

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

دوكاب  
Ducab

كابلات التحكم عن بعد المعزولة بمادة  
عديد كلوريد الفينيل والبولييثاين المترابط  
ذات الضغط المنخفض

**LOW VOLTAGE PVC AND XLPE  
INSULATED CONTROL  
AND AUXILIARY CABLES**



**The World Leaders in Cable Engineering**



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“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

Dubai Cable Company (Private) Limited – Ducab – is a joint venture between the Government of Dubai, the Government of Abu Dhabi through General Industry Corporation, and BICC. Ducab is located on a site of 54 hectares in Jebel Ali, Dubai in the United Arab Emirates. A major factory expansion took place in 1991 with production capacity being more than doubled. In 1999, Ducab again increased production capacity for low voltage cables and commissioned a world class production and testing facilities for **Ducab Powerplus™** Medium Voltage cables. The current factory floor area is 16,000 m<sup>2</sup>.

BICC is one of the world's leading cable makers and provides the day to day management at Ducab as well as providing technology and technical support.

Ducab manufactures electric cables to the highest quality standards.

This catalogue provides working information on Ducab's complete range of Control and Auxiliary cables rated 600/1000 Volts. Separate catalogues are available for Ducab's range of Power Cables, Wiring Cables, Lead Sheathed Cables, **Ducab Smokemaster™** Cables and **Ducab Powerplus™** Medium Voltage Cables.

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

## ORDERING ADVICE

The following details will ensure that your enquiries and orders are dealt with quickly and efficiently:

1. Length of cables required and individual drum lengths.\*
2. Voltage designation.
3. Relevant British or International Standard.
4. Number of cores.
5. Conductor size.
6. Type of insulation.
7. Armoured or unarmoured.
8. Special characteristics of PVC sheath, if any.
9. Any other requirement, e.g. screening/shielding.

\* Cables are normally supplied in lengths of 500 metres, 1000 metres and 2000 metres depending on cable size. Other lengths can be supplied if required.

## TECHNICAL ADVISORY SERVICE

Specialist advice and assistance on all matters concerning PVC and XLPE insulated Control and Auxiliary cables is available from Ducab Sales Offices or direct from Dubai Cable Company (Private) Limited, P. O. Box 11529, Dubai, U. A. E., Tel: (9714) 8082 500, Fax: (9714) 8082 511. E-mail: [marketing@ducab.co.ae](mailto:marketing@ducab.co.ae) Website: [www.ducab.co.ae](http://www.ducab.co.ae)



## CUSTOMER SERVICE

Dubai Cable Company - Ducab - is the leading cable manufacturer in the United Arab Emirates and, since 1979, has been meeting the requirements of customers throughout the Middle and Far East. Ducab's cables are used by some of the most demanding utilities in the world, for the following reasons:

### Product Quality

Ducab is committed to supplying its customers with the highest quality of product and of service. Ducab's Control and Auxiliary cables have been type approved by Lloyd's Register of the UK and have undergone rigorous type testing by the British Standards Institution (via BASEC) of the UK. They fully conform to BS 6346 and BS 5467 specifications for PVC and XLPE insulated cables respectively, for electricity supply, up to and including 600/1000 V ratings.

As part of an international cable manufacturing group - BICC- Ducab is able to demonstrate that its quality products and service compare favourably with the stringent targets set in "The Manufacturing & Business Excellence" programme.

In addition, Ducab was presented with the Dubai Quality Award 1994, for the best local industrial company of the year. Four years later, Ducab was presented with the Dubai Quality Award '98 Gold Category. The Gold Award rewards the most distinguished companies which are judged to be world class.



### 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 the resources of BICC 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 conductor, insulation and protective materials technology. In addition, Ducab's knowledge of application requirements throughout the Middle and Far East is an assurance of high performance.

Where required, Ducab can incorporate special features, for example to give the cable low smoke and fume (LSF) or reduced flame propagation characteristics, or to resist damage from chafing or impacts.

Our experienced Technical staff can provide guidance on cable selection and installation. With additional back-up from BICC they can ensure that you get the right cable for the job.

### Safety

Through BICC, 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. In 2000, Ducab was awarded the prestigious President's Award for Health and Safety which is a recognition of Ducab winning 10 consecutive annual Gold awards and acknowledges Ducab's total commitment to health and safety.



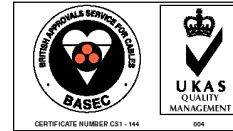
Ducab is the first organisation in the Middle East to receive accreditation to BS 8800 by the BASEC (British Approvals Service for Cables). Certification to BS 8800 provides a recognisable Occupational Health and Safety Management standard against which an organisation's management systems can be assessed and certified. Based on the structure of ISO 14001, 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 9001:1994 International Quality System Standard and is certified by the British Standards Institution who are an internationally recognised quality authority accredited in the UK and throughout the world. Ducab also holds ISO 9001:1994 certificate issued independently by BASEC.

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 the goods leaving Ducab's factory are of the highest quality and meet each customer's requirements in every respect.

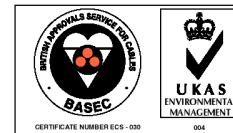


Ducab is particularly proud to have achieved certification to the stringent ISO 9001:1994 standard as it is an independent conformation that it designs, manufactures and tests cables consistently to accepted standards. ISO 9001 is widely used throughout Europe, and is therefore a reassurance to Ducab's 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 14001:1996 International Environmental Management Standard and is certified by the British Standards Institution who are an internationally recognised certifying authority accredited in the UK and throughout Europe.

Certification to the ISO 14001:1996 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 Product Marketing Licence issued by BASEC (British Approvals Service for Cables). The following products in this catalogue are approved by BASEC:

- 7 core to 19 core armoured electric cables having thermosetting insulation with stranded copper conductor 2.5 sq mm. (As per Table 18 of BS 5467:1997)



## **Customer Satisfaction**

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

## **BICC**

BICC has a 30% shareholding in Ducab and in addition maintains management control and provides technical assistance. It is one of the world's largest cable manufacturers and has over one hundred years of experience in the field. It has earned an enviable reputation for excellence and innovation and maintains the highest standards of professionalism in its activities. Ducab, as part of the BICC group, has access to the significant resources and operates to the same high standards in order to ensure that all customers receive the product and service that they expect.

We trust this publication will assist you in the selection and application of Ducab's Control and Auxiliary Cables... for people who really care about safety and reliability.

## 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 mm<sup>2</sup> up to 10 mm<sup>2</sup>, in 2, 3 and 4 cores.



**Auxiliary Cables** with copper conductors, XLPE or PVC insulated, covering sizes from 1.5 mm<sup>2</sup>, 2.5 mm<sup>2</sup> from 5 cores to 48 cores and 4 mm<sup>2</sup> up to 37 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 configurations 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 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 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 0.05 mm or 0.1 mm thick 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 228 specification.

These cables can also be offered with single strand, solid copper conductors in sizes up to 2.5 mm<sup>2</sup>.

### 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:

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

### **Fillers**

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

A PVC inner covering is included in PVC insulated unarmoured Control and Auxiliary cables, below the outersheath.

### **Bedding**

The bedding normally consists of a layer of extruded PVC. 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 or 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 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 332 Part 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 332 Part 3 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  
PVC Insulated to BS 6346  
Stranded Copper Conductors**

**TABLE 1 CONTROL CABLES - Dimensions and Weights**

| Conductor area mm <sup>2</sup> | 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  |
| <b>Two Core</b>                |                      |                                  |      |                     |      |                             |      |   |      |
| 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  |
| <b>Three Core</b>              |                      |                                  |      |                     |      |                             |      |   |      |
| 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  |
| <b>Four Core</b>               |                      |                                  |      |                     |      |                             |      |   |      |
| 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  |  |
| <b>Conductor 1.5 mm<sup>2</sup> (7/0.53 mm)</b> |                                  |      |                     |      |                             |      |   |      |  |
| 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 |  |
| <b>Conductor 2.5 mm<sup>2</sup> (7/0.67 mm)</b> |                                  |      |                     |      |                             |      |   |      |  |
| 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 |  |
| <b>Conductor 4 mm<sup>2</sup> (7/0.85 mm)</b>   |                                  |      |                     |      |                             |      |   |      |  |
| 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 <sup>2</sup> | 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 <sup>2</sup> | 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\*  
Stranded Copper Conductors**

**TABLE 5 CONTROL CABLES - Dimensions and Weights**

| Conductor area<br>mm <sup>2</sup> | Strand<br>No./mm | Approx. overall diameter<br>mm |      | Approx. weight<br>kg / km |     |
|-----------------------------------|------------------|--------------------------------|------|---------------------------|-----|
|                                   |                  | XLPE                           | PVC  | XLPE                      | PVC |
| <b>Two Core</b>                   |                  |                                |      |                           |     |
| 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 |
| <b>Three Core</b>                 |                  |                                |      |                           |     |
| 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 |
| <b>Four Core</b>                  |                  |                                |      |                           |     |
| 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<br>mm |      | Approx. weight<br>kg / km |      |
|--|--------------------------------|------|---------------------------|------|
|  | XLPE                           | PVC  | XLPE                      | PVC  |
| <b>Conductor 1.5 mm<sup>2</sup><br/>(7/0.53mm)</b> |                                |      |                           |      |
| 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 |
| <b>Conductor 2.5 mm<sup>2</sup><br/>(7/0.67mm)</b> |                                |      |                           |      |
| 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 |
| <b>Conductor 4 mm<sup>2</sup><br/>(7/0.85 mm)</b>  |                                |      |                           |      |
| 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 |

**Notes:**

- Only PVC insulated cables include a PVC inner covering.
- Unarmoured cables are not suitable for direct burial in ground.
- For current ratings, refer to Tables 7 to 10 as applicable

\* The IEC 502 standard has now been replaced by IEC 60502.

## 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, 16th Edition)

**Table 7**

| Nominal area of Conductor<br>mm <sup>2</sup> | Two core              |                                   | Three and Four core   |                                   |
|--|-----------------------|-----------------------------------|-----------------------|-----------------------------------|
|  | Current rating<br>amp | Volt drop per amp per metre<br>mV | Current rating<br>amp | Volt drop per amp per metre<br>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                    | 4.7                               | 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<br>mm <sup>2</sup> | Two core         |                |                                   | Three and Four core |                |                                   |
|--|------------------|----------------|-----------------------------------|---------------------|----------------|-----------------------------------|
|  | Current rating   |                | Volt drop per amp per metre<br>mV | Current rating      |                | Volt drop per amp per metre<br>mV |
|  | In ground<br>amp | In duct<br>amp |                                   | In ground<br>amp    | In duct<br>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             | 4.7                               | 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, 16th Edition)

**Table 9**

| Nominal area of Conductor<br>mm <sup>2</sup> | Two core              |                                   | Three and Four core   |                                   |
|--|-----------------------|-----------------------------------|-----------------------|-----------------------------------|
|  | Current rating<br>amp | Volt drop per amp per metre<br>mV | Current rating<br>amp | Volt drop per amp per metre<br>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<br>mm <sup>2</sup> | Two core         |                |                                   | Three and Four core |                |                                   |
|--|------------------|----------------|-----------------------------------|---------------------|----------------|-----------------------------------|
|  | Current rating   |                | Volt drop per amp per metre<br>mV | Current rating      |                | Volt drop per amp per metre<br>mV |
|  | In ground<br>amp | In duct<br>amp |                                   | In ground<br>amp    | In duct<br>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<br>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**

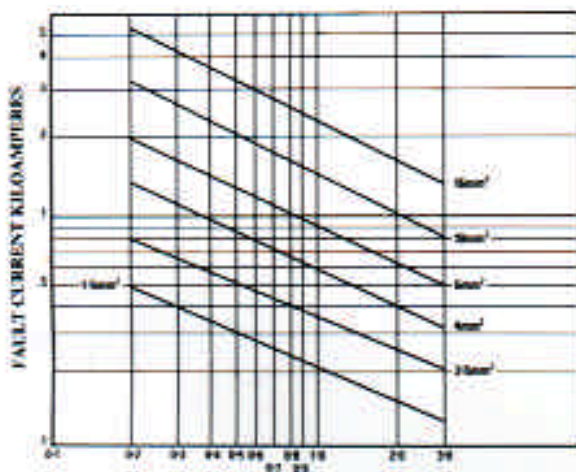
|                            | Number of cables in group | Spacing between cable centres |       |      |       |      |
|----------------------------|---------------------------|-------------------------------|-------|------|-------|------|
|                            |                           | 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

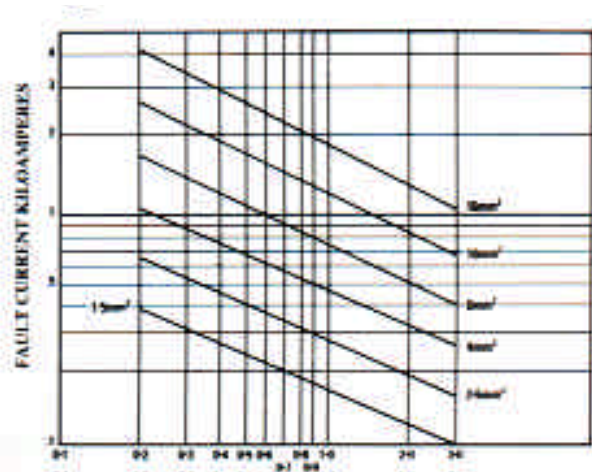


DURATION OF SHORT CIRCUIT IN SECONDS

### 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



DURATION OF SHORT CIRCUIT IN SECONDS

## 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 15th Edition of the IEE Wiring Regulations

#### Copper conductor cables

Table 17

| Overall cable diameter<br>mm | Support spacing  |                |
|------------------------------|------------------|----------------|
|                              | Horizontal<br>mm | Vertical<br>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<br>Circular copper<br>conductor | 6 D                    | 6 D                                 |

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

حلول متقدمة للكابلات من خلال التقنية والإبداع  
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