	152	32.9	1380
95 s	0.3200	0.3850	186	147	184	37.8	1865
120 s	0.2530	0.3050	209	170	215	41.2	2300
150 s	0.2060	0.2490	237	192	247	45.9	2760
185 s	0.1640	0.1990	266	220	285	50.7	3400
240 s	0.1250	0.1510	311	254	336	57	4345
300 s	0.1000	0.1230	350	294	399	63.3	5400
400 s	0.0778	0.0962	408	339	466	70.1	6890
<b>Four Core Cables with Reduced Neutral</b>							
35 r + 16 r	0.8680/1.9100	1.0430/2.2900	107	85	101	25	720
50 s + 25 r	0.6410/1.2000	0.7710/1.4400	130	96	121	28.1	970
70 s + 35 r	0.4430/0.8680	0.5330/1.0400	153	124	152	31.4	1240
95 s + 50 s	0.3200/0.6410	0.3850/0.7710	186	147	184	36.1	1660
120 s + 70 s	0.2530/0.4430	0.3050/0.5330	209	170	215	39.5	2040
150 s + 70 s	0.2060/0.4430	0.2490/0.5330	237	192	247	43.5	2435
185 s + 95 s	0.1640/0.3200	0.1990/0.3850	266	220	285	48.2	3025
240 s + 120 s	0.1250/0.2530	0.1510/0.3050	311	254	336	54.2	3830
300 s + 150 s	0.1000/0.2060	0.1230/0.2490	350	294	399	60	4720
400 s + 240 s	0.0778/0.125	0.0962/0.151	408	339	466	66	5980

The above data is approximate and subjected to manufacturing tolerance.

r : round, Stranded  
s : Sector, Stranded





## Multicore Cables, with Stranded Copper Conductors, PVC Insulated, Armored by Steel Tape and PVC Sheathed

**0.6/1 (1.2) kV**



### (a) Description

- Multicore cables of stranded Copper conductors are insulated with a PVC compound rated 90°C, assembled together, armored with steel tape and covered with an overall jacket of a PVC compound.
- Cables are produced according to IEC 60502.

### (b) Application

- For outdoor installations in damp and wet locations, where mechanical damages are expected to occur.

### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Plain annealed Copper, Class 2 according to IEC 60228.
Insulation :	PVC.
Colour Code :	Two cores : Red and Black. Three cores : Red, Yellow and Blue. Four cores : Red, Yellow, Blue and Black.
Laying up :	Cores twisted together with filling elements if necessary.
Wrapping :	At least 1 layer of Polypropylene Tape.
Bedding :	PVC.
Aarmor :	Double Steel Tape Armor.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 70 °C during operation.
Minimum Bending Radius:	15 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.



# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating			Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	"AC at 70 °C"	"Laid Direct in Ground"	Laid in Ducts	Laid in Free Air		
mm <sup>2</sup>	Ω/km	Ω/km	A	A	A	mm	kg/km

### Two Core Cables

25 r	0.7270	0.8700	124	96	133	22.0	1030
35 r	0.5240	0.6280	147	119	164	24.2	1295

### Three Core Cables

16 r	1.1500	1.3900	85	68	83	20.6	860
25 r	0.7270	0.8700	113	90	108	23.8	1200
35 r	0.5240	0.6280	136	107	127	26.2	1530

### Four Core Cables

16 r	1.1500	1.3900	85	68	83	22.3	1070
25 r	0.7270	0.8700	113	90	108	25.9	1520
35 r	0.5240	0.6280	136	107	127	28.6	1950
50 s	0.3870	0.4640	164	130	159	32.7	2640
70 s	0.2680	0.3220	198	164	197	37.5	3915
95 s	0.1930	0.2320	237	186	240	42.4	5140
120 s	0.1530	0.1850	271	220	278	46.2	6310
150 s	0.1240	0.1510	305	249	316	50.9	7615
185 s	0.0991	0.1210	339	277	361	56.1	9365
240 s	0.0754	0.0840	390	328	430	62.6	12790
300 s	0.0601	0.0770	441	362	506	68.7	14645
400 s	0.0470	0.0606	502	421	575	74.9	18510

### Four Core Cables with Reduced Neutral

35 r + 16 r	0.5240/1.1500	0.6280/1.3900	136	107	127	27.0	1740
50 s + 25 r	0.3870/0.7270	0.4640/0.8700	164	130	159	30.9	2365
70 s + 35 r	0.2680/0.5240	0.3220/0.6280	198	164	197	34.6	3155
95 s + 50 s	0.1930/0.3870	0.2320/0.4640	237	186	240	40.7	4625
120 s + 70 s	0.1530/0.2680	0.1850/0.3220	271	220	278	44.5	5730
150 s + 70 s	0.1240/0.2680	0.1510/0.3220	305	249	316	48.5	6740
185 s + 95 s	0.0991/0.1930	0.1210/0.2320	339	277	361	53.2	8300
240 s + 120 s	0.0754/0.1530	0.0840/0.1850	390	328	430	59.6	10550
300 s + 150 s	0.0601/0.1240	0.0770/0.1510	441	362	506	65.4	12920
400 s + 240 s	0.0470/0.0754	0.0606/0.084	502	421	575	70.8	16360

The above data is approximate and subjected to manufacturing tolerance.

r : round, Stranded  
s : Sector, Stranded



## Multicore Cables, with Stranded Aluminium Conductors, PVC Insulated, Armored by Steel Tape and PVC Sheathed

**0.6/1 (1.2) kV**



### (a) Description

- Multicore cables of stranded Aluminium conductors are insulated with a PVC compound rated 90°C, assembled together, armored with steel tape and covered with an overall jacket of a PVC compound.
- Cables are produced according to IEC 60502.

### (b) Application

- For outdoor installations in damp and wet locations, where mechanical damages are expected to occur.

### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Aluminium, Class 2 according to IEC 60228.
Insulation :	PVC.
Colour Code :	Two cores : Red and Black. Three cores : Red, Yellow and Blue. Four cores : Red, Yellow, Blue and Black.
Laying up :	Cores twisted together with filling elements if necessary.
Wrapping :	At least 1 layer of Polypropylene Tape.
Bedding :	PVC.
Aarmor :	Double Steel Tape Armor.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 70 °C during operation.
Minimum Bending Radius:	15 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.



# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating			Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	"AC at 70 °C"	"Laid Direct in Ground"	Laid in Ducts	Laid in Free Air		
mm <sup>2</sup>	Ω/km	Ω/km	A	A	A	mm	kg/km

### Two Core Cables

25 r	1.2000	1.440	87	68	93	22.0	730
35 r	0.8680	1.0430	116	94	132	24.2	880

### Three Core Cables

16 r	1.9100	2.290	60	47	58	20.6	570
25 r	1.2000	1.440	79	63	76	23.8	750
35 r	0.8680	1.0430	107	85	101	26.2	905

### Four Core Cables

16 r	1.9100	2.2900	60	47	58	22.3	680
25 r	1.2000	1.4400	79	63	76	25.9	920
35 r	0.8680	1.0430	107	85	101	28.6	1120
50 s	0.6410	0.7710	130	96	121	32.7	1475
70 s	0.4430	0.5530	153	124	152	37.5	2225
95 s	0.3200	0.3850	186	147	184	42.4	2830
120 s	0.2530	0.3050	209	170	215	46.2	3360
150 s	0.2060	0.2490	237	192	247	50.9	3975
185 s	0.1640	0.1990	266	220	285	56.1	4815
240 s	0.1250	0.1510	311	254	336	62.6	5925
300 s	0.1000	0.1230	350	294	399	68.7	7125
400 s	0.0778	0.0962	401	337	459	74.9	8950

### Four Core Cables with Reduced Neutral

35 r + 16 r	0.8680/1.9100	1.0430/2.2900	107	85	101	27.0	1020
50 s + 25 r	0.6410/1.2000	0.7710/1.4400	130	96	121	30.9	1330
70 s + 35 r	0.4430/0.8680	0.5330/1.0400	153	124	152	34.6	1675
95 s + 50 s	0.3200/0.6410	0.3850/0.7710	186	147	184	40.7	2585
120 s + 70 s	0.2530/0.4430	0.3050/0.5330	209	170	215	44.5	3100
150 s + 70 s	0.2060/0.4430	0.2490/0.5330	237	192	247	48.5	3590
185 s + 95 s	0.1640/0.3200	0.1990/0.3850	266	220	285	53.2	4300
240 s + 120 s	0.1250/0.2530	0.1510/0.3050	311	254	336	59.6	5325
300 s + 150 s	0.1000/0.2060	0.1230/0.2490	350	294	399	65.4	6365
400 s + 240 s	0.0778/0.125	0.0962/0.151	401	337	459	70.8	8000

The above data is approximate and subjected to manufacturing tolerance.

r : round, Stranded  
s : Sector, Stranded



### 0.6/1 (1.2) kV



#### (a) Description

- Multicore cables of stranded Copper conductors are insulated with a PVC compound rated 90°C, assembled together, armored with steel wires and covered with an overall jacket of a PVC compound.
- Cables are produced according to IEC 60502.

#### (b) Application

- For outdoor installations in damp and wet locations where mechanical damages are expected to occur.

#### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Plain annealed Copper, Class 2 according to IEC 60228.
Insulation :	PVC.
Colour Code :	Two cores : Red and Black. Three cores : Red, Yellow and Blue. Four cores : Red, Yellow, Blue and Black.
Laying up :	Cores twisted together with filling elements if necessary.
Wrapping :	At least 1 layer of Polypropylene Tape.
Bedding :	PVC.
Aarmor :	Galvanized Steel Wires Armor.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 70 °C during operation.
Minimum Bending Radius:	15 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.

# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating			Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	"AC at 70 °C"	"Direct in Ground"	Laid in Ducts	Laid in Free Air		
mm <sup>2</sup>	Ω/km	Ω/km	A	A	A	mm	kg/km

### Two Core Cables

25 r	0.7270	0.8700	124	96	133	25.3	1535
35 r	0.5240	0.6280	147	119	164	27.5	1790

### Three Core Cables

25 r	0.7270	0.8700	113	90	108	27.1	1765
35 r	0.5240	0.6280	136	113	127	29.5	2145

### Four Core Cables

25 r	0.7270	0.8700	119	101	102	29.2	2125
35 r	0.5240	0.6280	136	107	133	32.1	2635
50 s	0.3870	0.4640	164	130	164	37.1	3870
70 s	0.2680	0.3220	198	164	202	40.7	4900
95 s	0.1930	0.2320	237	186	247	46.6	6665
120 s	0.1530	0.1850	271	220	285	50.6	7990
150 s	0.1240	0.1510	305	249	323	55.1	9445
185 s	0.0991	0.1210	339	277	367	60.5	11425
240 s	0.0754	0.0840	390	328	437	66.8	14205
300 s	0.0601	0.0770	441	362	513	72.9	17870
400 s	0.0470	0.0606	483	408	564	80.0	21275

### Four Core Cables with Reduced Neutral

35 r + 16 r	0.5240/1.1500	0.6280/1.3900	136	107	133	28.7	2310
50 s + 25 r	0.3870/0.7270	0.4640/0.8700	164	130	164	35.5	3550
70 s + 35 r	0.2680/0.5240	0.3220/0.6280	198	164	202	39.2	4480
95 s + 50 s	0.1930/0.3870	0.2320/0.4640	237	186	247	42.6	5475
120 s + 70 s	0.1530/0.2680	0.1850/0.3220	271	220	285	48.9	7385
150 s + 70 s	0.1240/0.2680	0.1510/0.3220	305	249	323	52.7	8505
185 s + 95 s	0.0991/0.1930	0.1210/0.2320	339	277	367	57.6	10260
240 s + 120 s	0.0754/0.1530	0.0840/0.1850	390	328	437	64.0	12755
300 s + 150 s	0.0601/0.1240	0.0770/0.1510	441	362	513	69.8	15330
400 s + 240 s	0.0470/0.0754	0.0606/0.084	483	408	564	75.9	19260

The above data is approximate and subjected to manufacturing tolerance.

r : round, Stranded  
s : Sector, Stranded





### 0.6/1 (1.2) kV



#### (a) Description

- Multicore cables of stranded Aluminium conductors are insulated with a PVC compound rated 70°C, assembled together, armored with steel wires and covered with an overall jacket of a PVC compound.
- Cables are produced according to IEC 60502.

#### (b) Application

- For outdoor installations in damp and wet locations where mechanical damages are expected to occur.

#### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Aluminum, Class 2 according to IEC 60228.
Insulation :	PVC.
Colour Code :	Two cores : Red and Black. Three cores : Red, Yellow and Blue. Four cores : Red, Yellow, Blue and Black.
Laying up :	Cores twisted together with filling elements if necessary.
Wrapping :	At least 1 layer of Polypropylene Tape.
Bedding :	PVC.
Aarmor :	Galvanized Steel Wires Armor.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 70 °C during operation.
Minimum Bending Radius:	15 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.

# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating			Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	"AC at 70 °C"	"Direct in Ground"	Laid in Ducts	Laid in Free Air		
mm <sup>2</sup>	Ω/km	Ω/km	A	A	A	mm	kg/km

### Two Core Cables

25 r	1.2000	1.4400	87	68	93	25.3	1235
35 r	0.8680	1.0430	116	94	132	27.5	1370

### Three Core Cables

25 r	1.2000	1.4400	79	63	76	27.1	1315
35 r	0.8680	1.0430	107	85	101	29.5	1525

### Four Core Cables

25 r	1.2000	1.4400	79	63	76	29.2	1525
35 r	0.8680	1.0430	107	85	101	32.1	1805
50 s	0.6410	0.7710	130	96	121	37.1	3040
70 s	0.4430	0.5530	153	124	159	40.7	3750
95 s	0.3200	0.3850	186	147	190	46.6	4730
120 s	0.2530	0.3050	209	170	222	50.6	5570
150 s	0.2060	0.2490	237	192	253	55.1	6430
185 s	0.1640	0.1990	266	220	291	60.5	7790
240 s	0.1250	0.1510	311	254	342	66.8	9180
300 s	0.1000	0.1230	350	294	405	72.9	10590
400 s	0.0778	0.0962	393	332	457	80.0	11715

### Four Core Cables with Reduced Neutral

35 r + 16 r	0.8680/1.9100	1.0430/2.2900	107	85	108	28.7	1585
50 s + 25 r	0.6410/1.2000	0.7710/1.4400	130	96	127	35.5	2300
70 s + 35 r	0.4430/0.8680	0.5330/1.0400	153	124	159	39.2	2820
95 s + 50 s	0.3200/0.6410	0.3850/0.7710	186	147	190	42.6	3410
120 s + 70 s	0.2530/0.4430	0.3050/0.5330	209	170	222	48.9	4370
150 s + 70 s	0.2060/0.4430	0.2490/0.5330	237	192	253	52.7	5080
185 s + 95 s	0.1640/0.3200	0.1990/0.3850	266	220	291	57.6	5950
240 s + 120 s	0.1250/0.2530	0.1510/0.3050	311	254	342	64.0	7230
300 s + 150 s	0.1000/0.2060	0.1230/0.2490	350	294	405	69.8	8540
400 s + 240 s	0.0778/0.125	0.0962/0.151	393	332	457	75.9	10870

The above data is approximate and subjected to manufacturing tolerance.

r : round, Stranded  
s : Sector, Stranded





# 1

**Low Voltage Power Cables.**



## -1.4 Multicore Cables, XLPE Insulation

- Multicore Cables Copper, XLPE Insulation and PVC Sheathed.
- Multicore Cables Aluminum, XLPE Insulation and PVC Sheathed.
- Multicore Cables Copper, XLPE Insulation, Tape Armored and PVC Sheathed.
- Multicore Cables Aluminum, XLPE Insulation, Tape Armored and PVC Sheathed.
- Multicore Cables Copper, XLPE Insulation, Wires Armored and PVC Sheathed.
- Multicore Cables Aluminum, XLPE Insulation, Wires Armored and PVC Sheathed.

### 0.6/1 (1.2) kV



#### (a) Description

- Multicore cables of stranded Copper conductors are insulated with a XLPE compound, assembled together and covered with an overall jacket of a PVC compound.
- Cables are produced according to IEC 60502.

#### (b) Application

- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, in industrial plants, as well as in thermopower and hydropower Stations.

#### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Plain annealed Copper, Class 2 according to IEC 60228.
Insulation :	Cross Linked Polyethylene Compound (XLPE).
Colour Code :	Two cores : Red and Black. Three cores : Red, Yellow and Blue. Four cores : Red, Yellow, Blue and Black.
Laying up :	Cores twisted together with filling elements if necessary.
Wrapping :	At least 1 layer of Polypropylene Tape.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 90 °C during operation.
Minimum Bending Radius:	10 x cable outer diameter (Ø).
Packing Condition :	On non-returnable wooden drum.

# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating			Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	*AC at 90 °C	"Direct in Ground"	Laid in Ducts	"Direct in Free Air"		
mm <sup>2</sup>	Ω/km	Ω/km	A	A	A	mm	kg/km

### Two Core Cables

10 r	1.8300	2.3300	89	75	87	13.8	360
16 r	1.1500	1.4700	116	90	116	15.8	505
25 r	0.7270	0.9270	152	117	153	18.8	750
35 r	0.5240	0.6690	181	146	183	21.0	980

### Three Core Cables

10 r	1.8300	2.3300	82	65	75	15.1	430
16 r	1.1500	1.4700	106	82	98	17.3	620
25 r	0.7270	0.9270	140	111	132	20.5	910
35 r	0.5240	0.6690	169	131	160	22.9	1205

### Four Core Cables

10 r	1.8300	2.3300	82	65	75	16.4	565
16 r	1.1500	1.4700	106	82	98	18.9	795
25 r	0.7270	0.9270	140	111	132	22.5	1185
35 r	0.5240	0.6690	169	131	160	25.2	1575
50 s	0.3870	0.4940	202	158	197	27.1	2060
70 s	0.2680	0.3430	240	196	248	31.4	2905
95 s	0.1930	0.2480	289	229	295	35.1	3910
120 s	0.1530	0.1970	332	267	341	39.2	4915
150 s	0.1240	0.1600	365	300	387	43.7	6035
185 s	0.0991	0.1290	409	338	444	48.7	7540
240 s	0.0754	0.0990	474	398	531	54.5	9785
300 s	0.0601	0.0810	534	441	618	60.1	12190
400 s	0.0470	0.0642	631	519	726	66.9	15540

### Four Core Cables with Reduced Neutral

35 r + 16 r	0.5240/1.1500	0.6690/1.4700	169	131	156	23.6	1390
50 s + 25 r	0.3870/0.7270	0.4940/0.9270	202	158	197	25.9	1835
70 s + 35 r	0.2680/0.5240	0.3430/0.6690	240	196	237	29.7	2540
95 s + 50 s	0.1930/0.3870	0.2480/0.4940	289	229	295	33.6	3435
120 s + 70 s	0.1530/0.2680	0.1970/0.3430	332	267	341	37.5	4400
150 s + 70 s	0.1240/0.2680	0.1600/0.3430	365	300	387	41.3	5255
185 s + 95 s	0.0991/0.1930	0.1290/0.2480	409	338	444	46.2	6640
240 s + 120 s	0.0754/0.1530	0.0990/0.1970	474	398	531	51.5	8555
300 s + 150 s	0.0601/0.1240	0.0810/0.1600	534	441	618	56.8	10640
400 s + 240 s	0.0470/0.0754	0.0642/0.099	631	519	726	62.8	14436

The above data is approximate and subjected to manufacturing tolerance.

r : round, Stranded  
s : Sector, Stranded



### 0.6/1 (1.2) kV



#### (a) Description

- Multicore cables of Stranded Aluminium conductors are insulated with a XLPE compound, assembled together and covered with an overall jacket of a PVC compound.
- Cables are produced according to IEC 60502.

#### (b) Application

- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, in industrial plants, as well as in thermopower and hydropower Stations.

#### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Aluminium, Class 2 according to IEC 60228.
Insulation :	Cross Linked Polyethylene Compound (XLPE).
Colour Code :	Two cores : Red and Black. Three cores : Red, Yellow and Blue. Four cores : Red, Yellow, Blue and Black.
Laying up :	Cores twisted together with filling elements if necessary.
Wrapping :	At least 1 layer of Polypropylene Tape.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 90 °C during operation.
Minimum Bending Radius:	10 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.



# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating			Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	"AC at 90 °C"	"Direct in Ground"	Laid in Ducts	"Direct in Free Air"		
mm <sup>2</sup>	Ω/km	Ω/km	A	A	A	mm	kg/km

### Two Core Cables

16 r	1.9100	2.4500	81	63	80	15.8	310
25 r	1.2000	1.5400	106	82	107	18.8	450
35 r	0.8680	1.1130	140	116	132	21.0	565

### Three Core Cables

16 r	1.9100	2.4500	74	57	68	17.3	330
25 r	1.2000	1.5400	98	77	92	20.5	460
35 r	0.8680	1.1130	131	104	116	22.9	580

### Four Core Cables

16 r	1.9100	2.4500	74	57	68	18.9	405
25 r	1.2000	1.5400	98	77	92	22.5	585
35 r	0.8680	1.1130	131	104	121	25.2	745
50 s	0.6410	0.8220	158	120	150	26.5	905
70 s	0.4430	0.5690	191	153	185	30.8	1260
95 s	0.3200	0.4110	229	180	226	33.5	1565
120 s	0.2530	0.3250	256	207	260	37.6	1950
150 s	0.2060	0.2650	289	234	306	42.1	2405
185 s	0.1640	0.2120	316	262	347	47.1	2930
240 s	0.1250	0.1630	371	305	416	52.9	3725
300 s	0.1000	0.1310	425	354	491	58.5	4625
400 s	0.0778	0.1025	502	413	579	66.9	5975

### Four Core Cables with Reduced Neutral

35 r + 16 r	0.8680/1.9100	1.1130/2.4500	131	104	121	23.6	670
50 s + 25 r	0.6410/1.2000	0.8220/1.5400	158	120	150	25.3	830
70 s + 35 r	0.4430/0.8680	0.5690/1.1130	191	153	185	29.1	1120
95 s + 50 s	0.3200/0.6410	0.4110/0.8220	229	180	226	33	1415
120 s + 70 s	0.2530/0.4430	0.3250/0.5690	256	207	260	35.9	1770
150 s + 70 s	0.2060/0.4430	0.2650/0.5690	289	234	306	39.7	2120
185 s + 95 s	0.1640/0.3200	0.2120/0.4110	316	262	347	44.6	2590
240 s + 120 s	0.1250/0.2530	0.1630/0.3250	371	305	416	49.9	3260
300 s + 150 s	0.1000/0.2060	0.1310/0.2650	425	354	491	55.2	4065
400 s + 240 s	0.0778/0.1250	0.1025/0.1630	502	413	579	62.8	5255

The above data is approximate and subjected to manufacturing tolerance.

r : round, Stranded  
s : Sector, Stranded



## Multicore Cables, with Stranded Copper Conductors, XLPE Insulated, Armored by Steel Tape and PVC Sheathed

**0.6/1 (1.2) kV**



### (a) Description

- Multicore cables of stranded Copper conductors are insulated with a XLPE compound, assembled together, armored with steel tape and covered with an overall jacket of a PVC compound.
- Cables are produced according to IEC 60502.

### (b) Application

- For outdoor installations in damp and wet locations where mechanical damages are expected to occur.

### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Plain annealed Copper, Class 2 according to IEC 60228.
Insulation :	Cross Linked Polyethylene Compound (XLPE).
Colour Code :	Two cores : Red and Black. Three cores : Red, Yellow and Blue. Four cores : Red, Yellow, Blue and Black .
Laying up :	Cores twisted together with filling elements if necessary.
Wrapping :	At least 1 layer of Polypropylene Tape.
Bedding :	PVC.
Aarmor :	Double Steel Tape Armor.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 90 °C during operation.
Minimum Bending Radius:	15 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.



# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating			Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	*AC at 90 °C*	*Direct in Ground*	Laid in Ducts	*Direct in Free Air*		
mm <sup>2</sup>	Ω/km	Ω/km	A	A	A	mm	kg/km
<b>Two Core Cables</b>							
25 r	0.7270	0.9270	138	106	137	20.8	935
35 r	0.5240	0.6690	164	132	164	23.0	1185
<b>Three Core Cables</b>							
16 r	1.1500	1.4700	105	81	97	19.3	790
25 r	0.7270	0.9270	138	109	132	22.5	1105
35 r	0.5240	0.6690	167	130	157	24.9	1420
<b>Four Core Cables</b>							
10 r	1.8300	2.3300	81	64	74	18.4	720
16 r	1.1500	1.4700	105	81	97	20.9	975
25 r	0.7270	0.9270	138	109	132	24.5	1385
35 r	0.5240	0.6690	167	130	157	27.2	1775
50 s	0.3870	0.4940	202	158	196	30.1	2415
70 s	0.2680	0.3430	240	196	237	34.6	3335
95 s	0.1930	0.2480	289	229	295	39.7	4815
120 s	0.1530	0.1970	332	267	341	43.8	5910
150 s	0.1240	0.1600	365	300	387	48.7	7195
185 s	0.0991	0.1290	409	338	444	53.7	8830
240 s	0.0754	0.0990	474	398	531	60.0	11285
300 s	0.0601	0.0810	534	441	618	65.5	13835
400 s	0.0470	0.0642	618	514	710	71.7	17515
<b>Four Core Cables with Reduced Neutral</b>							
35 r + 16 r	0.5240/1.1500	0.6690/1.4700	167	130	157	25.6	1615
50 s + 25 r	0.3870/0.7270	0.4940/0.9270	202	158	196	28.7	2160
70 s + 35 r	0.2680/0.5240	0.3430/0.6690	240	196	237	33.1	2960
95 s + 50 s	0.1930/0.3870	0.2480/0.4940	289	229	295	38.0	4280
120 s + 70 s	0.1530/0.2680	0.1970/0.3430	332	267	341	42.1	5365
150 s + 95 s	0.1240/0.2680	0.1600/0.3430	365	300	387	46.3	6355
185 s + 120 s	0.0991/0.1530	0.1290/0.1970	409	338	444	51.2	7865
240 s + 150 s	0.0754/0.1240	0.0990/0.1600	474	398	531	57.1	10000
300 s + 185 s	0.0601/0.0991	0.0810/0.1290	534	441	618	62.2	12205
400 s + 240 s	0.0470/0.0754	0.0642/0.0990	618	514	710	67.8	15505

The above data is approximate and subjected to manufacturing tolerance.

r : round, Stranded  
s : Sector, Stranded



## Multicore Cables, with Stranded Aluminium Conductors, XLPE Insulated, Armored by Steel Tape and PVC Sheathed

**0.6/1 (1.2) kV**



### (a) Description

- Multicore cables of stranded Aluminium conductors are insulated with a XLPE compound, assembled together, armored with steel tape and covered with an overall jacket of a PVC compound.
- Cables are produced according to IEC 60502.

### (b) Application

- For outdoor installations in damp and wet locations where mechanical damages are expected to occur.

### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Aluminium, Class 2 according to IEC 60228.
Insulation :	Cross Linked Polyethylene Compound (XLPE).
Colour Code :	Two cores : Red and Black. Three cores : Red, Yellow and Blue. Four cores : Red, Yellow, Blue and Black .
Laying up :	Cores twisted together with filling elements if necessary.
Wrapping :	At least 1 layer of Polypropylene Tape.
Bedding :	PVC.
Aarmor :	Double Steel Tape Armor.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 90 °C during operation.
Minimum Bending Radius :	15 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.





# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating			Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	"AC at 90 °C"	"Direct in Ground"	Laid in Ducts	"Direct in Free Air"		
mm <sup>2</sup>	Ω/km	Ω/km	A	A	A	mm	kg/km

### Two Core Cables

25 r	1.2000	1.5400	105	81	106	20.8	630
35 r	0.8680	1.1130	141	114	139	23.0	770

### Three Core Cables

16 r	1.9100	2.4500	73	57	68	19.3	495
25 r	1.2000	1.5400	97	76	92	22.5	650
35 r	0.8680	1.1130	131	104	121	24.9	795

### Four Core Cables

16 r	1.9100	2.4500	73	57	68	20.9	585
25 r	1.2000	1.5400	97	76	92	24.5	780
35 r	0.8680	1.1130	131	104	121	27.2	940
50 s	0.6410	0.8220	158	120	150	30.1	1300
70 s	0.4430	0.5690	191	153	185	34.6	1750
95 s	0.3200	0.4110	229	180	226	39.7	2540
120 s	0.2520	0.3250	256	207	260	43.8	3020
150 s	0.2060	0.2650	289	234	306	48.7	3670
185 s	0.1640	0.2120	316	262	347	53.7	4380
240 s	0.1250	0.1630	371	305	416	60	4430
300 s	0.1000	0.1310	425	354	491	65.5	6510
400 s	0.0778	0.1025	494	411	567	71.7	7950

### Four Core Cables with Reduced Neutral

35 r + 16 r	0.8680/1.9100	1.1130/2.4500	131	104	121	25.6	890
50 s + 25 r	0.6410/1.2000	0.8220/1.5400	158	120	150	28.7	1200
70 s + 35 r	0.4430/0.8680	0.5690/1.1130	191	153	185	33.1	1550
95 s + 50 s	0.3200/0.6410	0.4110/0.8220	229	180	226	38.0	1970
120 s + 70 s	0.2530/0.4430	0.3250/0.5690	256	207	260	42.1	2710
150 s + 70 s	0.2060/0.4430	0.2650/0.5690	289	234	306	46.3	3290
185 s + 95 s	0.1640/0.3200	0.2120/0.4110	316	262	347	51.2	3980
240 s + 120 s	0.1250/0.2530	0.1630/0.3250	371	305	416	57.1	4910
300 s + 150 s	0.1000/0.2060	0.1310/0.2650	425	354	491	62.2	5920
400 s + 185 s	0.0778/0.1250	0.1025/0.1630	494	411	567	67.6	7110

The above data is approximate and subjected to manufacturing tolerance.

r : round, Stranded  
s : Sector, Stranded

## Multicore Cables, with Stranded Copper Conductors, XLPE Insulated, Armored by Steel Wires and PVC Sheathed

**0.6/1 (1.2) kV**



### (a) Description

- Multicore cables of stranded Copper conductors are insulated with a XLPE compound, assembled together, armored with steel wires and covered with an overall jacket of a PVC compound.
- Cables are produced according to IEC 60502.

### (b) Application

- For outdoor installations in damp and wet locations where mechanical damages are expected to occur.

### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Plain annealed Copper, Class 2 according to IEC 60228.
Insulation :	Cross Linked Polyethylene Compound (XLPE).
Colour Code :	Two cores : Red and Black. Three cores : Red, Yellow and Blue. Four cores : Red, Yellow, Blue and Black.
Laying up :	Cores twisted together with filling elements if necessary.
Wrapping :	At least 1 layer of Polypropylene Tape.
Bedding :	PVC.
Aarmor :	Galvanized Steel Wires Armor.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 90 °C during operation.
Minimum Bending Radius:	15 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.



# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating			Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	"AC at 90 °C"	"Direct in Ground"	Laid in Ducts	"Direct in Free Air"		
mm <sup>2</sup>	Ω/km	Ω/km	A	A	A	mm	kg/km

### Two Core Cables

25 r	0.7270	0.9270	153	118	154	24.1	1410
35 r	0.5240	0.6690	183	147	185	26.3	1715

### Three Core Cables

25 r	0.7270	0.9270	142	112	132	25.8	1620
35 r	0.5240	0.6690	172	133	162	28.2	1990

### Four Core Cables

25 r	0.7270	0.9270	142	112	134	27.8	1975
35 r	0.5240	0.6690	172	133	162	30.7	2465
50 s	0.3870	0.4940	202	158	202	33.1	3200
70 s	0.2680	0.3430	240	196	242	39.2	4645
95 s	0.1930	0.2480	289	229	300	42.9	5870
120 s	0.1530	0.1970	332	267	347	48.4	7555
150 s	0.1240	0.1600	365	300	413	53.1	8985
185 s	0.0991	0.1290	409	338	451	57.9	10760
240 s	0.0754	0.0990	474	398	537	64.1	13480
300 s	0.0601	0.0810	534	441	618	69.7	16215
400 s	0.0470	0.0642	596	500	697	76.8	20190

### Four Core Cables with Reduced Neutral

35 r + 16 r	0.5240/1.1500	0.6690/1.4700	172	133	162	28.9	2210
50 s + 25 r	0.3870/0.7270	0.4940/0.9270	202	158	202	31.3	2860
70 s + 35 r	0.2680/0.5240	0.3430/0.6690	240	196	242	37.5	4240
95 s + 50 s	0.1930/0.3870	0.2480/0.4940	289	229	300	41.2	5290
120 s + 70 s	0.1530/0.2680	0.1970/0.3430	332	267	347	45.3	6475
150 s + 70 s	0.1240/0.2680	0.1600/0.3430	365	300	413	50.5	8055
185 s + 95 s	0.0991/0.1930	0.1290/0.2480	409	338	451	55.4	9735
240 s + 120 s	0.0754/0.1530	0.0990/0.1970	474	398	537	60.3	11780
300 s + 150 s	0.0601/0.1240	0.0810/0.1600	534	441	618	66.4	14435
400 s + 240 s	0.0470/0.0754	0.0642/0.099	596	500	697	72.7	18500

The above data is approximate and subjected to manufacturing tolerance.

r : round, Stranded  
s : Sector, Stranded



### 0.6/1 (1.2) kV



#### (a) Description

- Multicore cables of stranded Aluminium conductors are insulated with a XLPE compound, assembled together, armored with steel wires and covered with an overall jacket of a PVC compound.
- Cables are produced according to IEC 60502.

#### (b) Application

- For outdoor installations in damp wet locations where mechanical damages are expected to occur.

#### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Aluminium, Class 2 according to IEC 60228.
Insulation :	Cross Linked Polyethylene Compound (XLPE).
Colour Code :	Two cores : Red and Black. Three cores : Red, Yellow and Blue. Four cores : Red, Yellow, Blue and Black .
Laying up :	Cores twisted together with filling elements if necessary.
Wrapping :	At least 1 layer of Polypropylene Tape.
Bedding :	PVC.
Aarmor :	Galvanized Steel Wires Armor.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 90 °C during operation.
Minimum Bending Radius:	15 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.



# Low Voltage Power Cables

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating			Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	*AC at 90 °C	"Direct in Ground"	Laid in Ducts	"Direct in Free Air"		
mm <sup>2</sup>	Ω/km	Ω/km	A	A	A	mm	kg/km
<b>Two Core Cables</b>							
25 r	1.2000	1.5400	105	81	111	24.1	1110
35 r	0.8680	1.1130	141	114	144	26.3	1300
<b>Three Core Cables</b>							
25 r	1.2000	1.5400	97	76	98	25.8	1170
35 r	0.8680	1.1130	131	104	127	28.2	1365
<b>Four Core Cables</b>							
16 r	1.9100	2.4500	73	57	74	24.2	1060
25 r	1.2000	1.5400	97	76	98	27.8	1370
35 r	0.8680	1.1130	131	104	127	30.7	1635
50 s	0.6410	0.8220	158	120	155	33.1	2330
70 s	0.4430	0.5690	191	153	190	39.2	2760
95 s	0.3200	0.4110	229	180	231	42.9	3340
120 s	0.2520	0.3250	256	207	265	48.4	4320
150 s	0.2060	0.2650	289	234	311	53.1	5080
185 s	0.1640	0.2120	316	262	352	57.9	5990
240 s	0.1250	0.1630	371	305	421	64.1	7220
300 s	0.1000	0.1310	425	354	496	69.7	8440
400 s	0.0778	0.1025	484	407	564	76.8	10630
<b>Four Core Cables with Reduced Neutral</b>							
35 r + 16 r	0.8680/1.9100	1.1130/2.4500	131	104	127	28.9	1490
50 s + 25 r	0.6410/1.2000	0.8220/1.5400	158	120	155	31.3	1870
70 s + 35 r	0.4430/0.8680	0.5690/1.1130	191	153	190	37.5	2600
95 s + 50 s	0.3200/0.6410	0.4110/0.8220	229	180	231	41.2	3090
120 s + 70 s	0.2530/0.4430	0.3250/0.5690	256	207	265	45.3	3690
150 s + 70 s	0.2060/0.4430	0.2650/0.5690	289	234	311	50.5	4700
185 s + 95 s	0.1640/0.3200	0.2120/0.4110	316	262	352	55.4	5550
240 s + 120 s	0.1250/0.2530	0.1630/0.3250	371	305	421	60.3	6560
300 s + 150 s	0.1000/0.2060	0.1310/0.2650	425	354	496	66.4	7820
400 s + 240 s	0.0778/0.1250	0.1025/0.1630	484	407	564	72.7	9845

The above data is approximate and subjected to manufacturing tolerance.

r : round, Stranded  
s : Sector, Stranded



# 2

**Low Voltage Control Cables.**

2.1- Copper Conductors, PVC Insulated and PVC Sheathed

P 66

2.2- Copper Conductors, PVC Insulated, Copper Tape Screen and PVC Sheathed P 68

**0.6/1 (1.2) kV**



### (a) Description

- Soft annealed stranded Copper conductors, insulated with a PVC compound rated 70 ° C and sheathed with a PVC compound layer.
- Cables are produced according to IEC 60227 & IEC 60502.

### (b) Application

- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, industrial plants, as well as in thermopower and hydropower stations.

### (c) Technical data

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Plain annealed Copper, Class 2 according to IEC 60228.
Insulation :	PVC.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 70 °C during operation.
Minimum Bending Radius:	8 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.



# Low Voltage Control Cables

## (d) Product Data

Size	Max. Conductor Resistance		Current Rating			Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	*AC at 70 °C*	*Laid Direct in Ground*	Laid in Ducts	Laid in Free Air		
mm <sup>2</sup>	Ω/km	Ω/km	A	A	A	mm	kg/km
5X1.5	12.1	14.477	20	18	16	11.8	230
7X1.5	12.1	14.477	18	16	14	13.3	265
12X1.5	12.1	14.477	15	13	12	17	415
19X1.5	12.1	14.477	11	10	9	19.7	605
24X1.5	12.1	14.477	10	9	9	22.9	750
37X1.5	12.1	14.477	8	7	7	26.1	1090
5X2.5	7.41	8.866	27	23	21	12.9	300
7X2.5	7.41	8.866	25	21	18	14.5	350
12X2.5	7.41	8.866	20	18	16	18.7	555
19X2.5	7.41	8.866	16	14	12	21.7	820
24X2.5	7.41	8.866	15	12	11	25.3	1020
37X2.5	7.41	8.866	11	10	9	29.1	1510
5X4	4.61	5.516	35	29	28	15.4	445
7X4	4.61	5.516	32	26	25	17.2	510
12X4	4.61	5.516	26	22	21	22.4	820
19X4	4.61	5.516	20	17	16	26.2	1235
24X4	4.61	5.516	18	15	14	30.9	1560

The above data is approximate and subjected to manufacturing tolerance.



## **0.6/1 (1.2) kV**



### **(a) Description**

- Soft annealed stranded Copper conductors, insulated with a PVC compound rated 70 ° C, screened by Copper Tape and sheathed with a PVC compound layer.
- Cables are produced according to IEC 60227 & IEC 60502.

### **(b) Application**

- For outdoor and indoor installations in damp and wet locations. They are normally used for power distribution in urban networks, industrial plants, as well as in thermopower and hydropower stations.

### **(c) Technical data**

Relevant Standard:	IEC 60502 Part 1.
Conductor :	Plain annealed Copper, Class 2 according to IEC 60228.
Insulation :	PVC.
Bedding :	PVC.
Screen :	Copper Tape Screen with Suitable Overlap.
Outer Jacket :	PVC.
Temperature Range :	15- °C up to + 70 °C during operation.
Minimum Bending Radius:	10 x cable outer diameter (ø).
Packing Condition :	On non-returnable wooden drum.

# Low Voltage Control Cables

## (d) Product Data

Size	Max. Conductor Resistance		"Laid Direct in Ground"	Laid in Ducts	Laid in Free Air	Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	*AC at 70 °C*					
mm <sup>2</sup>	Ω/km	Ω/km	A	A	A	mm	kg/km
5X1.5	12.1	14.477	19	17	15	14.2	330
7X1.5	12.1	14.477	17	15	13	15.7	375
12X1.5	12.1	14.477	14	12	11	19.4	555
19X1.5	12.1	14.477	10	10	9	22.1	765
24X1.5	12.1	14.477	10	9	9	25.3	940
37X1.5	12.1	14.477	8	7	7	28.5	1300
5X2.5	7.41	8.866	26	22	20	15.3	410
7X2.5	7.41	8.866	24	20	17	16.9	470
12X2.5	7.41	8.866	19	17	15	21.1	705
19X2.5	7.41	8.866	15	13	11	24.1	995
24X2.5	7.41	8.866	14	11	10	27.7	1225
37X2.5	7.41	8.866	10	10	9	31.5	1750
5X4	4.61	5.516	33	28	27	17.8	570
7X4	4.61	5.516	30	25	24	19.6	650
12X4	4.61	5.516	25	21	20	24.8	1005
19X4	4.61	5.516	19	16	15	28.6	1450
24X4	4.61	5.516	17	14	13	33.5	1825

The above data is approximate and subjected to manufacturing tolerance.





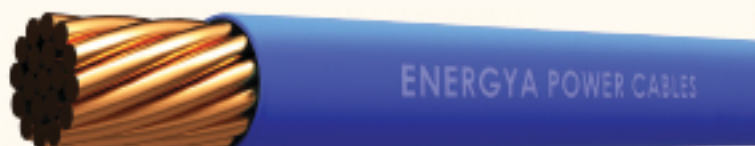
3

**Building Wires.**



3.1- Single Core Cables Stranded Copper Conductor with PVC Insulation.	P 72
3.2- Single Core Cables Stranded Aluminum Conductor with PVC Insulation.	P 74
3.3- Single Core Cables Flexible Copper Conductor with PVC Insulation.	P 76

### 450/750 V



#### (a) Description

- Soft annealed solid or stranded Copper conductor insulated with a PVC compound rated 70 °C or 90 °C (with special request).
- Wires are produced according to IEC 60227 & BS EN 50525.

#### (b) Application


- For indoor fixed installations in dry locations, laid in conduits, as well as in steel support brackets.

#### (c) Technical data

Relevant Standard:	IEC 60227 & BS EN 50525.
Conductor :	Plain annealed Copper, Class 1 or Class 2 according to IEC 60228.
Insulation :	PVC/C - as per IEC 60227.
Colour Code :	As per customer request.
Temperature Range :	15- °C up to + 70 °C during operation.
Packing Condition :	On non-returnable wooden drum For sizes $\geq 16 \text{ mm}^2$ and Air Coils for smaller Sizes.

# Building Wires

## (d) Product Data

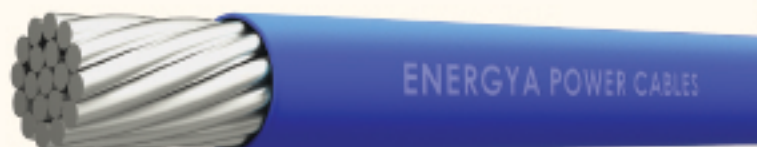
Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating in Air		Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	*AC at 70 °C**	Free 	In Pipes 		
mm <sup>2</sup>	Ω/km	Ω/km	A	A	mm	kg/km
1.5 o	12.1000	14.6000	20	15	2.8	20
1.5 r	12.1000	14.6000	20	15	3	21
2 o	9.1500	10.9000	22	17	3.2	27
2 r	9.1500	10.9000	22	17	3.4	28
2.5 o	7.4100	8.8900	28	21	3.4	31
2.5 r	7.4100	8.8900	28	21	3.6	33
3 o	6.1000	7.4100	31	24	3.6	37
3 r	6.1000	7.4100	31	24	3.8	39
4 o	4.6100	5.5100	37	26	3.9	47
4 r	4.6100	5.5100	37	26	4.2	50
6 o	3.0800	3.6800	46	33	4.4	68
6 r	3.0800	3.6800	46	33	4.7	71
10 r	1.8300	2.1700	66	46	6.1	117
16 r	1.1500	1.3700	87	61	7.1	177
25 r	0.7270	0.8600	118	79	8.8	278
35 r	0.5240	0.6300	147	98	9.9	371
50 r	0.3870	0.4600	179	120	11.8	514
70 r	0.2680	0.3200	230	148	13.5	711
95 r	0.1930	0.2300	289	188	15.7	967
120 r	0.1530	0.1900	337	215	17.4	1240
150 r	0.1240	0.1500	385	247	19.4	1500
185 r	0.0991	0.1200	449	283	21.5	1852
240 r	0.0754	0.0920	542	339	24.7	2457
300 r	0.0601	0.0750	621	384	27.2	2977

The above data is approximate and subjected to manufacturing tolerance.

r : round, Stranded  
o: round , Solid



### 450/750 V



#### (a) Description

- Soft stranded Aluminum conductor insulated with a PVC compound rated 70 °C or 90 °C (with special request) .
- Wires are produced according to IEC 60227 & BS EN 50525.

#### (b) Application

- For indoor fixed installations in dry locations, laid in conduits, as well as in steel support brackets.



#### (c) Technical data

Relevant Standard:	IEC 60227 & BS EN 50525.
Conductor :	Aluminum, Class 2 according to IEC 60228.
Insulation :	PVC/C - as per IEC 60227.
Colour Code :	As per customer request.
Temperature Range :	15- °C up to + 70 °C during operation.
Packing Condition :	On non-returnable wooden drum



# Building Wires

## (d) Product Data

Nominal Cross Sectional Area	Max. Conductor Resistance		Current Rating in Air		Approx. Overall Diameter	Approx. Weight
	DC at 20 °C	*AC at 70 °C*	Free 	In Pipes 		
mm <sup>2</sup>	Ω/km	Ω/km	A	A	mm	kg/km
16	1.91	2.2900	57	52	6.7	75
25	1.2	1.4400	73	75	8.2	115
35	0.868	1.0400	90	98	9.3	150
50	0.641	0.7700	107	121	11	200
70	0.443	0.5330	136	144	12.6	270
95	0.32	0.3850	153	184	14.5	355
120	0.253	0.3050	186	213	15.9	440
150	0.206	0.2480	203	242	17.7	545
185	0.164	0.1980	232	282	19.8	675
240	0.125	0.1510	271	334	22.5	870
300	0.1	0.1220	305	385	25.3	1090
400	0.0778	0.0590	350	449	28.4	1375
500	0.0605	0.0480	401	529	32.1	1735
630	0.0469	0.0390	458	615	35.6	2195
800	0.0367	0.0290	509	713	40.4	2790

The above data is approximate and subjected to manufacturing tolerance.



**450/750 V**



### (a) Description

- Soft annealed Copper fine wires, bunched together in subunits or stranded bunched groups into a main units, which forms the flexible conductor, insulated with a PVC 70 °C or 90 °C (with special request) compound.
- Wires are produced according to IEC 60227 & BS EN 50525.

### (b) Application


- For indoor fixed installations in dry locations, where particular flexibility is required. For electrical panels connection or for electrical apparatus.
- They can be laid in groups around steel sheets.

### (c) Technical data

Relevant Standard:	IEC 60227 & BS EN 50525.
Conductor :	Plain annealed flexible Copper, Class 5 according to IEC 60228.
Insulation :	PVC/C - as per IEC 60227.
Colour Code :	As per customer request.
Temperature Range :	15- °C up to + 70 °C during operation.
Packing Condition :	On non-returnable wooden drum For sizes $\geq 16 \text{ mm}^2$ and Air Coils for smaller Sizes .

# Building Wires

## (d) Product Data

Nominal CrossSectional Area	Maximum Diameter of Wires	Max. Conductor Resistance		Current Rating		Approx. Overall Diameter	Approx. Weight
		DC at 20 °C	*AC at 70 °C*	Free 	In Pipes 		
mm <sup>2</sup>	mm	Ω/km	Ω/km	A	A	mm	kg/km
4	0.31	4.9500	5.9300	37	26	4.5	60
6	0.31	3.3000	3.9500	46	33	5.1	71
10	0.41	1.9100	2.2900	66	46	6.9	120
16	0.41	1.2100	1.4500	87	61	7.6	179
25	0.41	0.7800	0.9400	118	79	9.5	276
35	0.41	0.5540	0.6630	147	98	11	375
50	0.41	0.3860	0.4620	179	120	12.6	542
70	0.51	0.2720	0.3260	230	148	14.6	733
95	0.51	0.2060	0.2470	289	188	16.8	957
120	0.51	0.1610	0.1930	337	215	18.9	1243
150	0.51	0.1290	0.1550	385	247	21.2	1548
185	0.51	0.1060	0.1270	449	283	23.4	1895
240	0.51	0.0801	0.0960	542	339	26.7	2400

The above data is approximate and subjected to manufacturing tolerance.



The background of the slide is a solid blue color. On the left side, there are several thin, curved orange lines that sweep from the top left towards the center. The number '4' is positioned in the upper right area of the blue field.

# 4

## Overhead Transmission Lines.



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### Bare Soft and Hard Drawn Copper Stranded



#### (a) Description

- Plain bare soft drawn Copper conductors as per IEC 60228 class 2.
- Plain bare hard drawn Copper conductors as per DIN 48201.

#### (b) Application

- Soft drawn Copper conductors are used for grounding electrical systems, where high conductivity and flexibility are required.
- Hard drawn Copper conductors are used in overhead electrical distribution networks.

#### (c) Technical data

Relevant Standard:	IEC 60228 & DIN 48201.
Conductor :	Soft or Hard drawn Copper.
Packing Condition :	On non-returnable wooden drum.



# Overhead Transmission Lines

## (d) Product Data

Nominal Cross Sectional Area	Number and Nominal Diameter of Wires No x $\phi$	Max. DC. resistance at 20 °C	Approx. Overall Diameter	Approx. Weight
$\text{mm}^2$	$n \times \text{mm}$	$\Omega/\text{km}$	$\text{mm}$	$\text{kg/km}$
<b>a - Bare soft drawn</b>				
10	7 x 1.43	1.83	3.7	86.5
16	7 x 1.75	1.15	4.7	137
25	7 x 2.18	0.727	5.8	217
35	7 x 2.65	0.524	6.9	298
50	19 x 1.86	0.387	8.2	410
70	19 x 2.16	0.268	10.1	595
95	19 x 2.65	0.193	11.3	820
120	19 x 3.05	0.153	12.7	1040
150	19 x 3.38	0.124	14.1	1277
185	37 x 2.63	0.0991	15.8	1610
240	34 x 3.23	0.0754	18.2	2120
300	61 x 2.64	0.0601	20.6	2630
400	61 x 2.98	0.047	23.2	3390
500	61 x 3.33	0.0366	26.6	4420
<b>b - Bare hard drawn</b>				
10	7 x 1.35	1.829	4.1	90
16	7 x 1.70	1.154	5.1	143
25	7 x 2.10	0.7563	6.3	218
35	7 x 2.50	0.5337	7.5	310
50	7 x 3.00	0.3706	9	446
50	19 x 1.80	0.3819	9	437
70	19 x 2.10	0.2806	10.5	596
95	19 x 2.50	0.198	12.5	845
120	19 x 2.80	0.1578	14	1060
150	37 x 2.25	0.1264	15.8	1337
185	37 x 2.50	0.1024	17.5	1649
240	61 x 2.25	0.07528	20.3	2209
300	61 x 2.50	0.06097	22.5	2725
400	61 x 2.89	0.0456	26	3640
500	61 x 3.23	0.0365	29.1	4545

The above data is approximate and subjected to manufacturing tolerance.



### All Aluminium Conductors (A.A.C.)



#### (a) Description

- Hard drawn Aluminium wires, stranded in successive layers, in opposite direction to form the Aluminium stranded A.A.C. conductor.
- Conductors are produced according to BS EN 50182 or IEC 61089.

#### (b) Application

- All Aluminium bare conductors are used for aerial distribution lines having relatively short spans, aerial feeders and bus bars of substations.

#### (c) Technical data

Relevant Standard:	BS EN 50182 or IEC 61089.
Conductor :	Hard drawn Aluminium wires.
Packing Condition :	On non-returnable wooden drum.





# Overhead Transmission Lines

## (d) Product Data

Nominal Cross Sectional Area	Number and Nominal Diameter of Wires No x $\phi$	Max. DC. resistance at 20 °C	Rated Strength	Approx. Overall Diameter	Approx. Weight
mm <sup>2</sup>	n x mm	$\Omega$ /km	kN	mm	kg/km

### a - According to BS EN 50182 - Germany

16	7 x 1.70	1.7986	3.02	5.1	43.4
25	7 x 2.10	1.1787	4.36	6.3	66.3
35	7 x 2.50	0.8317	6.01	7.5	93.9
50	7 x 3.00	0.5776	8.41	9	135.2
50	19 x 1.80	0.5944	8.94	9	132.9
70	19 x 2.10	0.4367	11.85	10.5	180.9
95	19 x 2.50	0.3081	16.32	12.5	256.3
120	19 x 2.80	0.2456	19.89	14	321.5
150	37 x 2.25	0.196	26.48	15.8	405.7
185	37 x 2.50	0.1588	31.78	17.5	500.9
240	61 x 2.25	0.1193	43.66	20.3	671.1
300	61 x 2.50	0.0966	52.4	22.5	828.5
400	61 x 2.89	0.0723	68.02	26	1107.1
500	61 x 3.23	0.0579	82.47	29.1	1382.9
625	91 x 2.96	0.0464	106.45	32.6	1739.7
800	91 x 3.35	0.0362	132.34	36.9	2228.3
1000	91 x 3.74	0.0291	159.95	41.1	2777.3

Nominal Cross Sectional Area	Number and Nominal Diameter of Wires No x $\phi$	Max. DC. resistance at 20 °C	Rated Strength	Approx. Overall Diameter	Approx. Weight
mm <sup>2</sup>	n x mm	$\Omega$ /km	kN	mm	kg/km

### b - According to BS EN 50182 - United Kingdom

23.3	7 x 2.06	1.2249	4.2	6.18	63.8
26.9	7 x 2.21	1.0643	4.83	6.63	73.4
36.9	7 x 2.59	0.7749	6.27	7.77	100.8
42.8	7 x 2.79	0.6678	7.28	8.37	117
52.8	7 x 3.10	0.5409	8.72	9.3	144.4
63.6	7 x 3.40	0.4497	10.49	10.2	173.7
73.6	7 x 3.66	0.388	11.78	11	201.3
78.6	7 x 3.78	0.3638	12.57	11.3	214.7
84.1	7 x 3.91	0.34	13.45	11.7	229.7
95.6	7 x 4.17	0.2989	15.3	12.5	261.3
106	7 x 4.39	0.2697	16.95	13.2	289.6
106.4	19 x 2.67	0.2701	18.08	13.4	292.4
132	7 x 4.90	0.2165	21.12	14.7	360.8
157.6	19 x 3.25	0.1823	26.01	16.3	433.2
185.9	19 x 3.53	0.1546	29.75	17.7	511.1
213.2	19 x 3.78	0.1348	34.12	18.9	586
237.6	19 x 3.99	0.121	38.01	20	652.9
265.7	19 x 4.22	0.1081	42.52	21.1	730.4
322.7	19 x 4.65	0.0891	51.63	23.3	886.8
373.1	19 x 5.00	0.077	59.69	25	1025.3
372.4	37 x 3.58	0.0774	59.59	25.1	1027.1
415.2	37 x 3.78	0.0695	66.43	26.5	1145.1
486.1	37 x 4.09	0.0593	77.78	28.6	1340.6
529.8	37 x 4.27	0.0544	84.77	29.9	1461.2
628.3	37 x 4.65	0.0459	100.54	32.6	1732.9

The above data is approximate and subjected to manufacturing tolerance.

### All Aluminium Alloy Conductors (A.A.A.C.)



#### (a) Description

- All Aluminium Alloy (ALMELEC) conductors, stranded in successive layers to form the stranded A.A.A.C. conductor.
- Conductors are produced according to BS EN 50182 or IEC 61089.

#### (b) Application

- A.A.A.C. are mainly used for overhead lines, in transmission and distribution electrical networks, having relatively long spans. They also use a messenger to support overhead electrical cables.

#### (c) Technical data

Relevant Standard:	BS EN 50182 or IEC 61089.
Conductor :	Aluminium Alloy.
Packing Condition :	On non-returnable wooden drum.



# Overhead Transmission Lines

## (d) Product Data

Nominal Cross Sectional Area	Number and Nominal Diameter of Wires No x $\phi$	Max. DC. resistance at 20 °C	Rated Strength	Approx. Overall Diameter	Approx. Weight
mm <sup>2</sup>	n x mm	$\Omega$ /km	kN	mm	kg/km
<b>a - According to BS EN 50182 - Germany</b>					
16	7 x 1.70	2.0701	4.69	5.1	43.4
25	7 x 2.10	1.3566	7.15	6.3	66.2
35	7 x 2.50	0.9572	10.14	7.5	93.8
50	7 x 3.00	0.6647	14.6	9	135.1
50	19 x 1.80	0.6841	14.26	9	132.7
70	19 x 2.10	0.5026	19.41	10.5	180.7
95	19 x 2.50	0.3546	27.51	12.5	256
120	19 x 2.80	0.2827	34.51	14	321.2
150	37 x 2.25	0.2256	43.4	15.8	405.3
185	37 x 2.50	0.1827	53.58	17.5	500.3
240	61 x 2.25	0.1373	71.55	20.3	670.3
300	61 x 2.50	0.1112	88.33	22.5	827.5
400	61 x 2.89	0.0832	118.04	26	1105.9
500	61 x 3.23	0.0666	147.45	29.1	1381.4
625	91 x 2.96	0.0534	184.73	32.6	1737.7
800	91 x 3.35	0.0417	236.62	36.9	2225.8
1000	91 x 3.74	0.0334	294.91	41.1	2774.3

The above data is approximate and subjected to manufacturing tolerance.

Nominal Cross Sectional Area	Number and Nominal Diameter of Wires No x $\phi$	Max. DC. resistance at 20 °C	Rated Strength	Approx. Overall Diameter	Approx. Weight
mm <sup>2</sup>	n x mm	$\Omega$ /km	kN	mm	kg/km
<b>b - According to BS EN 50182 - United Kingdom</b>					
18.8	7 x 1.85	1.748	5.55	5.55	51.4
23.8	7 x 2.08	1.3828	7.02	6.24	64.9
30.1	7 x 2.34	1.0926	8.88	7.02	82.2
35.5	7 x 2.54	0.9273	10.46	7.62	96.8
42.2	7 x 2.77	0.7797	12.44	8.31	115.2
47.8	7 x 2.95	0.6875	14.11	8.85	130.6
59.9	7 x 3.30	0.5494	17.66	9.9	163.6
71.6	7 x 3.61	0.4591	21.14	10.8	195.6
84.1	7 x 3.91	0.3913	24.79	11.7	229.5
89.7	7 x 4.04	0.3665	26.47	12.1	245
118.9	7 x 4.65	0.2767	35.07	14	324.5
150.9	19 x 3.18	0.2192	44.52	15.9	414.3
180.7	19 x 3.48	0.183	53.31	17.4	496.1
211	19 x 3.76	0.1568	62.24	18.8	579.2
239.4	37 x 2.87	0.1387	70.61	20.1	659.4
303.2	37 x 3.23	0.1095	89.4	22.6	835.2
362.1	37 x 3.53	0.0917	106.82	24.7	997.5
479	37 x 4.06	0.0693	141.31	28.4	1319.6
498.1	37 x 4.14	0.0666	146.93	29	1372.1
586.9	61 x 3.50	0.0567	173.13	31.5	1622
659.4	61 x 3.71	0.0505	194.53	33.4	1822.5
821.1	61 x 4.14	0.0406	242.24	37.3	2269.4
996.2	61 x 4.56	0.0334	293.88	41	2753.2

The above data is approximate and subjected to manufacturing tolerance.





### Aluminium Conductors Steel Reinforced (A.C.S.R.)



#### (a) Description

- An outer layer of Aluminium conductor concentrically stranded over the central core of galvanized solid or stranded steel wires to form Aluminium steel reinforced conductor.
- Conductors are produced according to BS EN 50182 or IEC 61089.

#### (b) Application

- A.C.S.R conductors are widely used for electrical power transmission over long distances, since they are ideal for long overhead lines spans. They are also used as a messenger for supporting overhead electrical cables.

#### (c) Technical data

Relevant Standard:	BS EN 50182 or IEC 61089.
Conductor :	Aluminium concentrically stranded over the central core of galvanized solid or stranded steel wires.
Packing Condition :	On non-returnable wooden drum.





# Overhead Transmission Lines

## (d) Product Data

Nominal Cross Sectional Area	Number and Nominal Diameter of Wires		Max. DC. resistance at 20 °C	Rated Strength	Approx. Overall Diameter	Approx. Weight
	Aluminium	Steel				
mm <sup>2</sup>	No x ø (mm)	No x ø (mm)	Ω/km	kN	mm	kg/km

### a - According to BS EN 50182 - Germany

16/2.5	6 x 1.80	1 x 1.80	1.8769	5.8	5.4	61.6
25/4	6 x 2.25	1 x 2.25	1.2012	8.95	6.75	96.3
35/6	6 x 2.70	1 x 2.70	0.8342	12.37	8.1	138.7
50/8	6 x 3.20	1 x 3.20	0.5939	16.81	9.6	194.8
70/12	26 x 1.85	7 x 1.44	0.4132	26.27	11.7	282.2
95/15	26 x 2.15	7 x 1.67	0.306	34.93	13.6	380.6
120/20	26 x 2.44	7 x 1.90	0.2376	44.5	15.5	491
150/25	26 x 2.70	7 x 2.10	0.194	53.67	17.1	600.8
185/30	26 x 3.00	7 x 2.33	0.1571	65.27	19	741
210/35	26 x 3.20	7 x 2.49	0.1381	73.36	20.3	844
240/40	26 x 3.45	7 x 2.68	0.1188	85.12	21.8	980.1
380/50	54 x 3.00	7 x 3.00	0.0758	121.3	27	1442.5
490/65	54 x 3.40	7 x 3.40	0.059	150.81	30.6	1852.9

Nominal Cross Sectional Area	Number and Nominal Diameter of Wires		Max. DC. resistance at 20 °C	Rated Strength	Approx. Overall Diameter	Approx. Weight
	Aluminium	Steel				
mm <sup>2</sup>	No x ø (mm)	No x ø (mm)	Ω/km	kN	mm	kg/km

### a - According to BS EN 50182 - Germany

12.4	6 x 1.50	1 x 1.50	2.7027	4.14	4.5	42.8
24.5	6 x 2.11	1 x 2.11	1.3659	7.87	6.33	84.7
30.6	6 x 2.36	1 x 2.36	1.0919	9.58	7.08	106
36.9	6 x 2.59	1 x 2.59	0.9065	11.38	7.77	127.6
42.8	6 x 2.79	1 x 2.79	0.7812	13.21	8.37	148.1
49.5	6 x 3.00	1 x 3.00	0.6757	15.27	9	171.2
61.7	6 x 3.35	1 x 3.35	0.5419	18.42	10.1	213.5
73.6	6 x 3.66	1 x 3.66	0.454	21.67	11	254.9
100.1	12 x 2.59	7 x 2.59	0.4568	52.79	13	463
87.5	6 x 3.99	1 x 3.99	0.382	25.76	12	302.9
116.2	12 x 2.79	7 x 2.79	0.3936	61.26	14	537.3
92	6 x 4.09	1 x 4.09	0.3635	27.06	12.3	318.3
97.9	6 x 4.22	1 x 4.22	0.3415	28.81	12.7	338.8
111.3	6 x 4.50	1 x 4.50	0.3003	32.76	13.5	385.3
122.5	6 x 4.72	1 x 4.72	0.273	36.04	14.2	423.8
118.5	6 x 4.72	7 x 1.57	0.2733	32.65	14.2	394
151.8	26 x 2.54	7 x 1.91	0.2192	45.86	15.9	520.7
138.8	18 x 3.05	1 x 3.05	0.2188	29.74	15.3	418.8
161.9	30 x 2.36	7 x 2.36	0.2202	57.87	16.5	602.2
194.9	30 x 2.59	7 x 2.59	0.1829	68.91	18.1	725.3
167.5	18 x 3.35	1 x 3.35	0.1814	35.87	16.8	505.2
226.2	30 x 2.79	7 x 2.79	0.1576	79.97	19.5	841.6
194.5	18 x 3.61	1 x 3.61	0.1562	40.74	18.1	586.7
261.5	30 x 3.00	7 x 3.00	0.1363	92.46	21	973.1
222.3	18 x 3.86	1 x 3.86	0.1366	46.57	19.3	670.8
293.9	30 x 3.18	7 x 3.18	0.1213	100.47	22.3	1093.4
326.1	30 x 3.35	7 x 3.35	0.1093	111.5	23.5	1213.4
400	30 x 3.71	7 x 3.71	0.0891	135.13	26	1488.2
462.6	30 x 3.99	7 x 3.99	0.0771	156.3	27.9	1721.3
422.6	54 x 2.97	7 x 2.97	0.0773	118.88	26.7	1413.8
431.2	54 x 3.00	7 x 3.00	0.0758	121.3	27	1442.5
529.8	30 x 4.27	7 x 4.27	0.0673	179	29.9	1971.4
484.5	54 x 3.18	7 x 3.18	0.0674	131.92	28.6	1620.8
588.5	30 x 4.50	7 x 4.50	0.0606	198.8	31.5	2189.5
538.7	54 x 3.35	7 x 3.35	0.0608	146.4	30.2	1798.8
597	54 x 3.53	7 x 3.53	0.0547	159.92	31.8	1997.3

The above data is approximate and subjected to manufacturing tolerance.



**600v**



### (a) Description

- They are composed of one or more insulated conductors and one neutral (bare or insulated) conductor. They are required as two (Duplex) or three (Triplex) or four (Quadruplex) conductors, XLPE with 2.5 % Carbon black insulated.
- Cables are produced according to IEC 1-60502, DIN 48201 & IEC60228.

### (b) Application

- They are used for secondary over head lines (in circuits not exceeding 600 volts phase to phase) on poles or as feeders to residential premises.

### (c) Technical data

Relevant Standard:	IEC 1-60502, DIN 201 48, IEC60228.
Conductor :	Plain Hard Drawn Copper.
Insulation :	Cross Linked Polyethylene Compound (XLPE)2.5+ % Carbon Black.
Temperature Range :	15- °C up to + 90 °C during operation.
Packing Condition :	On non-returnable wooden drum.

# Overhead Transmission Lines

## (d) Product Data

Phase		Max. DC. resistance at 20 °C	Approx. Overall Diameter	Approx. Weight
Nominal Cross Sectional Area	Insulation thickness			
mm <sup>2</sup>	mm	Ω/km	mm	kg/km
Two conductors (Duplex)				
10	1.2	1.83	10.7	198
16	1.2	1.15	12.8	307
25	1.2	0.727	15.3	469
35	1.2	0.524	17.6	650
50	1.5	0.387	21.2	898
70	1.5	0.268	24.5	1247
95	1.5	0.193	28.3	1736
120	1.7	0.153	31.8	2170
Three conductors (Triplex)				
10	1.2	1.83	13.7	305
16	1.2	1.15	15.8	471
25	1.2	0.727	18.5	719
35	1.2	0.524	20.7	991
50	1.5	0.387	25	1357
70	1.5	0.268	28.7	1900
95	1.5	0.193	32.4	2631
120	1.7	0.153	36.6	3285
Four conductors (Quadruplex)				
10	1.2	1.83	16.3	413
16	1.2	1.15	18.8	634
25	1.2	0.727	22	970
35	1.2	0.524	24.6	1332
50	1.5	0.387	29.8	1821
70	1.5	0.268	34.2	2553
95	1.5	0.193	38.6	3526
120	1.7	0.153	43.5	4579

The above data is approximate and subjected to manufacturing tolerance.

**600v**



### (a) Description

- They are composed of one or more insulated conductors and one neutral (bare or insulated) conductor. They are required as two (Duplex) or three (Triplex) or four (Quadruplex) conductors, XLPE with 2.5 % Carbon black insulated.
- Cables are produced according to IEC 1-60502, BS 50182 & IEC60228.

### (b) Application

- They are used for secondary over head lines (in circuits not-exceeding 600 volts phase to phase) on poles or as feeders to residential premises.

### (c) Technical data

Relevant Standard:	BS 50182, IEC 1-60502 & IEC60228.
Conductor :	Hard Drawn Aluminium.
Insulation :	Cross Linked Polyethylene Compound (XLPE)+ 2.5 % Carbon Black.
Temperature Range :	15- °C up to + 90 °C during operation.
Packing Condition :	On non-returnable wooden drum.



# Overhead Transmission Lines

## (d) Product Data

Phase		Max. DC. resistance at 20 °C	Approx. Overall Diameter	Approx. Weight
Nominal Cross Sectional Area	Insulation thickness			
mm <sup>2</sup>	mm	Ω/km	mm	kg/km
<b>Two conductors (Duplex)</b>				
16	1.2	1.910	12.9	115
25	1.2	1.200	15.3	168
35	1.2	0.868	17.7	229
50	1.5	0.641	21.4	322
70	1.5	0.443	24.4	428
95	1.5	0.320	28.4	626
120	1.7	0.253	31.8	734
<b>Three conductors (Triplex)</b>				
16	1.2	1.910	15.6	185
25	1.2	1.200	18.0	267
35	1.2	0.868	20.4	364
50	1.5	0.641	25.2	519
70	1.5	0.443	28.2	674
95	1.5	0.320	32.2	928
120	1.7	0.253	36.6	1245
<b>Four conductors (Quadruplex)</b>				
16	1.2	1.910	19.0	256
25	1.2	1.200	22.0	367
35	1.2	0.868	24.9	499
50	1.5	0.641	30.3	710
70	1.5	0.443	33.9	920
95	1.5	0.320	38.8	1263
120	1.7	0.253	43.5	1556

The above data is approximate and subjected to manufacturing tolerance.





# Appendix.

1. Appendix 1  
General Information

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2. Appendix 2  
Derating Factors

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### General Information

#### Selecting a Power Cable:

The following factors are important when selecting a suitable cable construction , which is required to transport electrical energy from the power station to the consumer:

- ▶ Maximum operating voltage.
- ▶ Insulation Level.
- ▶ Frequency.
- ▶ Load to be carried.
- ▶ Magnitude and duration of possible overload.
- ▶ Magnitude and duration of short-circuit current.
- ▶ Voltage drop.
- ▶ Length of line.
- ▶ Type of installation:
  - Underground (direct or in ducts).
  - In air.
- ▶ Chemical and physical properties of soil.
- ▶ Max. and min. ambient air temperature and soil temperature.
- ▶ Specification and requirements to be met.

### Voltage

The standard rated voltage of a cable is denoted by  $U_0/U$  ( $U_m$ ).

#### where

$U_0$  : is the rated power-frequency voltage between the conductor and earth or a metallic screen.

$U$  : is the rated power-frequency voltage between conductors.

$U_m$  : is the maximum continuously permissible operating voltage of a cable at any given time or in any part of the network.



# Appendix 1

## Standards

1. Cables described in this catalogue are standard types, and their performance has been proven in operation.
2. Construction and tests are in accordance with the recommendation of IEC publications wherever applicable.
3. Power cables in accordance to other standards (e.g. BS, HD, NEMA) can be manufactured upon customer's request.

## Weight and Dimension

Weight and dimension are approximate.

The deviations are due to manufacturing tolerance.

## Jacket Marking:

### Standard embossed outer Jacket Marking consisting of:

1. Name of manufacturer "Energya Power Cables"
2. Type designation, size of conductor, rated voltage.
3. Continuous length marking every meter.
4. Year of manufacture.
5. Any special part no. on request.



### Definition

#### Definitions of dimensional values

1. Nominal value :

Value by which a quantity is designated and which is often used in tables. Usually, in IEC standards, nominal values give rise to values to be checked by measurements taking into account specified tolerances.

2. Approximate value :

Value which is neither guaranteed nor checked; it is used, for example, for the calculation of other dimensional values.

3. Median value :

When several test results have been obtained and ordered in an increasing (or decreasing) succession, the median value is the middle value if the number of available values is odd, and the mean of the two middle values if the number is even.

4. Fictitious value :

Value calculated according to the "fictitious method" described in annex A in IEC 60502.





# Appendix 1

## Definifions concerning Tests

### 1. Routine tests :

Tests made by the manufacturer on each manufactured length of the cable to check that each length meets the specified requirements.

### 2. Sample tests :

Tests made by the manufacturer on samples of completed cable or components taken from a completed cable, at a specified frequency, so as to verify that the finished product meets the specified requirements.

### 3. Type tests :

Test made before supplying, on a general commercial basis, a type of cable covered by this standard, in order to demonstrate satisfactory performance characteristics to meet the intended application. These tests are of such a nature that, after they have been made, they need not be repeated, unless changes are made in the cable materials or design or manufacturing process, which might change the performance characteristics.

### 4. Electrical tests after installation :

Tests made to demonstrate the integrity of the cable and its accessories as installed.



### Technical Data & Cables Parameters

#### 1-Resistance

The values of conductor DC resistance given in the following tables are based on 20 °C. In case the DC resistance is required at any other temperature the following formula is used :

$$R_{\theta} = R_{20} [ 1 + \alpha (\theta - 20) ] \quad (\Omega/\text{km})$$

**where**

$R_{\theta}$  : Conductor DC resistance at  $\theta$  °C ( $\Omega/\text{km}$ )

$R_{20}$  : Conductor DC resistance at 20 °C ( $\Omega/\text{km}$ )

$\theta$  : Operating temperature ( $^{\circ}\text{C}$ )

$\alpha$  : Resistance temperature coefficient ( $1 / ^{\circ}\text{C}$ )

= 0.00393 for Copper

= 0.00403 for Aluminium

To get AC resistance of the conductor at its operating temperature the following formula is used

$$R_{AC} = R_{\theta} ( 1 + y_p + y_s ) \quad (\Omega/\text{km})$$

**where**

$y_p$  and  $y_s$  are the proximity and skin effect factors respectively which depend on operation frequency and cable spacing.

#### 2-Inductance

The self and mutual inductance are formulated as follow :

$$L = K + 0.2 \ln (2S/d) \quad (\text{mh/Km})$$

**where**

$L$  : Inductance ( $\text{mh/Km}$ )

$K$  : Constant depends on the conductor's number of wires

$d$  : Conductors diameter ( $\text{mm}$ )

$S$  : Axial spacing between cables in trefoil formation ( $\text{mm}$ )

$S$  : 1.26 x axial spacing between cables in flat formation ( $\text{mm}$ )





# Appendix 1

## 3-Capacitance

The capacitance is formulated as follow :

$$C = \frac{\epsilon_r}{181 \ln \frac{D}{d}} \quad (\mu f / Km)$$

where

C : Capacitance ( $\mu f / km$ )

$\epsilon_r$  : Relative permittivity of insulation material

D : Diameter over insulation (mm)

d : Conductor diameter (mm)

## 4- Insulation Resistance

The Insulation Resistance is formulated as follow :

$$R = K \ln (D/d)$$

where

R : Insulation resistance (M $\Omega$ /km)

K : Constant depends on the insulation material

d : Diameter of the conductor (including the semiconducting layer) (mm)

D : Diameter of the insulated core (mm)

## 5- Cable Ampacity

Cable ampacity or current carrying capacity is defined as the continuous maximum current that cable can carry at its maximum operating temperature.

The technical information tables & the following installation conditions were assumed during the current calculation:

- Ambient air temperature = 30 °C
- Ground temperature = 25 °C
- Ground thermal resistivity = 120 °C. cm Watt
- Burial depth = 0.5 mt

- In case of installation conditions are different from the stated, Derating factors tabulated in tables 3 to 11 must be used for calculating the new current carrying capacity.

- All cable ampacities are based on IEC 60287.



### 6- Cable Short Circuit Capacity

Tables 17-12 give the short circuit current for the conductor and screen based on the following conditions :

- a- Short circuit starts from the maximum operating conductor/screen temperature.
- b- Maximum temperature during short circuit.
- c- Maximum short circuit current duration is 5 seconds.

- If the short circuit current is required at a duration not mentioned in the catalogue, it is obtained by dividing the short circuit current for 1 second by the square root of the required duration as follows:

$$I_{s.c.t} = \frac{I_{s.c.1}}{\sqrt{t}}$$

**where**

$I_{s.c.t}$  : Short circuit current for  $t$  second (KA)

$I_{s.c.1}$  : Short circuit current for 1 second (KA)

$t$  : Duration (Sec.)





## Appendix 1



### 7- Voltage Drop

When current flows in a cable conductor there is a voltage drop between the ends of conductor which is the product at the current and the impedance.

The following equations should be used to calculate the voltage drop:

a- Single phase circuit.

$$V_d = 2I \ell (R \cos \phi + X \sin \phi) \quad (V)$$

b- Three phase circuit.

$$V_d = \sqrt{3} I \ell (R \cos \phi + X \sin \phi) \quad (V)$$

where

$V_d$  : Voltage drop (V)

$I$  : Load current (A)

$R$  : AC Resistance ( $\Omega/\text{km}$ )

$X$  : Reactance

$\cos \phi$  : Power factor

$\ell$  : Length (km)

$$X = \omega L \cdot 10^{-3} \quad (\Omega/\text{km})$$

$$\omega = 2 \pi f$$

$$L = \text{from tables} \quad (\text{mh}/\text{km})$$

Relation between  $\cos \phi$  and  $\sin \phi$

<b>Cos <math>\phi</math></b>	<b>1.0</b>	<b>0.9</b>	<b>0.8</b>	<b>0.71</b>	<b>0.6</b>	<b>0.5</b>
<b>Sin <math>\phi</math></b>	<b>0.0</b>	<b>0.44</b>	<b>0.6</b>	<b>0.71</b>	<b>0.8</b>	<b>0.87</b>

\*L.V. cable systems should be planned so as not to exceed voltage drop 5-3 % in normal operating conditions.

\*Voltage drop data for L.V. Cable (Single & Multi Core) are tabulated in Tables 21-18.



# Appendix 1

## Metals Used for Cables

### Electrical Properties

Table 1

Metal	Relative Conductivity Copper 100%	Electrical Resistivity at 20 °C ohm. m (10 <sup>-4</sup> )	Temperature Coefficient of Resistance per °C
Copper (annealed)	100	1.7241	0.00393
Copper (hard drawn)	97	1.777	0.00393
Tinned copper	95-97	1.741 - 1.814	0.00393
Aluminium	61	2.8264	0.00403
Lead	8	21.4	0.00400

### Physical Properties

Table 2

Property	Unit	Copper	Aluminium	Lead
Density at 20 °C	kg / m <sup>3</sup>	8890.0	2703.0	11340.00
Coeff. thermal expansion	Per °C x 10 <sup>-4</sup>	17.0	23.0	29.00
Melting point	°C	1083.0	659.0	327.00
Thermal conductivity	W/cm °C	3.8	2.4	0.34
Ultimate tensile strength	Mn/m <sup>2</sup>	225.0	70-90	-



### Derating Factors Ground temperature

Table 3

Ground Temperature °C	15	20	25	30	35	40	45	50
PVC cables rated 70 °C	1.1	1.05	1.00	0.94	0.88	0.82	0.75	0.67
XLPE cables rated 90 °C	1.06	1.03	1.00	0.95	0.92	0.87	0.83	0.73

### Air Temperature Derating Factor

Table 4

Air temperature °C	20	25	30	35	40	45	50	55
PVC cables rated 70 °C	1.12	1.06	1.00	0.94	0.87	0.83	0.71	0.62
XLPE cables rated 90 °C	1.07	1.04	1.00	0.95	0.91	0.82	0.81	0.76

### Burial Depth Derating Factor

Table 5

Depth of Laying (m)	Up to 70 (mm²)	Cables Cross Section 95 up to 240 (mm²)	300 mm² & above
0.50	1.00	1.00	1.00
0.60	0.99	0.98	0.97
0.80	0.97	0.96	0.94
1.00	0.95	0.93	0.92
1.25	0.94	0.92	0.89
1.50	0.93	0.90	0.87
1.75	0.92	0.89	0.86
2.00	0.91	0.88	0.85

### Soil Thermal Resistivity Derating Factor

Table 6

Soil Thermal Resistivity in °C. cm/Watt	80	90	100	120	150	200	250	300
Rating factor	1.17	1.12	1.07	1.00	0.91	0.80	0.73	0.67

## Appendix 2

### PVC Rated Temperature Derating Factor

Table 7

Type of PVC Rated Temperature °C	70	85
Rating factor	1.000	1.20

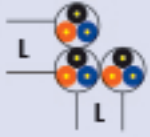

### Trefoil or Flat Formation Derating Factors for Three Single Core Cables Laid Direct in Ground

Table 8

Number of Circuit						
	Trefoil formation			Flat formation		
	Touching		Spacing = 0.15 M		Spacing = 0.30 M	
	<i>nr</i>	<i>Trefail</i>	<i>Flat</i>	<i>Trefail</i>	<i>Flat</i>	<i>Trefail</i>
2	0.77	0.80	0.82	0.85	0.88	0.91
3	0.66	0.69	0.73	0.76	0.80	0.83
4	0.60	0.63	0.68	0.71	0.74	0.77
5	0.56	0.59	0.64	0.67	0.72	0.75
6	0.53	0.57	0.61	0.64	0.70	0.73

### Trefoil Formation Derating Factors for Multicore Cables Laid Direct in Ground

Table 9







Number of Circuits						
	Trefoil formation				Flat formation	
	Touching		Spacing = 0.15 M		Spacing = 0.30 M	
	<i>nr</i>	<i>Trefoil</i>	<i>Flat</i>	<i>Trefoil</i>	<i>Flat</i>	<i>Trefoil</i>
2	0.81	0.81	0.87	0.87	0.91	0.91
3	0.69	0.70	0.76	0.78	0.82	0.84
4	0.62	0.63	0.72	0.74	0.77	0.81
5	0.58	0.60	0.66	0.70	0.73	0.78
6	0.54	0.56	0.63	0.67	0.70	0.76

\* L = Spacing



**Reduction factors for groups of more than one multicore cable in air to be multiplied by the current carrying capacity for one multicore cable in free air.**

Table 10

Number of Trays	Number of Cables						Method of Installation
	1	2	3	4	6	9	
1	1.00	0.88	0.82	0.79	0.76	0.73	<div> <div>Cables on perforated trays</div> <div>  <div>Touching</div> </div> <div>  <div>Spaced</div> </div> </div>
2	1.00	0.87	0.80	0.77	0.73	0.68	
3	1.00	0.86	0.79	0.76	0.71	0.66	
1	1.00	1.00	0.98	0.95	0.91	-	
2	1.00	0.99	0.96	0.92	0.87	-	
3	1.00	0.98	0.95	0.91	0.85	-	
1	1.00	0.88	0.82	0.78	0.73	0.72	<div> <div>Cables on vertical perforated trays</div> <div>  <div>Touching</div> </div> <div>  <div>Spaced</div> </div> </div>
2	1.00	0.88	0.81	0.76	0.71	0.70	
1	1.00	0.91	0.89	0.88	0.87	-	
2	1.00	0.91	0.88	0.87	0.85	-	
1	1.00	0.87	0.82	0.80	0.79	0.78	
2	1.00	0.86	0.80	0.78	0.76	0.73	
3	1.00	0.85	0.79	0.76	0.73	0.70	<div> <div>Cables on ladder supports, cleats, etc</div> <div>  <div>Touching</div> </div> <div>  <div>Spaced</div> </div> </div>
1	1.00	1.00	1.00	1.00	1.00	-	
2	1.00	0.99	0.98	0.97	0.96	-	
3	1.00	0.98	0.97	0.96	0.93	-	

**NOTE 1** Values given are averages for the cable types and range of conductor sizes considered. The spread of values is generally less than %5.

**NOTE 2** Factors apply to single layer groups of cables as shown above and do not apply when cables are installed in more than one layer touching each other. Values for such installations may be significantly lower and must be determined by an appropriate method.

**NOTE 3** Values are given for vertical spacing between trays of 300 mm and at least 20 mm between trays and wall. For closer spacing, the factors should be reduced.




**NOTE 4** Values are given for horizontal spacing between trays of 225 mm with trays mounted back to back. For closer spacing the factors should be reduced.



## Appendix 2

**Reduction factors for groups of more than one circuit of single-core cables (Note 2) to be multiplied by the current carrying capacity for one circuit of single-core cables in free air.**

Table 11

Number of Trays	Number of Cables			Use as a multiplier to rating for	Method of installation
	1	2	3		
1	0.98	0.91	0.87	Three cables in horizontal formation	Perforated trays (Note 3) 
2	0.96	0.87	0.81		
3	0.95	0.85	0.78		
1	1.00	0.97	0.96	Three cables in horizontal formation	Ladder supports cleats, etc. (Note 3) 
2	0.98	0.93	0.89		
3	0.97	0.90	0.86		
1	1.00	0.98	0.96	Three cables in trefoil formation	"Perforated trays (Note 3)" 
2	0.97	0.93	0.89		
3	0.96	0.92	0.86		
1	1.00	0.91	0.89		Vertical perforated trays (Note 4) 
2	1.00	0.90	0.86		
3	1.00	0.90	0.86		
1	1.00	1.00	1.00		Ladder supports cleats, etc. (Note 3) 
2	0.97	0.95	0.93		
3	0.96	0.94	0.90		

**NOTE 1** Values given are averages for the cable types and range of conductor sizes considered. The spread of values is generally less than %5.

**NOTE 2** Factors are given for single layers of cables (or trefoil groups) as shown in the table and do not apply when cables are installed in more than one layer touching each other. Values for such installations may be significantly lower and should be determined by an appropriate method.

**NOTE 3** Values are given for vertical spacings between trays of 300 mm. For closer spacing, the factors should be reduced.

**NOTE 4** Values are given for horizontal spacing between trays of 225 mm with trays mounted back to back. For closer spacing, the factors should be reduced.

**NOTE 5** For circuits having more than one cable in parallel per phase, each three phase set of conductors should be considered as a circuit for the purpose of this table.

## Short Circuit Current

### Max. Short Circuit Temperature for Cable Components

Table 12

Material	Item	Temp. °C
Insulation	PVC insulation	140 For C.S.A > 300 mm <sup>2</sup> & 160 For C.S.A ≤ 300 mm <sup>2</sup>
	XLPE insulation	250
Jacket	PVC sheathing	200
	LLDPE sheathing	150
	HDPE sheathing	180
Metal	Lead sheath	170
	Lead sheath - alloy	200*
	Copper	250
	Aluminum	250

\* Temp. = 210 °C for cables with rated voltages above 30kV (Um=36 kV),

### kA Short Circuit Current - Copper Conductor - PVC Insulation

Table 13

C.S.A. mm <sup>2</sup>	Duration sec.							
	0.1	0.2	0.3	0.4	0.5	1	3.0	4.0
16	5.8	4.1	3.4	2.9	2.6	1.8	1.1	0.9
25	9.1	6.4	5.2	4.5	4.1	2.9	1.7	1.4
35	12.7	9.0	7.3	6.4	5.7	4	2.3	2
50	18.2	12.9	10.5	9.1	8.1	5.8	3.3	2.9
70	25.5	18.0	14.7	12.7	11.4	8.1	4.6	4
95	34.5	24.4	19.9	17.3	15.5	10.9	6.3	5.5
120	43.6	30.9	25.2	21.8	19.5	13.8	8	6.9
150	54.5	38.6	31.5	27.3	24.4	17.3	10	8.6
185	67.3	47.6	38.8	33.6	30.1	21.3	12.3	10.6
240	87.3	61.7	50.4	43.6	39.0	27.6	15.9	13.8
300	109.1	77.1	63.0	54.5	48.8	34.5	19.9	17.3
400	130.0	91.9	75.1	65.0	58.2	41.1	23.7	20.6
500	162.5	114.9	93.8	81.3	72.7	51.4	29.7	25.7
630	204.8	144.8	118.2	102.4	91.6	64.8	37.4	32.4

## Appendix 3

### kA Short Circuit Current - Copper Conductor - XLPE Insulation

Table 14

C.S.A. mm <sup>2</sup>	Duration sec.							
	0.1	0.2	0.3	0.4	0.5	1	3.0	4.0
16	7.2	5.1	4.2	3.6	3.2	2.3	1.3	1.1
25	11.3	8.0	6.5	5.7	5.1	3.6	2.1	1.8
35	15.8	11.2	9.1	7.9	7.1	5.0	2.9	2.5
50	22.6	16.0	13.1	11.3	10.1	7.2	4.1	3.6
70	31.7	22.4	18.3	15.8	14.2	10.0	5.8	5.0
95	43.0	30.4	24.8	21.5	19.2	13.6	7.8	6.8
120	54.3	38.4	31.3	27.1	24.3	17.2	9.9	8.6
150	67.8	48.0	39.2	33.9	30.3	21.5	12.4	10.7
185	83.7	59.2	48.3	41.8	37.4	26.5	15.3	13.2
240	108.5	76.7	62.7	54.3	48.5	34.3	19.8	17.2
300	135.7	95.9	78.3	67.8	60.7	42.9	24.8	21.5
400	180.9	127.9	104.4	90.4	80.9	57.2	33.0	28.6
500	226.1	159.9	130.5	113.1	101.1	71.5	41.3	35.8
630	284.9	201.4	164.5	142.4	127.4	90.1	52.0	45.0
800	361.8	255.8	208.9	180.9	161.8	114.4	66.0	57.2
1000	452.2	319.8	261.1	226.1	202.2	143.0	82.6	71.5
1200	542.6	383.7	313.3	271.3	242.7	171.6	99.1	85.8
1600	723.5	511.6	417.7	361.8	323.6	228.8	132.1	114.4
2000	904.4	639.5	522.2	452.2	404.5	286.0	165.1	143.0
2500	1130.5	799.4	652.7	565.3	505.6	357.5	206.4	178.8





### kA Short Circuit Current - Aluminum Conductor - PVC Insulation

Table 15

C.S.A. mm <sup>2</sup>	Duration sec.							
	0.1	0.2	0.3	0.4	0.5	1	3.0	4.0
16	3.8	2.7	2.2	1.9	1.7	1.2	0.7	0.6
25	6.0	4.2	3.5	3.0	2.7	1.9	1.1	1.0
35	8.4	5.9	4.9	4.2	3.8	2.7	1.5	1.3
50	12.0	8.5	6.9	6.0	5.4	3.8	2.2	1.9
70	16.8	11.9	9.7	8.4	7.5	5.3	3.1	2.7
95	22.8	16.1	13.2	11.4	10.2	7.2	4.2	3.6
120	28.8	20.4	16.7	14.4	12.9	9.1	5.3	4.6
150	36.0	25.5	20.8	18.0	16.1	11.4	6.6	5.7
185	44.5	31.4	25.7	22.2	19.9	14.1	8.1	7.0
240	57.7	40.8	33.3	28.8	25.8	18.2	10.5	9.1
300	72.1	51.0	41.6	36	32.2	22.8	13.2	11.4
400	86.0	60.8	49.7	43.0	38.5	27.2	15.7	13.6
500	107.5	76.0	62.1	53.8	48.1	34	19.6	17.0
630	135.5	95.8	78.2	67.7	60.6	42.8	24.7	21.4





## Appendix 3

### kA Short Circuit Current - Aluminium Conductor - XLPE Insulation

Table 16

C.S.A. mm <sup>2</sup>	Duration sec.							
	0.1	0.2	0.3	0.4	0.5	1	3.0	4.0
16	4.7	3.4	2.7	2.4	2.1	1.5	0.9	0.75
25	7.4	5.2	4.3	3.7	3.3	2.3	1.4	1.2
35	10.4	7.3	6.0	5.2	4.6	3.3	1.9	1.6
50	14.8	10.5	8.6	7.4	6.6	4.7	2.7	2.3
70	20.7	14.7	12.0	10.4	9.3	6.6	3.8	3.3
95	28.1	19.9	16.3	14.1	12.6	8.9	5.1	4.5
120	35.6	25.1	20.5	17.8	15.9	11.2	6.5	5.6
150	44.4	31.4	25.7	22.2	19.9	14.1	8.1	7.0
185	54.8	38.8	31.6	27.4	24.5	17.3	10.0	8.7
240	71.1	50.3	41.1	35.6	31.8	22.5	13.0	11.2
300	88.9	62.9	51.3	44.4	39.8	28.1	16.2	14.1
400	118.5	83.8	68.4	59.3	53.0	37.5	21.6	18.7
500	148.2	104.8	85.5	74.1	66.3	46.9	27.0	23.4
630	186.7	132.0	107.8	93.3	83.5	59.0	34.1	29.5
800	237.0	167.6	136.9	118.5	106.0	75.0	43.3	37.5
1000	296.3	209.5	171.1	148.2	132.5	93.7	54.1	46.9
1200	355.6	251.4	205.3	177.8	159.0	112.4	64.9	56.2
1600	474.1	335.2	273.7	237	212	150	87	75
2000	592.6	419	342.1	296.3	265	187	108.2	93.7
2500	741.2	524.1	427.9	370.6	331.5	234.4	135.3	117.2

### kA Short Circuit Current - Copper Screen

Table 17

C.S.A. mm <sup>2</sup>	Duration sec.							
	0.1	0.2	0.3	0.4	0.5	1	3.0	4.0
16	7.5	5.3	4.3	3.7	3.3	2.4	1.4	1.2
25	11.7	8.3	6.8	5.9	5.2	3.7	2.1	1.9
35	16.4	11.6	9.5	8.3	7.3	5.2	3.0	2.6

Conductor temperature before short circuit = 90 °C.

Maximum conductor temperature during short circuit = 250 °C.

Maximum screen temperature before short circuit = 80 °C.



## Voltage Drop for Single Core L.V Cables

Table 18


C.S.A. mm <sup>2</sup>	Copper Conductor Voltage Drop (mv / AMP / Meter)			
	PVC Insulation & PVC Sheathed		XLPE Insulation & PVC Sheathed	
	Flat 	Trefoil 	Flat 	Trefoil 
4	7.830	7.770	8.337	8.277
6	5.287	5.226	5.628	5.568
10	3.184	3.124	3.401	3.341
16	2.068	2.008	2.203	2.142
25	1.357	1.297	1.440	1.380
35	1.034	0.971	1.085	1.024
50	0.793	0.732	0.836	0.776
70	0.595	0.534	0.624	0.564
95	0.469	0.408	0.490	0.430
120	0.410	0.349	0.417	0.357
150	0.354	0.294	0.366	0.305
185	0.312	0.252	0.322	0.262
240	0.272	0.211	0.278	0.218
300	0.247	0.187	0.253	0.192
400	0.224	0.164	0.220	0.159
500	0.208	0.148	0.211	0.150
630	0.194	0.134	0.191	0.131



## Appendix 4

### Voltage Drop for Single Core L.V Cables

Table 19

C.S.A. mm <sup>2</sup>	Aluminium Conductor Voltage Drop (mv / AMP / Meter)			
	PVC Insulation & PVC Sheathed		XLPE Insulation & PVC Sheathed	
	Flat 	Trefoil 	Flat 	Trefoil 
16	3.343	3.283	3.561	3.500
25	2.161	2.100	2.296	2.235
35	1.602	1.542	1.700	1.640
50	1.222	1.162	1.291	1.230
70	0.890	0.830	0.937	0.877
95	0.686	0.623	0.719	0.655
120	0.569	0.509	0.594	0.534
150	0.490	0.430	0.511	0.451
185	0.420	0.360	0.437	0.377
240	0.353	0.293	0.367	0.307
300	0.3 12	0.252	0.322	0.262
400	0.274	0.214	0.278	0.218
500	0.245	0.185	0.260	0.199
630	0.222	0.162	0.223	0.163

#### The above data are based on:

- Max. operating temp: 90 °C for XLPE & 70 °C for PVC.
- Power factor: 0.8.
- Rated frequency: 50 HZ.
- Cables are touched in flat formation.





## Voltage Drop for Multicore L.V Cables

Table 20

C.S.A. mm <sup>2</sup>	Copper Conductor Voltage Drop (mv / AMP / Meter)	
	PVC Insulation & PVC Sheathed	XLPE Insulation & PVC Sheathed
1.5	20.345	20.341
2.5	12.397	13.197
4	7.741	7.731
6	5.199	5.191
10	3.101	3.094
16	1.988	1.982
25	1.280	1.276
35	0.959	0.955
50	0.720	0.715
70	0.524	0.520
95	0.398	0.394
120	0.341	0.337
150	0.285	0.282
185	0.244	0.241
240	0.204	0.201
300	0.180	0.177
400	0.157	0.155





## Appendix 4

### Voltage Drop for Multicore L.V Cables

Table 21

C.S.A. mm <sup>2</sup>	Aluminium Conductor Voltage Drop (mv / AMP / Meter)	
	PVC Insulation & PVC Sheathed	XLPE Insulation & PVC Sheathed
16	3.263	3.479
25	2.084	2.218
35	1.527	1.624
50	1.150	1.217
70	0.819	0.865
95	0.613	0.645
120	0.500	0.524
150	0.421	0.442
185	0.352	0.369
240	0.286	0.299
300	0.245	0.255
400	0.208	0.211

#### The above data are based on:

- Max. operating temp: 90 °c for XLPE &. 70 °C for PVC.
- Power factor:0.8.                      - Rated frequency: 50 HZ.
- Cables are touched in flat formation.





**Certifications.**





## CERTIFICATE OF REGISTRATION

This is to certify that the management system of:

### Energya Power Cables

Main Site: A1-Third Industrial Zone, 10th of Ramadan City, Al Sharqia, Egypt.

has been registered by Intertek as conforming to the requirements of:

### ISO 9001:2015

The management system is applicable to:

Manufacturing low Voltage Cables, Medium Voltage Cables, High Voltage Cables up to 150 KV, Extra High Voltage Cables up to 500 KV and Over Head Transmission lines

Certificate Number:  
0070052-00

Initial Certification Date:  
17 December 2014

Date of Certification Decision:  
15 December 2017

Issuing Date:  
15 December 2017

Valid Until:  
16 December 2020



Calin Moldoveanu  
President, Business Assurance

Intertek Certification Limited, 104 Victory  
Park, Victory Road, Derby DE24 8ZF, United  
Kingdom

Intertek certification Limited is a  
UKAS accredited body under  
schedule of accreditation no. 014.



In the issuance of this certificate, Intertek assumes no liability to any party other than to the Client, and then only in accordance with the agreed upon Certification Agreement. This certificate's validity is subject to the organization maintaining their system in accordance with Intertek's requirements for system certification. Validity may be confirmed via email at [certificate.validation@intertek.com](mailto:certificate.validation@intertek.com) or by scanning the code to the right with a smartphone. The certificate remains the property of Intertek, to whom it must be returned upon request.





# Certificates



## CERTIFICATE

This is to certify that

**Energya Power Cables**  
10th of Ramadan city, 3rd Industrial zone, Egypt.

Environmental Management System has been assessed and registered as conforming with the requirements of the ISO 14001:2015.

**Scope:**  
Manufacturing of low Voltage Cables, Medium Voltage Cables, High Voltage Cables up to 150 KV, Extra High Voltage

Certificate Registration No. 000497-1-EG-1-EMS

Certified Since	22.01.2018
Valid from	22.01.2018
Valid until	21.01.2021
Recertification Due	21.01.2021






**Managing Director**  
Business Systems Certification Pty. Ltd. (BCS) P.O. Box 75, 31 Mays Road WIMBORNE, Australia

Certification is subject to satisfactory ongoing Surveillance Assessments.  
The validity of this certificate can be verified at [www.bscs.org.au](http://www.bscs.org.au)

Issue No. 1 Date: 24.01.2018



## CERTIFICATE

This is to certify that

**Energya Power Cables**  
10th of Ramadan city, 3rd Industrial zone, Egypt.

Health and Safety Management System has been assessed and registered as conforming with the requirements of the BS OHSAS 18001:2007.

**Scope:**  
Manufacturing of low Voltage Cables, Medium Voltage Cables, High Voltage Cables up to 150 KV, Extra High Voltage

Certificate Registration No. 000497-2-EG-1-OHS



Certified Since	22.01.2018
Valid from	22.01.2018
Valid until	21.01.2021
Recertification Due	21.01.2021





**Managing Director**  
Business Systems Certification Pty. Ltd. (BCS) P.O. Box 75, 31 Mays Road WIMBORNE, Australia

Certification is subject to satisfactory ongoing Surveillance Assessments.  
The validity of this certificate can be verified at [www.bscs.org.au](http://www.bscs.org.au)

## TEST REPORT

REPORT No. 1405/180173

**CLIENT :** Energya Power Cables CO. El Secoudy-Mediet

**Report Date:** 18/12/2017

**Place:**  
Laboratories of Extra High Voltage Research Center.

**Assessment:**  
Type tests according to Specifications Standard



**Standard Specification:**  
IEC 60287, IEC 60288, IEC 60289.

**Description of the Specimen:**  
Aluminum Conductor Type (ASCR) 15025 mm<sup>2</sup>.

**Description of the Test Equipment:**  
Digital Low Resistance Ohmmeter (DLRO) Type: (R446) - Serial No. (42189).  
Universal testing machine 100 kN - 11.07701 - Model: L8188C P.L.S - Serial No. 190322.

**Test Results:**  
Test sample was chosen under the responsibility of the client.

**Notes:**  
1. Conductor construction and dimension measurements.  
2. Determination of discoloration.  
3. Determination of lay length.  
4. Resistivity test.  
5. Mass per unit length.  
6. Tensile test for wires.




## التقرير الاختباري

رقم التقرير: 1405/180173

**العميل:** شركة الطاقة المصرية (إيجيكا)

**تاريخ التقرير:** 18/12/2017

**مكان الاختبار:**  
مركز أبحاث الجهد العالي،  
القاهرة، مصر.

**الهدف من الاختبار:**  
اختبار نوعي وفقًا لمواصفات القياسية المصرية (IEC).

**المواصفات القياسية:**  
IEC 60287، IEC 60288، IEC 60289.

**وصف العينة:**  
نوع الموصل (ASCR) 15025 مم<sup>2</sup>.

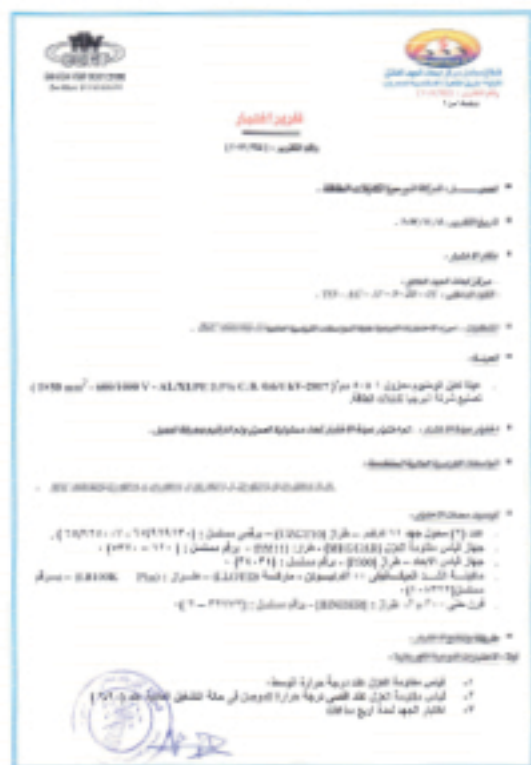
**وصف معدات الاختبار:**  
IEC 60287، IEC 60288، IEC 60289، IEC 60287، IEC 60288، IEC 60289.

**نتائج الاختبار:**  
1. تم اختيار عينة الاختبار تحت مسؤولية العميل.  
2. قياسات المقاومة منخفضة (DLRO) - رقم التسلسل (42189).  
3. آلة اختبار عالمية 100 كيلو نيوتن - 11.07701 - نموذج L8188C P.L.S - رقم التسلسل 190322.

**ملاحظات:**  
1. قياسات المقاومة منخفضة (DLRO) - رقم التسلسل (42189).  
2. قياسات المقاومة منخفضة (DLRO) - رقم التسلسل (42189).  
3. قياسات المقاومة منخفضة (DLRO) - رقم التسلسل (42189).  
4. قياسات المقاومة منخفضة (DLRO) - رقم التسلسل (42189).  
5. قياسات المقاومة منخفضة (DLRO) - رقم التسلسل (42189).  
6. قياسات المقاومة منخفضة (DLRO) - رقم التسلسل (42189).  
7. قياسات المقاومة منخفضة (DLRO) - رقم التسلسل (42189).





## Notes

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## Notes

[illegible]



## Notes

[illegible]



**elsewedy HELAL**

**Factory:**

**10<sup>th</sup> of Ramadan City, A1**

**Tel.: +2 (055) 410 188 / 199**

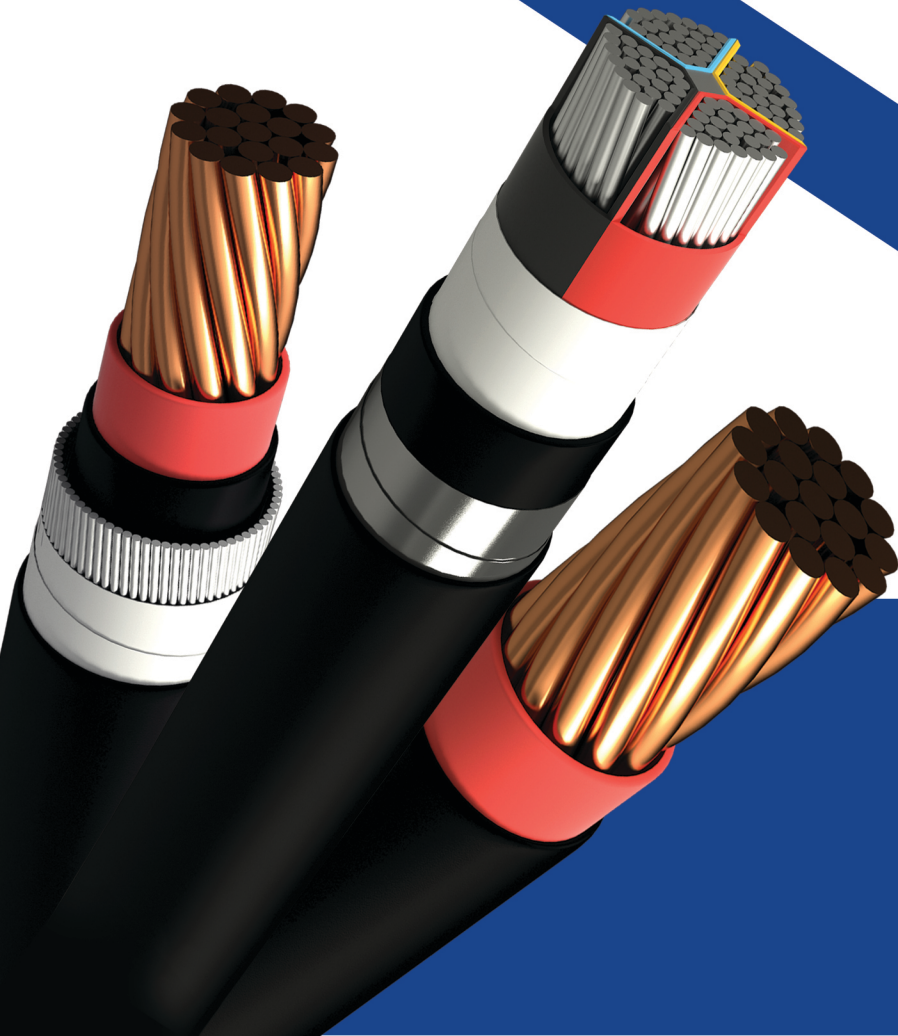
**Fax: +2 (055) 410 450**

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**Tel.: +2 02 2415 2371/2**

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