

# دوكاب Ducab

## أسلاك التمديدات الكهربائية المعزولة بمادة عديد كلوريد الفينيل PVC Insulated Wiring Cables



حلول متقدمة للكابلات من خلال التقنية والابتداع  
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, Control & Auxiliary, 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 **ÚXÓÁ• |æãÁ ãã** \* 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



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

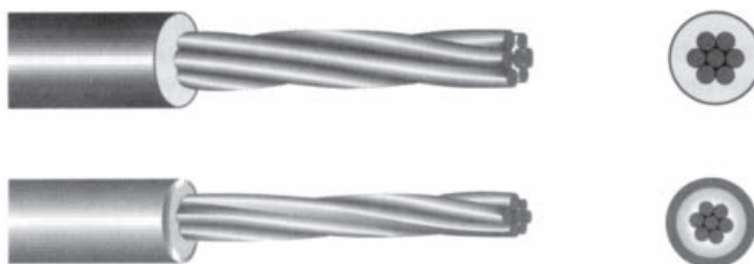
Ducab's customer satisfaction programme is designed to ensure that customers receive a consistently high level of service from Ducab's dedicated staff.



## PRODUCT RANGE

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

6491X - Single core, PVC insulated non-sheathed cables, available in size range  $1.5\text{mm}^2$  to  $630\text{mm}^2$  and rated 450/750V. These cables can be considered to have a voltage rating up to 1000V a.c. when installed in fixed protected installations eg. lighting fittings and inside appliances, switchgear and control gear.



The above wiring cables conform to BS 6004 specification for "PVC insulated cables (non-armoured) for electric power and lighting". The cables also generally satisfy the International Specification IEC 60227 (6491 X only) and German standard VDE 0281 for "PVC insulated cables and cords with rated voltage not exceeding 750V"

## CONSTRUCTION

### CONDUCTORS

Wiring cable conductors are stranded, high conductivity plain annealed copper wires meeting the requirements of class 2 in BS 60228 and IEC 60228 specifications for "Conductors in insulated cables and cords". Wiring cables with solid copper conductors are offered up to  $2.5\text{mm}^2$ .

### INSULATION

The insulation of standard wiring cables is PVC grade Type TI 1 of BS 7655 (formerly BS 6746) suitable for a maximum continuous conductor operating temperature of  $70^{\circ}\text{C}$ .

Where specifically required, wiring cables can be offered with heat resistant PVC insulation, Type TI 3 ( $90^{\circ}\text{C}$ ).

### CORE IDENTIFICATION

Unless specifically agreed otherwise, insulation colours are in accordance with BS 6004 specifications as follows:  
Single Core: Red, Black, Blue, Green/Yellow, Brown, Grey.

Note: Insulation colors other than the above may be manufactured on customer request.

### FINISH

Wiring cables have a smooth finish and are continuously marked with DUCAB by printing or embossing on the external surface.

## RANGE, DIMENSIONS AND WEIGHTS

### SINGLE CORE PVC INSULATED CABLES

**Table 1**

Nominal Conductor area	PVC insulated, non-sheathed 6491X, 450/750V	
	** Maximum diameter	Approximate Weight
mm <sup>2</sup>	mm	kg/km
1.5*	3.2	21
1.5	3.3	23
2.5*	3.9	33
2.5	4.0	35
4	4.6	50
6	5.2	70
10	6.7	120
16	7.8	180
25	9.7	280
35	10.9	370
50	12.8	500
70	14.6	700
95	17.1	970
120	18.8	1190
150	20.9	1470
185	23.3	1840
240	26.6	2400
300	29.6	3010
400	33.2	3820
500	36.9	4900
630	41.1	6100

\*Note: Conductors are solid, all others are stranded. Refer to Table 5 for details.

\*\* These dimensions are Ducab's maximum and also apply to wiring insulated with Heat Resistant PVC, Type TI 3 (erstwhile Type 5). The weight (kg/km) of Heat Resistant PVC wiring cables will be slightly less than the standard 6491X cables shown above.

## PERFORMANCE CHARACTERISTICS

### VOLTAGE RATINGS

The non-sheathed general purpose type 6491X cables are rated 450/750V (450V to earth, 750V between conductors). These cables are considered suitable for fixed protected installations in lighting fittings and inside appliances, switchgear and control gear for voltages up to 1000V a.c. or up to 750V to earth d.c..

### CURRENT CARRYING CAPACITIES AT AMBIENT TEMPERATURE 30°C

The tabulated current carrying capacities relate to continuous loading and are also known as the "full thermal ratings" implying that the cables will operate at their maximum conductor continuous temperature of 70°C. The data is extracted from IEE Wiring Regulations (BS 7671).

The tabulated current rating capacities also relate to installations where the overload protection is afforded by a fuse to BS 88 or BS 1361 or a miniature circuit breaker. Where the conductor is protected by a semi-enclosed fuse to BS 3036, the size of the conductor is to be such that its tabulated current carrying capacity is not less than the value of the fuse rating adjusted by multiplier 1.38 in addition to the correction factors for ambient temperature, thermal insulation and grouping. For details refer to IEE Wiring Regulations.

## VOLTAGE DROP DATA

For a given cable run, to calculate the voltage drop (in mV), the tabulated value (mV/A/m) has to be multiplied by the cable route length in metres and the design current. For three-phase circuits the tabulated mV/A/m values relate to the line voltage.

For cables of 16mm<sup>2</sup> or less cross sectional area, the inductance can be ignored and mV/A/m values are based on resistance (r) only. For cables of cross sectional area greater than 16mm<sup>2</sup>, mV/A/m values based on resistance (r) and inductance (x) are significant. However for brevity, Table 2, for single core cables of sizes 25mm<sup>2</sup> & 35mm<sup>2</sup>, list (mV/A/m) z values based on total impedance (z) only.

Where the power factor of the A.C. load is widely different from the cable power factor, use of (mV/A/m) z values for calculating the volt drop may give a pessimistically high value. For detailed information, reference should be made to Appendix 4 of the IEE Wiring Regulations.

### SINGLE CORE PVC INSULATED NON-SHEATHED CABLES - CABLES IN CONDUIT ON A WALL OR CEILING OR IN TRUNKING (REFERENCE METHOD 3)

**Table 2**

Conductor Cross Sectional Area  mm <sup>2</sup>	Current carrying capacities (amperes)		Voltage Drop (mV/A/m)		Conductor Cross Sectional Area  mm <sup>2</sup>	Current carrying capacities (amperes)		Voltage Drop (mV/A/m)					
	2 cables single phase ac or dc	3 or 4 cables three phase ac	2 cables single phase ac	3 or 4 cables three phase ac		2 cables single phase ac or dc	3 or 4 cables three phase ac	2 cables single phase ac			3 or 4 cables three phase ac		
								r	x	z	r	x	z
1	13.5	12	44	38	50	151	134	0.95	0.30	1.00	0.81	0.26	0.85
1.5	17.5	15.5	29	25	70	192	171	0.65	0.29	0.72	0.56	0.25	0.61
2.5	24	21	18	15	95	232	207	0.49	0.28	0.56	0.42	0.24	0.48
4	32	28	11	9.5	120	269	239	0.39	0.27	0.47	0.33	0.23	0.41
6	41	36	7.3	6.4	150	300	262	0.31	0.27	0.41	0.27	0.23	0.36
-	-	-	-	-	185	341	296	0.25	0.27	0.37	0.22	0.23	0.32
10	57	50	4.4	3.8	240	400	346	0.195	0.26	0.33	0.17	0.23	0.29
16	76	68	2.8	2.4	300	458	394	0.160	0.26	0.31	0.14	0.23	0.27
*25	101	89	1.8	1.55	400	546	467	0.130	0.26	0.29	0.12	0.22	0.25
*35	125	110	1.3	1.10	500	626	533	0.110	0.26	0.28	0.10	0.22	0.25
					630	720	611	0.094	0.25	0.27	0.08	0.22	0.24

\* Voltage drop for sizes 25mm<sup>2</sup> and 35mm<sup>2</sup> are based on total impedance 'z' only.  
For 'r' and 'x' data, IEE Wiring Regulations should be referred to.

**Note:** Data in the above table is based on IEE Wiring Regulations. The current carrying capacities of Heat Resistant PVC insulated cables are higher, please refer to Technical Department if data is required.

## THERMAL INSULATION

Current ratings pertaining to cables or cable conduits totally surrounded by thermally insulating material are not included in the above tables. For such situations, in the absence of precise information, a rating factor of 0.5 may be applied to the appropriate current ratings.

For multicore cables, current ratings of cables installed in thermally insulated ceilings but in contact with a thermally conductive surface on one side are stated. For similar information applicable to single core cables, reference should be made to the IEE Wiring Regulations.

## RATING FACTORS FOR AMBIENT TEMPERATURE OTHER THAN 30°C, THE TABULATED CURRENT RATINGS SHOULD BE ADJUSTED BY FACTORS AS FOLLOWS:

Table 3

Ambient temperature °C		25	30	35	40	45	50	55	60	65	70	75	80	85
Overload protection afforded by device other than semi-enclosed fuse to BS 3036	Heat resisting PVC (90°C)*	1.03	1.0	0.97	0.94	0.91	0.87	0.84	0.80	0.76	0.71	0.61	0.5	0.35
	Ordinary PVC (70°C)	1.03	1.0	0.94	0.87	0.79	0.71	0.61	0.50	0.35	-	-	-	-
Semi-enclosed fuse to BS 3036 (formerly coarse excess current protection)	Heat resisting PVC (90°C)*	1.03	1.0	0.97	0.94	0.91	0.87	0.84	0.80	0.76	0.72	0.68	0.63	0.49
	Ordinary PVC (70°C)	1.03	1.0	0.97	0.94	0.91	0.87	0.84	0.69	0.48	-	-	-	-

\* These factors are applicable only to ratings in Table 2.

## CORRECTION FACTORS FOR GROUPS OF CABLES (REF. IEE WIRING REGULATION)

Table 4

Method of Installation		Correction factor													
		Number of circuits or multicore cables													
		2	3	4	5	6	7	8	9	10	12	14	16	18	20
Enclosed in conductor trunking (Method 3 or 4) or bunched and clipped directly to non-metallic surface (Method 1)		0.80	0.70	0.65	0.60	0.57	0.54	0.52	0.50	0.48	0.45	0.43	0.41	0.39	0.38
Single layer clipped to a non-metallic surface (Method 1)	Touching	0.85	0.79	0.75	0.73	0.72	0.72	0.71	0.70	-	-	-	-	-	-
	Spaced*	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Single layer multicore on a perforated metal cable tray, vertical or horizontal (Method 11)	Touching	0.86	0.81	0.77	0.75	0.74	0.73	0.73	0.72	0.71	0.70	-	-	-	-
	Spaced*	0.91	0.89	0.88	0.87	0.87	-	-	-	-	-	-	-	-	-
Single layer single core on a perforated metal cable tray, touching (Method 11)	Horizontal	0.90	0.85	-	-	-	-	-	-	-	-	-	-	-	-
	Vertical	0.85	-	-	-	-	-	-	-	-	-	-	-	-	-
Single layer multicore touching on ladder supports (Method 13)		0.86	0.82	0.80	0.79	0.78	0.78	0.78	0.77	-	-	-	-	-	-

\* 'Spaced' means a clearance between adjacent surfaces of at least one cable diameter (D). Where the horizontal clearances between adjacent cables exceeds 2D no correction factor need be applied.

### Notes to Table 4:

- The factors in the table are applicable to groups of cables all of one size. The value of current derived from application of the appropriate factors is the maximum continuous current to be carried by any of the cables in the group.
- If, due to known operating conditions, a cable is expected to carry not more than 30% of its grouped rating, it may be ignored for the purpose of obtaining the rating factor for the rest of the group.

## CONDUCTOR RESISTANCE

**Table 5**

Nominal conductor area mm <sup>2</sup>	Maximum diameter of conductor mm	Maximum conductor resistance per km at 20°C ohm	Nominal conductor area mm <sup>2</sup>	Maximum diameter of conductor mm	Maximum conductor resistance per km at 20°C ohm
1.5*	1.38	12.1	50	8.30	0.387
1.5	1.59	12.1	70	10.00	0.268
2.5*	1.78	7.41	95	11.70	0.193
2.5	2.01	7.41	120	13.15	0.153
-	-	-	150	14.55	0.124
4	2.55	4.61	185	16.30	0.0991
6	3.12	3.08	240	18.75	0.0754
10	4.05	1.83	300	21.00	0.0601
16	4.85	1.15	400	23.90	0.0470
25	6.15	0.727	500	28.40	0.0366
35	7.25	0.524	630	31.70	0.0283

## CONDUCTOR SHORT CIRCUIT RATINGS

Short circuit rating of copper conductor shall be calculated using following formula:

Short circuit current  $I = kA/\sqrt{t}$

Where,

$k = 0.115$

$A$  = Cross sectional Area of conductor

$t$  = Duration in seconds

e.g. Short circuit rating of 300mm<sup>2</sup> Cu conductor for 1 second.

$$I = 0.115 \times 300 / \sqrt{1} \\ = 34.5 \text{ kA/sec.}$$

The values of short circuit ratings derived from above formula based on the PVC insulated cable being fully loaded at the start of the short circuit conductor temperature of 70°C and final conductor temperature of 160°C.

## WIRING CABLE INSTALLATION

Wiring cables should be installed in accordance with IEE Wiring Regulations, or local installation regulations.

Minimum internal radius at bends:

CABLE DIAMETER	Minimum internal radius
Up to 10mm	3 x cable diameter
Exceeding 10mm but less than 25mm	4 x cable diameter
Exceeding 25mm	6 x cable diameter

# دوكاب Ducab

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UAE Quality Mark

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