

دوكاب Ducab

كابلات الجهد المنخفض XLPE Insulated Low Voltage Cables



حلول متقدمة للكابلات من خلال التقنية والابداع
Advanced Cable Solutions Through Technology and Innovation

BICC

PRODUCT RANGE

Voltage range: 0.6/1kV and 1.9/3.3 kV

CABLE TYPES

- 1) Armoured/unarmoured XLPE insulated cables
- 2) Lead sheathed cables
- 3) Copper or Aluminium PE tape (with drain wire) shielded

CABLE SIZES

- Single core up to and including 1000 mm²
- 2 core up to and including 300 mm²
- 3 core up to and including 400 mm²
- 4 core up to and including 500 mm²
- 5 core up to and including 95 mm²

SPECIFICATION

- BS 5467.....for XLPE insulated armoured cables
- BS 7889.....for XLPE insulated single core unarmoured cables
- IEC 60502 (Part 1).....for XLPE insulated single/multicore armoured/unarmoured cables
- Any other International Specification as per VDE/DIN, GOST and as per customer's specifications.

SPECIFICATION AND CONSTRUCTION

CONDUCTORS

It is the current carrying component of the cable.

Material

- Plain, stranded, compacted copper as per BS 6360/IEC: 60228
- Aluminium, stranded, compacted conductors

INSULATION

The rated voltage level of the cable depends on the dielectric strength and thickness of the insulation.

Material

Cross-linked polyethylene (XLPE) Type GP8 as per BS 7655:Section 1.3.

Colour Masterbatch

Ultra-violet (UV) resistant polyethylene masterbatch is used for colouring of insulation. This protects the insulation from deterioration when exposed to continuous sunlight.

CORE IDENTIFICATION

Core identification is by colour as follows (unless otherwise agreed):

No. of cores Core Colours

1	Red or Black
2	Red and Black
3	Red, Yellow and Blue
4	Red, Yellow, Blue and Black
5	Red, Yellow, Blue, Black and Green/Yellow

* Cables to new colour scheme of BS 1111 eg. Blue, Brown, Black, Grey could also be supplied on special request

FILLERS

For providing circular shape to the cable, non-hygroscopic compatible fillers (wherever necessary) are included between laid up cores.

METALLIC SCREEN

If required by the customer screening may be provided for electrical shielding.

Material

Copper tape / Copper laminate / Aluminium laminate

Aluminium PE tape along with tinned copper drain wire (for providing screen continuity).

Note: Special constructions other than stated above may be provided on request.

BARRIER TAPE

Material

Polypropylene/PETP tape is used as a barrier tape over the laid up cores.

Functions

Holds the cores together and prevents them from opening out.

Works as a separator between different polymers used in a cable.

BEDDING

Extruded bedding serves as a bedding for the armour and as a protection for the laid-up cores.

Material

Extruded PVC Type 9 Compound as per BS 7655.

Reduced propagation flame retardant (RPLHCL)/RP PVC Compound for reduced flame propagation characteristics.

Smokemaster Low Smoke & Zero Halogen and fume for installations where fire hazards exist.

ARMOUR

Armour provides mechanical protection to the cable. It also serves as an Earth Continuity Conductor (ECC).

One layer of round wire is applied helically over the bedding.

Material

Galvanised round steel wire (GSW).

Galvanised round steel wire (GSW) **along with tinned copper wires (TCW) for maintaining specified conductivity of armour (if required by the customer).**

Aluminium round wire armour (AWA) is generally used for single core ac circuits as aluminium is a non-magnetic material and this will reduce losses due to armour.

Note: Aluminium glands should be used in conjunction with cables having aluminium wire armour.

OVERSHEATH - FINISH

Following types of materials may be specified for oversheathing.

- **General Purpose:** Extruded PVC Type 9 Compound as per BS 7655.
- **Medium Density Polyethylene (MDPE):** Offers higher protection from water ingress and mechanical abrasion.
- **Anti Termite:** Termite resistance can be built in both types described above by compounding with proper additives.
- **Reduced Propagation (RP):** Retards propagation of flame in fire situation. (Oxygen Index \approx 30)
- **Reduced Propagation and Low Acid Fumes (RPLHCL):** Retards propagation of flames and gives low emission of hydrochloric acid fumes. (OI \approx 30 & acid gas emission is less than 18%)
- **Smokemaster Low Smoke & Fume (LSZH):** Smokemaster cables are ideal for installations where the dense black smoke generated by PVC cables in a fire are a danger to people. Smokemaster is characterised by the features as Oxygen Index greater than 35, acid-gas liberation almost nil (<0.5%) and smoke density within controllable limit of 40% smoke density. Smokemaster cables are offered to BS 6724.

XLPE INSULATED CABLES TO BS 5467 & IEC-60502 - 1

DIMENSIONS AND WEIGHTS



STRANDED COPPER & ALUMINIUM CONDUCTORS THREE CORE CABLES

600/1000 V UNARMoured AND ARMoured, PVC SHEATHED CABLES Table 22

Nominal area of conductor mm ²	Thickness of insulation mm	Unarmoured Cables (approximate values)			Armoured Cables (approximate values)				
		Cable diameter overall mm	Cable weight Aluminium kg/km	Cable weight Copper kg/km	Diameter under armour mm	Armour wire diameter mm	Cable diameter overall mm	Cable weight Aluminium kg/km	Cable weight Copper kg/km
16*	0.7	18.0	-	675	16.0	1.25	21.6	-	1130
25*	0.9	21.5	500	990	20.0	1.6	26.7	1220	1710
35*	0.9	24.0	610	1295	22.7	1.6	29.4	1415	2100
50	1.0	24.6	740	1640	23.0	1.6	28.5	1550	2450
70	1.1	28.0	1050	2220	26.0	1.6	32.2	1810	3120
95	1.1	31.0	1170	2980	30.0	2.0	37.0	2500	4310
120	1.2	34.8	1440	3730	32.8	2.0	40.4	2870	5160
150	1.4	38.5	2300	5195	36.8	2.5	45.5	3660	7160
185	1.6	44.0	2750	6470	41.5	2.5	49.8	4320	8600
240	1.7	49.5	3020	8380	46.0	2.5	55.1	5170	10755
300	1.8	53.5	3660	10420	51.5	2.5	60.2	6100	13080
400	2.0	59.2	3730	11575	56.4	2.5	66.6	7050	15810

* Circular conductors, all others are sector shaped.

Note: Unarmoured cables & cables with Stranded Aluminium Conductors conform to IEC 60502 - 1

CURRENT RATINGS (AC)

STRANDED COPPER & ALUMINIUM CONDUCTORS THREE CORE CABLES

600/1000 V

ARMOURED PVC SHEATHED CABLES

Table 23

Nominal area of conductor mm ²	Stranded Copper Conductors						Stranded Aluminium Conductors					
	Current Ratings			Approximate voltage drop per ampere per metre			Current Ratings			Approximate voltage drop per ampere per metre		
	Direct in ground amps	In single way ducts amps	Installed in air amps	Ground mV	Duct mV	Air mV	Direct in ground amps	In single way ducts amps	Installed in air amps	Ground mV	Duct mV	Air mV
16	115	94	99	2.5	2.5	2.5	89	72	74	4.2	4.2	4.2
25	150	125	131	1.7	1.7	1.7	115	94	98	2.7	2.7	2.7
35	180	150	162	1.2	1.2	1.2	135	110	120	1.9	1.9	1.9
50	215	175	197	0.9	0.9	0.9	165	135	145	1.4	1.4	1.4
70	265	215	251	0.6	0.6	0.6	200	165	185	1.0	1.0	1.0
95	315	260	304	0.5	0.5	0.5	240	200	224	0.7	0.7	0.7
120	360	300	353	0.4	0.4	0.4	275	230	264	0.6	0.6	0.6
150	405	335	406	0.3	0.3	0.3	310	255	305	0.5	0.5	0.5
185	460	380	463	0.3	0.3	0.3	350	295	350	0.4	0.4	0.4
240	530	440	546	0.2	0.2	0.2	410	340	418	0.3	0.3	0.3
300	590	495	628	0.2	0.2	0.2	460	385	488	0.3	0.3	0.3
400	667	570	728	0.2	0.2	0.2	520	443	562	0.2	0.2	0.2

600/1000 V

UNARMOURED PVC SHEATHED CABLES

Table 24

Nominal area of conductor mm ²	Stranded Copper Conductors						Stranded Aluminium Conductors					
	Current Ratings			Approximate voltage drop per ampere per metre			Current Ratings			Approximate voltage drop per ampere per metre		
	Direct in ground amps	In single way ducts amps	Installed in air amps	Ground mV	Duct mV	Air mV	Direct in ground amps	In single way ducts amps	Installed in air amps	Ground mV	Duct mV	Air mV
16	120	93	100	2.5	2.5	2.5	-	-	-	-	-	-
25	145	125	127	1.7	1.7	1.7	115	92	97	2.7	2.7	2.7
35	180	145	158	1.2	1.2	1.2	135	110	120	1.9	1.9	1.9
50	215	175	192	0.9	0.9	0.9	165	135	146	1.4	1.4	1.4
70	265	215	246	0.6	0.6	0.6	200	165	187	1.0	1.0	1.0
95	315	255	298	0.5	0.5	0.5	240	195	227	0.7	0.7	0.7
120	365	300	346	0.4	0.4	0.4	275	225	263	0.6	0.6	0.6
150	405	330	399	0.3	0.3	0.3	310	255	304	0.5	0.5	0.5
185	465	380	456	0.3	0.3	0.3	350	290	347	0.4	0.4	0.4
240	540	440	538	0.2	0.2	0.2	415	340	409	0.3	0.3	0.3
300	600	500	621	0.2	0.2	0.2	465	385	471	0.3	0.3	0.3
400	675	575	741	0.2	0.2	0.2	523	443	570	0.2	0.2	0.2

Direct in ground - Cables touching

Single way ducts - ducts touching

Note: Unarmoured cables are as per IEC 60502 - 1

Installation conditions for above ratings:

Ambient air temperature: 30°C

Ground temperature: 15°C, Depth of laying: 0.5 m

Soil thermal resistivity: 1.2°C m/W

Maximum conductor operating temperature at rated current is 90°C

For rating factors see Tables 2 to 6 and 8 to 12

XLPE INSULATED CABLES TO BS 5467

CURRENT RATINGS (AC) AND VOLT DROPS STRANDED COPPER CONDUCTORS

600/1000 V THREE AND FOUR CORE ARMoured, PVC SHEATHED CABLES **Table 31**

Conductor size mm ²	Current in air A	Voltage drop mV/A/m	Current in ground A	Conductor size mm ²	Current in air A	Voltage drop mV/A/m	Current in ground A	Conductor size mm ²	Current in air A	Voltage drop mV/A/m	Current in ground A
16	99	2.50	115	70	251	0.607	265	185	463	0.255	460
	97	2.50	112		240	0.599	260		450	0.252	450
	93	2.47	110		230	0.589	250		430	0.249	435
	89	2.43	105		220	0.580	245		415	0.246	420
	84	2.39	100		210	0.572	235		395	0.243	405
	80	2.35	97		195	0.562	225		370	0.240	390
	74	2.31	94		185	0.554	215		345	0.237	375
	68	2.27	89		170	0.545	205		320	0.235	355
	62	2.23	84		150	0.536	195		290	0.232	335
25	131	1.65	150	95	304	0.446	315	240	546	0.211	530
	130	1.59	145		295	0.439	305		530	0.208	515
	125	1.56	140		290	0.433	300		510	0.206	500
	120	1.54	135		270	0.427	290		490	0.204	485
	110	1.51	130		255	0.421	280		465	0.203	470
	105	1.49	125		240	0.415	270		440	0.200	450
	99	1.46	120		225	0.408	255		410	0.199	430
	91	1.44	115		210	0.402	245		375	0.197	410
	82	1.41	110		190	0.396	230		340	0.195	385
35	162	1.15	180	120	353	0.366	360	300	628	0.185	590
	155	1.15	175		340	0.357	350		605	0.183	575
	150	1.13	170		325	0.352	340		580	0.181	560
	145	1.11	165		310	0.347	330		555	0.180	540
	135	1.09	160		300	0.342	320		530	0.179	520
	130	1.08	150		280	0.337	305		500	0.177	500
	120	1.06	145		260	0.333	295		465	0.176	480
	110	1.04	140		240	0.328	280		430	0.174	455
	100	1.02	130		215	0.323	260		390	0.174	430
50	197	0.865	215	150	406	0.303	405	400	728	0.166	667
	190	0.852	210		395	0.299	395		715	0.163	640
	180	0.839	200		375	0.295	385		685	0.162	620
	175	0.826	195		365	0.292	370		655	0.161	600
	165	0.813	190		345	0.288	360		620	0.160	580
	155	0.800	185		325	0.284	345		585	0.159	560
	145	0.787	175		305	0.280	330		545	0.158	535
	135	0.774	165		280	0.277	315		500	0.157	505
	120	0.761	155		250	0.273	295		450	0.156	475

Installation conditions for above ratings:

Ambient temperature: 30°C

Ground Temperature: 15°C

Soil Thermal resistivity: 1.2°Cm/W

Depth of laying: 0.5 m