

دوكاب Ducab

كابلات التحكم ذات الجهد المنخفض Low Voltage Control & Auxiliary Cables



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

BICC

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Ducab is listed in the following publication issued by the Department of Trade and Industry of the United Kingdom.

“THE DTI QA REGISTER - PRODUCTS AND SERVICES LIST”

Only those companies whose quality system is assessed and certified by U.K. accredited certification bodies appear in the above publication.

INTRODUCTION

Established in 1979, Ducab is the leading cable manufacturing company in the region and is equally owned by the Governments of Dubai and Abu Dhabi. Ducab has three major manufacturing facilities that support its continuous growth, one in Jebel Ali and two in Abu Dhabi Industrial City. Ducab-HV, inaugurated in November 2011, is a joint venture between Ducab, ADWEA and DEWA offering High Voltage cable systems up to 400 kV. Ducab-HV will sell cable systems in the voltage range 66kV (66,000 Volts) to 400kV (400,000 Volts) covering the highest voltage currently used in the GCC.

To meet the growing demand of customers around the region and the world, Ducab continues to expand its world-class facilities across the Middle East, North Africa, Europe and India. Ducab prides itself on setting and maintaining the highest quality standards of power cables. Experienced and highly skilled employees operate state-of-the-art equipment, and conduct extensive testing at every phase of production.

When it comes to advanced cable solutions, Ducab continues its status as the superbrand across the world in 40 countries. Ducab product range covers High Voltage cables up to 400kV, Ducab Powerplus Medium Voltage cables up to 33kV, Low Voltage power cables, Wiring and Lead-Sheathed cables, Ducab Smokemaster - Low Smoke Zero Halogen Cables, and Ducab Flam BICC (Fire Resistance cables), DuFlex cables, Instrumentation and Pilot cables, Cable components and cable accessories, Installation of cables, as well as Copper rod manufactured in Ducab's own Copper rod plant.

This catalogue provides working information on Ducab's Low voltage Control & Auxiliary Powerplus Medium Voltage cables. Separate catalogues are available for the remaining range of Ducab Cables.

ORDERING ADVICE

Due to the wide range of cables in the catalogue, it is advisable, when ordering, to provide as much information as possible. Please use the following table as a guide:

1. Cable standard / specification number.
2. Voltage designation.
3. Number of cores.
4. Conductor size.
5. Colour of outer sheath.
6. Length of cables required and individual drum lengths.*
7. Any other special requirement, e.g. special PVC sheath material, drum weight limitation, etc.

* Cables are normally supplied in lengths of 100 metres, 500 metres and 1000 metres depending on conductor size. Other lengths can be supplied if required.

TECHNICAL ADVISORY SERVICE

For any specialist advice and assistance on the entire Ducab product range contact the Technical Department, Dubai Cable Company (Private) Limited, P. O. Box 11529, Dubai, U. A. E., Tel: 971 4 815 8888, Fax: 971 4 815 8111.

CUSTOMER SERVICE

Ducab is the premier cable manufacturer in the United Arab Emirates and, since 1979, has been meeting the requirements of customers throughout the GCC, Middle East and Asian markets. Ducab cables are preferred for the following reasons:

PRODUCT QUALITY

Ducab is committed to supplying its customers with the highest quality of product and of service. Ducab's cables have been type approved by recognized certifying bodies such as BASEC UK (British Approval Service for Cables), Lloyd's Register of the UK, KEMA Netherland, LPCB UK (Loss Prevention Certification Board), ESMA (Emirates Authority for standardization and Metrology). They fully conform to BS, IEC other international and national specifications.



In addition, Ducab was presented with the Dubai Quality Award 1994, for the best local industrial company of the year. Ducab won Dubai Quality Gold Category award twice, in 1998 and in 2004. The Gold Award rewards the most distinguished companies which are judged to be world class and Ducab is the only manufacturing company in the region to win such acclaim.

Ducab has won the Sheikh Mohammed Bin Rashid Al Maktoum (MRM) Business Excellence Award in manufacturing category in 2009. Recognizing quality products and services, Ducab has also won the Superbrand award for 4 years consecutively from 2009.

RELIABILITY

Specifying the right cable for a particular application is the first step. The key to reliability however, is in the manufacturing process. The cable must be free from material and manufacturing defects, and weaknesses that will be revealed in service.

Ducab constantly monitors its manufacturing processes and operates stringent quality assurance procedures to give long term reliability. This is of vital significance where cables are to be installed in locations where future access would be difficult and this is where Ducab's reputation and resources give peace of mind.

PERFORMANCE

Optimum cable performance can be provided only by a company such as Ducab, with access to the latest developments in materials technology. In addition, Ducab's knowledge of application requirements throughout the Middle and Far East is an assurance of high performance.

Our experienced Technical Staff can provide guidance on cable selection and installation and can ensure that you get the right cable for the job.

HEALTH & SAFETY MANAGEMENT SYSTEM CERTIFIED TO OHSAS 18001



Ducab is able to maintain a close watch on world developments in cable technology and regulations and therefore ensure that its products are designed and constructed to be hazard-free under the prescribed conditions of use.

Ducab uses only tried and tested materials and processes in full compliance with all relevant British and International Standards. Our cables are therefore manufactured for safe use without risk to health on the understanding that users will exercise the same degree of care in their selection and application.



Safety is an important issue for Ducab, and the strictest standards are adhered to throughout the company. Ducab is proud of its safety record and has been awarded RoSPA (Royal Society for the Prevention of Accidents) Gold Awards for safety from 1991 to 1999. From 2000 onward, Ducab was awarded the prestigious President's Award for Health and

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Safety which is a recognition of Ducab winning 10 consecutive annual Gold awards and acknowledges Ducab's total commitment to health and safety. In 2002, Ducab was declared the joint winner of the Manufacturing Industry Sector Award from RoSPA.

Ducab is the first organisation in the Middle East to receive accreditation to OHSAS 18001 by BASEC (British Approvals Service for Cables). Certification to OHSAS 18001 provides a recognisable Occupational Health and Safety Management standard against which an organisation's management systems can be assessed and certified. Based on the structure of OHSAS 18001, the standard requires continual improvement in health and safety related activities.

QUALITY MANAGEMENT SYSTEM CERTIFIED TO ISO 9001



Ducab's Quality Management System conforms to the ISO 9001 International Quality System Standard and is certified by BASEC (British Approvals Service for Cables), a specialist certifying body for cables who are an internationally recognised quality authority accredited in the UK and throughout the world.

Certification to the ISO 9001 International standard demonstrates that Ducab has drawn up written procedures to ensure full compliance with all requirements of the standard and that these procedures are followed by every department in the company, thus ensuring that goods leaving Ducab's factory are of the highest quality and meet each customer's requirements in every respect.

Ducab is particularly proud to have achieved certification to the stringent ISO 9001 standard as it is an independent conformation that the company designs, manufactures and tests cables consistently to accepted standards. ISO 9001 is widely used throughout Europe, and is therefore a reassurance to Ducab's customers that the products and service supplied by the company are equal to the best in the world.

ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFIED TO ISO 14001

Ducab's Environmental Management System conforms to the ISO 14001 International Environmental Management Standard and is certified by BASEC who are an internationally recognised certifying authority accredited in the UK and throughout Europe.

Certification to the ISO 14001 International standard shows that Ducab has a well defined structure and established working practices aimed at limiting its impact on the environment.

Measurement and monitoring of effects, issuing work instructions, training of personnel and taking corrective actions are all essential elements to limiting the impact on the environment. Ducab has set improvement targets to reduce the significant environmental impacts associated with its activities.



Ducab is proud to be the first cable manufacturer in the region to achieve certification to ISO 14001 and this certification along with its quality, business success and safety record demonstrates that Ducab is a world class organisation and can hold its head up to any business community throughout the world.

BASEC CERTIFICATION

Ducab is also proud to hold a Process capability certification issued by BASEC (British Approvals Service for Cables) for several cables in its product range.

DUCAB SHAREEK

Ducab's customer satisfaction programme is designed to ensure that customers receive a consistently high level of service from Ducab's dedicated staff.



PRODUCT RANGE

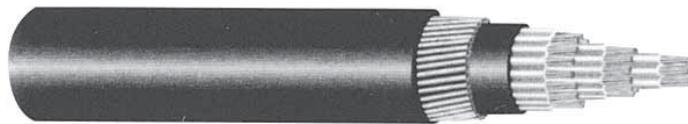
This publication provides details of the following types of electric cables:

Control Cables with copper conductors, XLPE or PVC insulated, covering sizes from 1.5 mm² up to 10 mm², in 2, 3 and 4 cores.



Auxiliary Cables with copper conductors, XLPE or PVC insulated, covering sizes from 1.5 mm², 2.5 mm², 4 mm² from 5 cores to 48 cores.

Construction details in this publication pertain to Auxiliary cables with the standard number of cores (ie. 7, 12, 19, 27, 37 or 48). However, enquiries for other number of cores can be considered.



The cables conform to the following cable specification, as applicable:

BS 5467 specification for XLPE insulated Armoured cables, rated 600/1000V.

BS 6346 specification for PVC insulated Armoured cables, rated 600/1000V.

IEC 60502-1 specification for PVC or XLPE insulated Unarmoured cables, rated 600/1000V.

XLPE insulated LSF sheathed cables with “low smoke and fume” emission characteristics as per BS 6724 specification can also be manufactured and these have similar dimensional features as cables to BS 5467.

Armoured Control and Auxiliary cables, can be offered to IEC 60502-1 specifications where required. Details are available upon request.

Control and Auxiliary cables, both armoured and unarmoured, can be offered with a common/overall screen or shield. The screening material is plain annealed copper tape / copper laminate / Aluminium laminate as specified.

CONSTRUCTION

Conductors

The conductors are bunched seven wire strands, made from high conductivity plain annealed copper wires and meet the requirements of BS 6360 specification for “Conductors in insulated cables and cords” and also IEC 60228 specification.

These cables can also be offered with single strand, solid copper conductors in sizes up to 2.5 mm².

Insulation

According to its particular standard specification, a cable will be insulated with either:

XLPE (Cross-linked polyethylene) or
PVC (Polyvinyl Chloride).

PVC is a clean, easy to handle material with good electrical characteristics and reasonable resistance to a range of oils and chemicals. It is inherently flame retardant and is suitable for a maximum continuous operating temperature of 70°C. XLPE is not flame retardant but matches all of the other attributes of PVC and at higher temperatures the toughness and physical properties are improved. In particular there is greatly enhanced resistance to deformation. This enables the conductors of XLPE insulated cables to operate at a maximum continuous temperature of 90°C, which imparts an important advantage when considering current ratings and is of particular significance in countries and installation sites where the ambient temperature is relatively high.

Core Identification

Core identification is as follows unless otherwise specified:

Number of cores	Core Identification
<u>Control Cables</u>	
Two	Red, Black
Three	Red, Yellow, Blue
Four	Red, Yellow, Blue, Black
<u>Auxiliary Cables</u>	
Five and more	White cores with number printing in black

Cables to new colour scheme of BS5467 eg. Blue, Brown, Black, Grey could also be supplied on special request.

Fillers

Wherever necessary, non-hygroscopic polypropylene fillers are applied in the interstices of multicore cables during laying up.

Bedding

The bedding normally consists of a layer of extruded PVC for cables to BS 5467 and BS 6346. The material is a special halogen-free compound in the case of LSF cables to BS 6724.

Armour

The armour is a single layer of galvanised steel wires. The direction lay of the armour is left hand and the size of the armour-wires is as specified in the cable standard specification. See Tables 1 and 2 for armour wire diameter.

Finish

The standard finish of all cables consists of an extruded black PVC oversheath, the external surface of which is embossed with the appropriate legend. The oversheath PVC grade is usually Type TM 1 or Type 9 to BS 7655 although other grades, e.g., Type 5 (85°C Hard) PVC or PVC sheath with anti-termite properties can be provided when specified. The PVC grade is ST2 for cables conforming to IEC 60502-1 standard.

Another option is medium density polyethylene (MDPE) sheath where abrasion resistance is important or where the cable is to be buried in a waterlogged area.

PVC is intrinsically flame retardant and all cables described in this publication conform to IEC 60332-1 "Test on Electric Cables under Fire Conditions". For special enquiries, PVC with high oxygen index, specially formulated for enhanced fire performance can be considered.

In the case of LSF cables to BS 6724 the material is a special halogen-free compound. LSF cables meet the requirements of IEC 60332-3-24 Cat-C for reduced flame propagation and do not emit smoke or acid fumes when exposed to fire.

**600/1000V Armoured Cables: XLPE Insulated to BS 5467-1997
PVC Insulated to BS 6346-1997
Stranded Copper Conductors**

TABLE 1 CONTROL CABLES - Dimensions and Weights

Conductor area mm ²	Strand No. / Size mm	Approx. diameter under Armour mm		Armour wire size mm		Approx. overall diameter mm		Approx. weight of completed cable kg/km	
		XLPE	PVC	XLPE	PVC	XLPE	PVC	XLPE	PVC
Two Core									
1.5	7/0.53	7.7	7.7	0.9	0.9	12.1	12.3	275	285
2.5	7/0.67	9.0	9.0	0.9	0.9	13.6	13.6	340	350
4	7/0.85	10.1	10.5	0.9	0.9	14.7	15.1	420	440
6	7/1.04	11.3	11.7	0.9	0.9	15.9	16.5	490	530
10	7/1.35	13.2	14.4	0.9	1.25	18.0	20.1	640	800
Three Core									
1.5	7/0.53	8.2	8.2	0.9	0.9	12.6	12.8	300	305
2.5	7/0.67	9.5	9.5	0.9	0.9	14.1	14.1	385	380
4	7/0.85	10.7	11.2	0.9	0.9	15.3	15.8	460	495
6	7/1.04	12.0	12.5	0.9	1.25	16.6	18.0	570	690
10	7/1.35	14.0	15.5	1.25	1.25	19.5	21.2	835	935
Four Core									
1.5	7/0.53	8.9	8.9	0.9	0.9	13.3	13.5	355	365
2.5	7/0.67	10.4	10.4	0.9	0.9	15.0	15.0	445	460
4	7/0.85	11.8	12.3	0.9	1.25	16.4	17.8	550	685
6	7/1.04	13.2	13.7	1.25	1.25	18.7	19.2	760	810
10	7/1.35	15.6	17.1	1.25	1.25	21.1	22.8	985	1092

TABLE 2 AUXILIARY CABLES - Dimensions and Weights

Number of cores	Approx. diameter under Armour mm		Armour wire size mm		Approx. overall diameter mm		Approx. weight of completed cable kg/km		
	XLPE	PVC	XLPE	PVC	XLPE	PVC	XLPE	PVC	
Conductor 1.5 mm² (7/0.53 mm)									
7	10.6	10.6	0.9	0.9	15.2	15.2	445	465	
12	13.9	13.9	1.25	1.25	19.4	19.4	710	745	
19	16.5	16.5	1.25	1.25	22.2	22.2	945	1000	
27	20.1	20.1	1.6	1.6	26.7	26.7	1355	1435	
37	22.4	22.4	1.6	1.6	29.0	29.2	1645	1765	
48	25.9	25.9	1.6	1.6	32.7	32.9	2000	2155	
Conductor 2.5 mm² (7/0.67 mm)									
7	12.5	12.5	0.9	1.25	17.1	18.0	575	685	
12	16.7	16.7	1.25	1.25	22.4	22.4	945	995	
19	20.0	20.0	1.6	1.6	26.6	26.6	1420	1500	
27	23.9	23.9	1.6	1.6	30.7	30.7	1815	1930	
37	27.0	27.0	1.6	1.6	33.8	34.0	2240	2392	
48	31.3	31.3	2.0	2.0	39.3	39.5	3045	3245	
Conductor 4 mm² (7/0.85 mm)									
7	14.2	14.8	1.25	1.25	19.7	20.5	830	900	
12	19.3	20.2	1.6	1.6	25.7	26.8	1380	1535	
19	22.7	23.7	1.6	1.6	29.3	30.5	1820	2010	
27	27.4	29.1	1.6	2.0	34.4	37.1	2350	2945	
37	31.2	32.6	2.0	2.0	39.2	40.8	3320	3650	
48	35.9	37.6	2.0	2.0	44.1	46.0	4003	4475	

TABLE 3 RESISTANCE OF CONDUCTOR AND ARMOUR - CONTROL CABLES

Nominal area of conductor mm ²	Maximum resistance per km of cable at 20°C in ohm/km							
	Copper Conductor ohm/km	Steel wire armour						
		Two core		Three core		Four core		
		XLPE	PVC	XLPE	PVC	XLPE	PVC	
1.5	12.1	10.2	10.2	9.5	9.5	8.8	8.8	
2.5	7.41	8.8	8.8	8.2	8.2	7.7	7.7	
4	4.61	7.9	7.5	7.5	7.0	6.8	4.6	
6	3.08	7.0	6.8	6.7	4.6	4.3	4.1	
10	1.83	6.0	3.9	4.0	3.7	3.7	3.4	

TABLE 4 RESISTANCE OF CONDUCTOR AND ARMOUR - AUXILIARY CABLES

Nominal area of conductor mm ²	Maximum resistance per km of cable at 20°C in ohm/km												
	Copper conductor ohm/km	Steel wire armour											
		Number of cores											
		7		12		19		27		37		48	
		XLPE	PVC	XLPE	PVC	XLPE	PVC	XLPE	PVC	XLPE	PVC	XLPE	PVC
1.5	12.1	7.5	7.5	4.0	4.0	3.5	3.5	2.3	2.3	2.0	2.0	1.8	1.8
2.5	7.41	6.3	4.6	3.5	3.5	2.3	2.3	1.9	1.9	1.7	1.7	1.2	1.2
4	4.61	4.0	3.9	2.3	2.2	2.0	1.9	1.7	1.3	1.2	1.1	1.0	0.96

XLPE or PVC Insulated Unarmoured Cables, 600/1000V to IEC 60502-1 Stranded Copper Conductors

TABLE 5 CONTROL CABLES - Dimensions and Weights

Conductor area mm ²	Strand No./mm	Approx. overall diameter mm		Approx. weight kg / km	
		XLPE	PVC	XLPE	PVC
Two Core					
1.5	7/0.53	10.3	12.4	125	190
2.5	7/0.67	11.0	12.9	155	230
4	7/0.85	12.5	14.8	200	310
6	7/1.04	13.4	15.8	265	380
10	7/1.35	15.5	18.0	375	510
Three Core					
1.5	7/0.53	10.5	12.8	150	220
2.5	7/0.67	11.8	13.5	190	260
4	7/0.85	12.8	15.5	250	365
6	7/1.04	14.0	17.0	325	460
10	7/1.35	16.1	19.0	475	640
Four Core					
1.5	7/0.53	11.7	13.4	180	265
2.5	7/0.67	12.5	14.5	230	340
4	7/0.85	14.3	17.0	320	465
6	7/1.04	15.5	18.5	410	570
10	7/1.35	17.8	21.0	615	800

TABLE 6 AUXILIARY CABLES - Dimensions and Weights

Number of Cores	Approx. overall diameter mm		Approx. weight kg / km	
	XLPE	PVC	XLPE	PVC
Conductor 1.5 mm² (7/0.53mm)				
5	12.5	14.5	270	305
7	13.2	15.0	320	360
12	16.7	19.0	470	550
19	19.3	21.6	675	780
27	23.6	25.8	750	1050
37	25.6	28.5	975	1360
48	29.5	32.6	1260	1735
Conductor 2.5 mm² (7/0.67mm)				
5	13.6	15.7	260	370
7	14.5	16.5	330	460
12	18.5	21.0	520	710
19	21.5	24.0	750	1020
27	25.5	27.0	1030	1390
37	28.5	31.7	1350	1810
48	32.8	35.8	1810	2340
Conductor 4 mm² (7/0.85 mm)				
5	15.0	18.0	350	520
7	16.1	19.3	450	650
12	20.7	25.1	720	1040
19	24.3	28.6	1070	1515
27	29.0	34.5	1475	2100
37	33.0	39.2	1970	2800
48	36.1	43.0	2325	3400

Notes:

- Unarmoured cables are not suitable for direct burial in ground.
- For current ratings, refer to Tables 7 to 10 as applicable

CURRENT RATINGS (AC)

XLPE INSULATED CABLES

(Maximum conductor temperature 90°C)

Installed in free air (Reference Method 11 on cable tray or Method 13 in free air, IEE Wiring Regulations.

Table 7

Nominal area of Conductor mm ²	Two core		Three and Four core	
	Current rating amp	Volt drop per amp per metre mV	Current rating amp	Volt drop per amp per metre mV
1.5	29	31	25	27
2.5	39	19	33	16
4	52	12	44	10
6	66	7.9	56	6.8
10	90	4.9	78	4.0

Ratings based on Ambient air temp 30°C

Laid directly in ground, run in single-way ducts

Table 8

Nominal area of Conductor mm ²	Two core			Three and Four core		
	Current rating		Volt drop per amp per metre mV	Current rating		Volt drop per amp per metre mV
	In ground amp	In duct amp		In ground amp	In duct amp	
1.5	38	31	31	32	26	27
2.5	49	41	19	42	34	16
4	65	53	12	55	45	10
6	81	67	7.9	69	56	6.8
10	109	89	4.9	92	75	4.0

Ratings based on Ground temp 15°C, Soil thermal resistivity 1.2°Cm/W. Depth of laying 0.5m. All circuits thermally independent. 100mm diameter single-way ducts.

Current Ratings for cables having more than four cores are available on request.

PVC INSULATED CABLES

(Maximum conductor temperature 70°C)

Installed in free air (Reference Method 11 on cable tray or Method 13 in free air, IEE Wiring Regulations.

Table 9

Nominal area of Conductor mm ²	Two core		Three and Four core	
	Current rating amp	Volt drop per amp per metre mV	Current rating amp	Volt drop per amp per metre mV
1.5	22	29	19	25
2.5	31	18	26	15
4	41	11	35	9.5
6	53	7.3	45	6.4
10	72	4.4	62	3.8

Ratings based on Ambient air temp 30°C

Laid directly in ground, run in single-way ducts

Table 10

Nominal area of Conductor mm ²	Two core			Three and Four core		
	Current rating		Volt drop per amp per metre mV	Current rating		Volt drop per amp per metre mV
	In ground amp	In duct amp		In ground amp	In duct amp	
1.5	32	26	29	27	22	25
2.5	41	34	18	35	29	15
4	55	45	11	47	38	9.5
6	69	57	7.3	59	48	6.4
10	92	76	4.4	78	64	3.8

Ratings based on Ground temp 15°C, Soil thermal resistivity 1.2°Cm/W. Depth of laying 0.5m. All circuits thermally independent. 100mm diameter single-way ducts.

Current Ratings for cables having more than four cores are available on request.

RATING FACTORS

Rating factors for ambient air temperature

Table 11

Ambient air temperature	25°C	30°C	35°C	40°C	45°C	50°C	55°C
Cable type	Rating factor						
XLPE and LSF cable	1.02	1.00	0.96	0.91	0.87	0.82	0.76
PVC cable	1.03	1.00	0.94	0.87	0.79	0.71	0.61

Correction factors for Groups of Cables, installed in air

Table 12

Arrangement of cables	Number of circuits or multicore cables									
	2	3	4	5	6	7	8	9	10	
In conduit, trunking or bunched and clipped directly	0.8	0.7	0.65	0.6	0.57	0.54	0.52	0.5	0.48	
On metal tray and cables touching	0.86	0.81	0.77	0.75	0.74	0.73	0.73	0.72	0.71	

Rating factors for depth of laying (to centre of cable or to centre of duct)

Table 13

Depth of laying m	Multicore Cables	
	Direct in ground	In single way ducts
0.50	1.00	1.00
0.60	0.99	0.99
0.80	0.97	0.97
1.00	0.95	0.96
1.25	0.94	0.95

Rating factors for variation in thermal resistivity of soil (average values)

Table 14

Type of installation	Soil thermal resistivity in °Cm/W					
	0.8	0.9	1.0	1.5	2.0	2.5
Multicore cables laid directly in ground	1.09	1.06	1.04	0.93	0.84	0.77
Multicore cables installed in single way ducts	1.03	1.02	1.02	0.97	0.91	0.87

Rating factors for ground temperature (cables laid direct or in ducts)

Table 15

Ground temperature	15°C	20°C	25°C	30°C	35°C	40°C	45°C
XLPE insulated	1.0	0.97	0.93	0.89	0.86	0.82	0.76
PVC insulated	1.0	0.95	0.90	0.85	0.80	0.74	0.67

Group rating factors for multicore cables in horizontal formation (average values)

Table 16

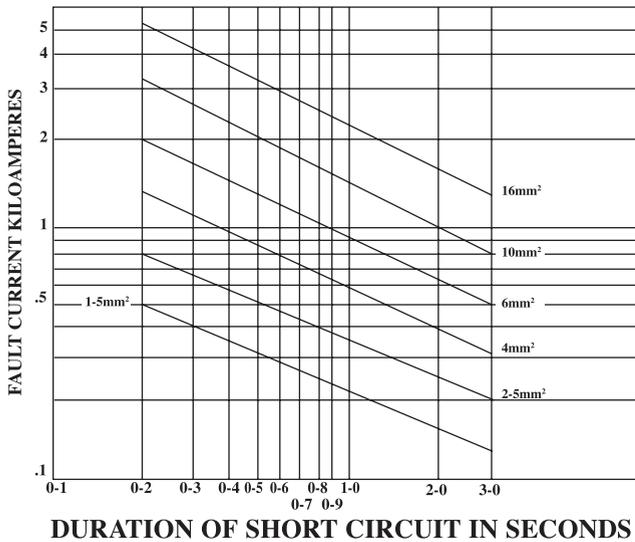
	Number of cables in group	Spacing between cable centres				
		Touching	0.15m	0.3m	0.45m	0.6m
Cables direct in ground	2	0.81	0.87	0.91	0.93	0.94
	3	0.70	0.78	0.84	0.87	0.90
	4	0.63	0.74	0.81	0.86	0.89
	5	0.59	0.70	0.78	0.83	0.87
	6	0.55	0.67	0.76	0.82	0.86
Cables in single way ducts	2	0.90		0.93	0.95	0.96
	3	0.82		0.87	0.90	0.93
	4	0.78		0.85	0.89	0.91
	5	0.76		0.82	0.87	0.90
	6	0.72		0.81	0.86	0.90

SHORT CIRCUIT RATINGS

XLPE Insulated Cables

The values of fault current given in the graph are based on the cable being fully loaded at the start of the short circuit (conductor temperature 90°C) and a final conductor temperature of 250°C. It should be ensured that the accessories associated with the cable are also capable of operation at these values of fault current and temperature.

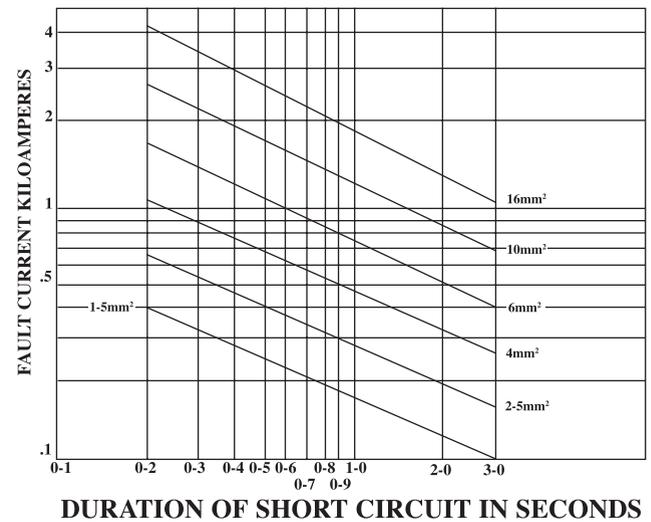
Copper Conductors



PVC Insulated Cables

The values of fault current given in the graph are based on the cable being fully loaded at the start of the short circuit (conductor temperature 70°C) and a final conductor temperature of 160°C.

Copper Conductors



INSTALLATION

Environment

All the cables described in this publication can be used indoors or outdoors, but some reservations are necessary concerning cables without armour for direct burial e.g.:

- (i) Unarmoured cables are not recommended for laying directly in the ground;
- (ii) Cables laid directly in the ground, particularly in sustained wet conditions, should have extruded bedding;
- (iii) For installations where there is water-logging or where it is likely to occur, advice should be obtained from our technical department. It may be desirable to recommend an alternative type of outersheath for the cable (e.g. MDPE).

Cable support spacing

The following tables are for XLPE and PVC insulated cables to BS 5467 and BS 6346. They are, where possible, in line with the IEE Wiring Regulations.

Copper conductor cables

Table 17

Overall cable diameter mm	Support spacing	
	Horizontal mm	Vertical mm
Below 15	350	450
15 to less than 20	400	550
20 to less than 40	450	600
40 to less than 60	700	900

Minimum Bending Radius

Table 18

Type of cable	Minimum Bending Radius	
	During installation	Adjacent to joints and terminations
BS 5467, BS 6346 & IEC 60502-1 Circular copper conductor	6 D	6 D

Note: The minimum bending radius for LSF cables to BS 6724 is 8 times the overall diameter.

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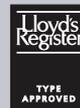
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