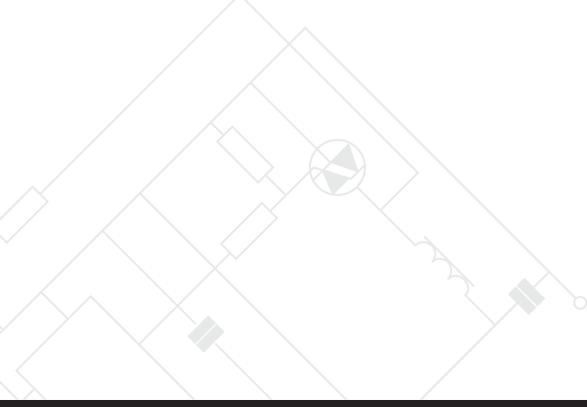
### Ducab جالح

#### حوط باوربلاس كابلات الطاقة ذات الجمد المتوسط Ducab Powerplus MEDIUM VOLTAGE CABLES



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#### INTRODUCTION

Ducab is the leading manufacturer of electric cables in the Middle East. Established in 1979, the company is owned by the Governments of Dubai and Abu Dhabi. Ducab is based in Jebel Ali, however to keep pace with the steady growth of the region, Ducab opened a second factory in Abu Dhabi in 2005. This state of the art facility doubles the production capacity enabling Ducab to better service its customers.

This catalogue provides working information on Ducab's complete range of **Ducab Powerplus** Cables rated up to 33 kV. Separate catalogues are available for Ducab's range of Control and Auxiliary Cables, Wiring Cables, **Ducab Smokemaster** LSF Cables and XLPE Low Voltage Cables.

This brochure contains technical information covering the **Ducab Powerplus** range of XLPE insulated medium voltage cables rated up to U0/U = 18/30kV i.e., equivalent to 33kV rating of the British Standards. The applicable standards are IEC 60502-2 and BS 6622.

The **Ducab Powerplus** cable range includes copper and aluminium conductors in a range of voltages with a choice of single or three core armoured and unarmoured, a range of sheathing, screening, taping and armouring options. To locate particular voltages and cable designs and eliminate errors a look-up guide has been included (see pages 6 & 7). This acts as a guide to the cable data for the **Ducab Powerplus** range of cables set out in pages 8 - 57.

Technical Data is covered in pages 58 - 65. Cable handling instructions appear in pages 66 - 67.

The cable designs in this brochure are to IEC 60502-2 and in most parts to BS 6622. Ducab can also supply a range of alternative designs to meet more specialised customer needs including water blocking, **Ducab Smokemaster** to BS 7835 and enhanced fire performance. Alternative sheathing materials and colours can also be manufactured along with cables to individual customer specifications.

"Ducab Connect" range of cable components and accessories for medium voltage cables are also available on request. For "Ducab Connect" product range for MV cable please contact, Telephone: (971-4) 808 2500, Fax: (971-4) 808 2599.



#### **Quality**

#### Where Quality is a Way of Life

The definition of quality in Ducab goes far beyond the conformance of product to specified requirements. Ducab is committed to providing the customer with total quality excellence of product and service that fully meets expectations and is superior in value to that which can be obtained elsewhere.

Since its inception, Ducab has an unrivaled reputation for quality in the region. For many years the company has worked to raise quality awareness in Dubai and throughout the Gulf. The company's Quality Management System was certified to ISO 9001 in 1995 and upgraded in 2002 to the new, more stringent ISO 9001: 2000 standard by BASEC (British Approval Service for Cables), a reputed UKAS accredited certification body specialising in the cable industry. Ducab was the first cable company in the Middle East to achieve this distinction.

In 1997, Ducab became the first manufacturing company in the Middle East to obtain the ISO 14001 environmental certification.

Ducab is also the only cable manufacturer in the Middle East to obtain product type approval of a range ofl ow voltage cables to British Standards by BASEC (The British Approvals Service for Cables). This approval is only awarded to manufacturers who meet the requirements of BS EN ISO 9000 Quality Management Standard and certified by BASEC.

Ducab cables have been type tested in reputed external laboratories like KEMA, The Netherlands; BRE, UK; CPRI, India, etc. Ducab is proud to hold Lloyd's approval for various product range.

#### **Quality Assurance**

Ducab's quality management system is certified for conformance to ISO 9001 Standard by BASEC.

Ducab's medium voltage cables have been accepted as world class following the type testing and certification of several products by the KEMA High Voltage Laboratory in the Netherlands. Type testing included the requirements of the IEC 60502-2 standard and some of the stringent provisions of BS 6622: 1999 standard. 11kV and 33kV cables tested by KEMA consistently exhibited discharge-free characteristics. These cables also withstood Basic Impulse Levels of 95kV and 195kV respectively as against 75kV and 175kV specified in IEC 60502-2.

Ducab's high voltage test facility includes modern, highly sensitive partial discharge test equipment, situated in a fully screened room. For materials and in-process cable tests, well-equipped laboratories, manned by experienced and trained personnel are available. A separate cable fire test facility exists for IEC 60332 Pt. 3, smoke density and other tests.









#### **Cable Selection**

It is essential that any design of a cable system selected for a particular project or a distribution system is suitable for its intended use. Choice needs to be based on a range of factors including installation specifications, local regulations and the required performance characteristics, some of which are shown below:

- · normal current load
- · maximum fault current and its duration under fault conditions
- · voltage grade
- subsoil conditions for underground installations e.g., presence of water, soil temperature and thermal resistivity, possible attack of rodents, termites etc.
- · cable fire performance requirements
- · compatibility with an existing distribution system

In the tables in the next section, cable constructions and performance features correspond to IEC 60502-2 Standard and Ducab's in-house quality norms.

#### **Cable Design and Construction**

#### **CONDUCTORS**

The conductors of all Ducab's HV and MV cables, both copper and aluminium, with the exception of very large sizes of 800sq mm and above, are all HCC <sup>+</sup> ™ design.

These are highly compacted and concentric conductors and offer the following advantages:

- \* Smaller overall size
- \* Smoother conductor/conducting screen interface

Conductors of 800 sq mm and above, are plain stranded and wrapped with penetration resistant semi-conductive tape prior to passage through the triple extrusion line.

All conductors comply with the requirements of IEC 60228, Class 2.

#### **CONDUCTOR SCREEN**

This is a layer of crosslinkable semi-conducting compound extruded directly over the conductor during the XLPE insulation extrusion.

#### INSULATION

All Ducab's MV and HV cables feature DFI ™ XLPE insulation which is virtually discharge free, ensuring a long and trouble-free service life.

The insulation is extruded and dry cured to meet the requirements of the standards and/or customer specification. A high degree of concentricity is assured through the use of x-ray monitoring device during extrusion. The XLPE insulation is capable of operation continuously at 90°C.

#### INSULATION SCREEN

This is a layer of cross-linkable semi-conducting compound extruded directly over the insulation at the same time when the conductor screen and XLPE insulation are extruded. This semi-conducting screen is cold strippable but fully bonded screens may be provided, if specified.

#### **Cable Selection**

#### METALLIC SCREEN

The metallic screen can be a helically applied copper tape or a number of copper wires applied with a lay or a combination of tape and wires applied over the semi-conducting screen. The metallic screen provides the earth fault current path and it is of a cross section designed as per customer's performance specification.

In case of three core cables, phase identification tapes (red/yellow/blue) are generally longitudinally applied under the metallic screen.

#### LAYING UP

In the case of three core cables, the three cores identified as red, yellow and blue are laid up together with polypropylene string fillers at the interstices between the three cores. A binder e.g., polyester tape is wrapped round the assembly to form a compact circular cable during this process.

#### **BEDDING SHEATH**

Black polyvinyl chloride (PVC) or Polyethylene (PE) Compound is extruded over the laid up 3 core cable or on the screened single core cables.

#### **ARMOURING**

This process is not applicable if an unarmoured cable is specified. If armour is required, then following variations are possible:

#### Single Core Cables:

Aluminium armour wires applied all round the cable with a lay.

#### • Three Core Cables:

- a) Galvanised Steel Wires applied all round the cable with a lay.
- b) Galvanised Steel Tapes applied helically to provide coverage all round the cable.

#### **OVERSHEATH**

This is an extruded layer of black PVC (Type ST2) or PE (Type ST 3 or ST7) as required by customer specification. The oversheath has an embossed legend in two or more lines appropriate for the cable.

#### SPECIAL FEATURES

The cable as a whole or its specific cores or other design elements can vary in a number of ways to meet specific customer needs. The following are some examples, and by no means an exhaustive list of special features possible:

- Longitudinal and radial water blocking of conductors, cores or complete cable.
- · Extra water-tree retardant XLPE insulation
- · Lead sheath construction
- PVC oversheath with:
  - a) reduced flame propagation (RP) and low HCL (LHCL) emission properties
  - b) anti-termite properties
- Ducab Smokemaster™ Low Smoke and Fume construction using zero-halogen bedding and oversheath
  - Oversheath of red colour with sulphide-resistant and/or UV resistant properties
  - · Graphite coated oversheath
  - Embossed legend as per customer specification
  - Metre length marking



#### **Cable Data**

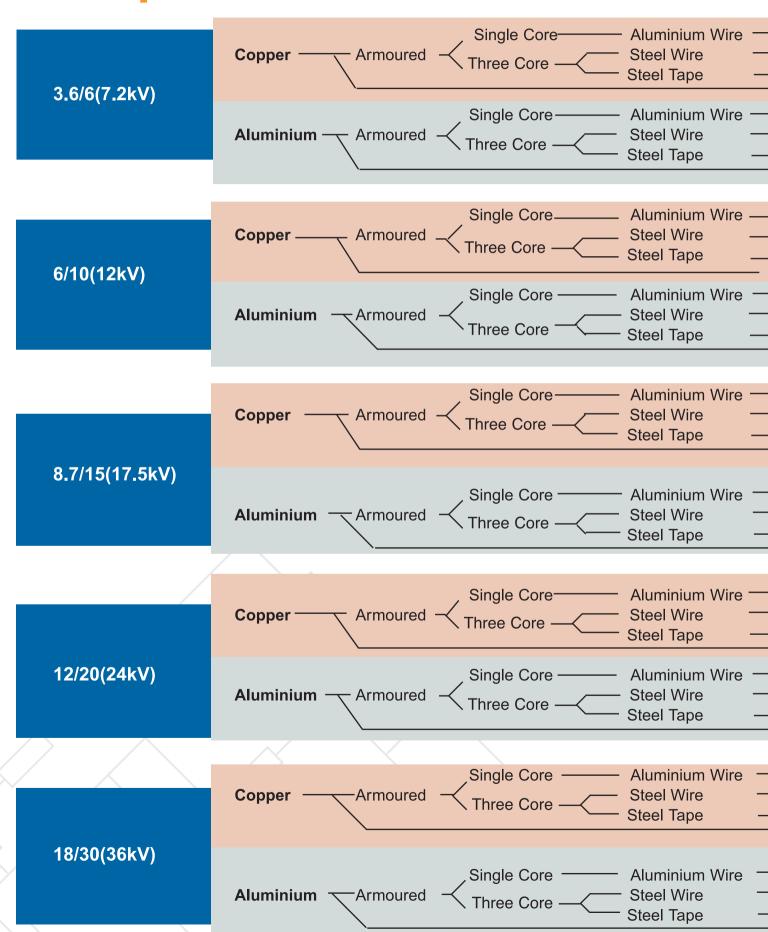
The following data sheets cover a range of cables based on the IEC Specification 60502-2. Cables to other specifications and with special features such as lead sheaths, water swelling fillers, water blocking tapes and graphite coatings can also be supplied.

For all cables the maximum conductor operating temperature is 90°C and the limiting conductor temperature after short circuit is 250°C.

To locate a cable of a specific voltage rating and design, please refer to the look-up table on pages 6 & 7.



#### **Look-up Table**



#### حوكاب باوربسلاس

— Page 11 — Page 12 — Page 13	— Unarmoured	Single Core —— Page 8 Three Core —— Page 9
— Page 35 — Page 36 — Page 37	– Unarmoured	Single Core — Page 33 Three Core — Page 34
— Page 15 — Page 16 — Page 17	—Unarmoured	Single Core Page 13 Three Core Page 14
— Page 40 — Page 41 — Page 42	— Unarmoured	Single Core —— Page 38  Three Core —— Page 39
<ul><li>Page 20</li><li>Page 21</li><li>Page 22</li></ul>	– Unarmoured	Single Core —— Page 18 Three Core —— Page 19
Page 45 Page 46 Page 47	—Unarmoured	Single Core —— Page 43 Three Core —— Page 44
— Page 25 — Page 26 — Page 27	— Unarmoured	Single Core—— Page 23 —— Three Core—— Page 24
— Page 50 — Page 51 — Page 52	— Unarmoured	Single Core —— Page 48 Three Core —— Page 49
— Page 30 — Page 31 — Page 32	— Unarmoured	Single Core —— Page 28 Three Core —— Page 29
<ul><li>Page 55</li><li>Page 56</li><li>Page 57</li></ul>	— Unarmoured	Single Core ——Page 53 Three Core ——Page 54

## **Cable Data**

**Ducab Powerplus** 

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# حوطاب باوربسلاس

### Table 1

Nominal Area of Conductor	mm <sub>2</sub>	20	70	95	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	420	909	839	1056	1297	1629	2141	2686	3421	4335	5855	7346	9160
Insulation Thickness (Nominal)	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8	က	3.2	3.2	3.2	3.2
Outersheath Thickness (Nominal)	mm	1.6	1.6	1.7	1.7	1.8	1.8	1.9	2	2.1	2.2	2.3	2.5	2.6
Approximate Overall Diameter	mm	20.0	21.5	23.5	25.0	26.5	28.0	31.0	33.5	37.5	41.0	44.5	48.5	52.5
Approximate Cable Weight	Kg/Km	800	1050	1370	1600	1910	2280	2930	3630	4530	2680	7080	8610	10500
Standard Drum Length	E	200	200	200	200	200	200	200	200	200	200	400	300	250
Minimum Bending Radius of Cable (during installation)	mm	396	428	464	494	526	260	614	899	744	814	882	964	1042
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047	0.0366	0.0283	0.0221	0.0176
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.494	0.342	0.247	0.196	0.159	0.127	860.0	0.079	0.063	0.05	0.0405	0.039	0.029
Approximate Reactance at 50 Hertz	ohm/Km	0.12	0.12	0.11	0.11	0.10	0.10	0.10	60.0	60.0	60'0	60.0	0.08	0.08
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.36	0.27	0.22	0.19	0.16	0.14	0.12	0.11	0.10	960.0	0.092	0.086
Approximate Capacitance of Cable	pf/Km	0.34	0.38	0.43	0.47	0.51	0.56	0.61	0.63	0.65	69'0	0.73	0.79	0.85
Approx. Charging Current per phase at Uo = 3.6kV and f = 50Hz	m/ym	0.38	0.43	0.49	0.53	0.58	0.63	69.0	0.71	0.74	0.78	0.83	0.84	96.0
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	<	196	240	285	320	365	409	472	534	605	899	739	819	890
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	∢	200	240	285	320	356	392	449	498	543	605	899	739	810
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	<	217	262	331	382	432	497	589	681	773	865	1021	1168	1288
One Second Short Circuit Current Rating of Conductor	\$	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20	71.50	90.10	115	143

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

**Copper Conductors** 3.6/6 (7.2)kV Single Core

XLPE Insulated to IEC 60502-2

Unarmoured



1.HCC⁺™ Copper Conductor

2.Semiconductive conductor screen 3.DFI™ XLPE Insulation 4. Semiconductive insulation screen

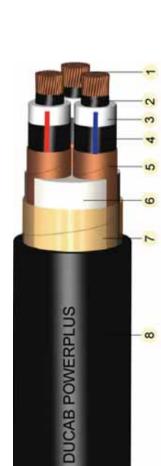
5.Copper wire screen

6. Tape binder

#### Table 2

Nominal Area of Conductor	mm²	50	20	95	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	1281	1845	2558	3219	3954	4966	6526	8187	10428
Insulation Thickness (Nominal)	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8	က
Outersheath Thickness (Nominal)	mm	2.2	2.3	2.5	2.6	2.7	2.8	က	3.1	3.4
Approximate Overall Diameter	mm	40.5	44.0	48.0	51.0	54.5	58.0	64.0	70.0	78.0
Approximate Cable Weight	Kg/Km	2620	3350	4250	2090	6040	7220	9130	11360	14160
Standard Drum Length	E	200	200	200	200	200	200	400	300	250
Minimum Bending Radius of Cable (during installation)	шш	909	929	716	764	815	870	957	1047	1169
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047
Maximum AC resistance of Conductor at 90°C	ohm/Km	0.493	0.343	0.247	0.196	0.159	0.128	660'0	080'0	0.064
Approximate Reactance at 50 Hertz	ohm/Km	0.11	0.10	0.10	60.0	60.0	60.0	0.09	0.08	0.08
Approximate Impedance at 50 Hertz	ohm/Km	0.5	0.36	0.26	0.22	0.18	0.15	0.13	0.12	0.1
Maximum Equivalent Star Capacitance of Cable	µf/Km	0.34	0.38	0.43	0.47	0.51	0.56	0.61	0.63	0.65
Approx. Charging Current per phase at Uo = 3.6kV and f = 50Hz	mA/m	0.38	0.43	0.49	0.53	0.58	0.63	69.0	0.71	0.74
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	<	198	241	283	321	358	406	462	510	999
2. Drawn into Ducts, Ground Temp. 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	170	202	241	273	312	349	401	443	200
3. Laid Singly in Air, Ambient Temp. 35° C	4	210	258	316	329	412	469	545	622	708
One Second Short Circuit Current Rating of Conductor	kA	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.



**Copper Conductors** XLPE Insulated to

Three Core

IEC 60502-2 Unarmoured

3 6/6 (7 2)kV

1.HCC⁺™ Copper Conductor

2. Semiconductive conductor screen

4. Semiconductive insulation screen 3.DFI™ XLPE Insulation

5.Copper tape screen

7 Tape binder 6. Fillers

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# حهجاب باوربسلاس

### Table 3

Nominal Area of Conductor	mm <sup>2</sup>	20	70	92	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	420	605	839	1056	1297	1629	2141	2686	3421	4335	5885	7346	9160
Insulation Thickness (Nominal)	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8	3	3.2	3.2	3.2	3.2
Separation Sheath Thickness	mm	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.4	4.1	1.5
Armour Wire Diameter (Nominal)	mm	1.6	1.6	1.6	1.6	1.6	2	2	2	2	2.5	2.5	2.5	2.5
Outersheath Thickness (Nominal)	mm	1.8	1.8	1.9	1.9	2	2	2.1	2.2	2.3	2.5	2.6	2.7	2.9
Approximate Overall Diameter	mm	26.0	28.0	29.5	31.0	32.5	35.0	37.5	40.5	44.0	49.0	52.5	27.0	61.0
Approximate Cable Weight	Kg/Km	1100	1400	1750	2000	2300	2800	3450	4200	5100	6450	8000	10000	12090
Standard Drum Length	٤	200	200	200	200	200	200	200	200	200	200	400	300	250
Minimum Bending Radius of Cable (during installation)	mm	387	417	438	461	485	522	263	909	099	732	786	849	915
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047	0.0366	0.0283	0.0221	0.0176
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.494	0.342	0.247	0.196	0.159	0.128	0.098	0.079	0.063	0.050	0.041	0.038	0.029
Approximate Reactance at 50 Hertz	ohm/Km	0.13	0.13	0.12	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.10	60.0	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.36	0.27	0.22	0.19	0.16	0.14	0.12	0.11	0.10	960'0	0.092	0.086
Approximate Capacitance of Cable	pf/Km	0.34	0.38	0.43	0.47	0.51	0.56	0.61	0.63	0.65	69.0	0.73	0.79	0.85
Approx. Charging Current per phase at Uo = 3.6kV and f = 50Hz	mA/m	0.38	0.43	0.49	0.53	0.58	0.63	69.0	0.71	0.74	0.78	0.83	0.89	96.0
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	⋖	196	240	285	320	365	405	463	516	629	632	929	721	765
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	196	231	271	303	334	365	418	445	472	202	552	287	614
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	⋖	230	285	345	396	451	909	298	681	773	856	957	1049	1132
One Second Short Circuit Current Rating of Conductor	₹	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20	71.50	90.10	115	143
Бов ит смагае тые махимим соминетов овератию темвератнае в 90°С ами имятию соминестов темвератнае свотит в 950°С	T HOLD I I I I I I I I I I I I I I I I I I I	al ITV de da da la	L AFTER CL	TIL CIBCLIT	J. 020 si									

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

3.6/6 (7.2)kV

Copper Conductors XLPE Insulated to IEC 60502-2 Aluminium Wire Single Core Armoured



1.HCC⁺™ Copper Conductor

2.Semiconductive conductor screen 3.DFI™ XLPE Insulation

4. Semiconductive insulation screen

5.Copper tape screen 6. Bedding

7. Aluminium Armour

### **Table 4**

Nominal Area of Conductor	mm <sup>2</sup>	20	70	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	1281	1845	2558	3219	3954	4966	6526	8187	10428
Insulation Thickness (Nominal)	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8	က
Separation Sheath Thickness	mm	1.3	1.4	1.4	1.5	1.6	1.6	1.7	1.8	2
Armour Wire Diameter (Nominal)	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.15	3.15
Outersheath Thickness (Nominal)	mm	2.5	2.6	2.7	2.8	2.9	3.1	3.3	3.5	3.8
Approximate Overall Diameter	шш	49.0	52.5	56.5	0.09	63.5	0.79	73.0	81.0	0.68
Approximate Cable Weight	Kg/Km	4700	2600	0029	7700	8800	10400	13500	16000	19300
Standard Drum Length	٤	200	200	200	400	400	300	250	250	250
Minimum Bending Radius of Cable (during installation)	mm	583	979	929	715	758	804	928	296	1068
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.493	0.343	0.247	0.196	0.159	0.128	0.099	0.080	0.064
Approximate Reactance at 50 Hertz	ohm/Km	0.11	0.10	0.10	60.0	60.0	0.09	60.0	0.08	0.08
Approximate Impedance at 50 Hertz	ohm/Km	0.5	0.36	0.26	0.22	0.18	0.15	0.13	0.12	0.1
Approximate Capacitance of Cable	µf/Km	0.34	0.38	0.43	0.47	0.51	0.56	0.61	0.63	0.65
Approx. Charging Current per phase at Uo = 3.6kV and f = 50Hz	mA/m	0.38	0.43	0.49	0.53	0.58	0.63	69.0	0.71	0.74
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	⋖	187	227	267	303	338	383	436	481	534
2. Drawn into ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	161	191	227	258	294	329	378	418	472
3. Laid singly in Air, Ambient Temp. 35° C	⋖	203	248	304	345	396	451	524	298	681
One Second Short Circuit Current Rating of Conductor	kΑ	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20
					0					

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.



- 2.Semiconductive conductor screen
  - 3.DFI™ XLPE Insulation
- 4.Semiconductive insulation screen
- 5.Copper tape screen6. Fillers
- 7. Tape binder
  - 8. Bedding
- 9. Galvanised steel wire armour
  - 10. Outer sheath



**Steel Wire Armoured** 

IEC 60502-2

Copper Conductors XLPE Insulated to

3.6/6 (7.2)kV

Three Core



### Table 5

Nominal Area of Conductor	mm²	20	02	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	1281	1845	2558	3219	3954	4966	6526	8187	10428
Insulation Thickness (Nominal)	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8	က
Separation Sheath Thickness	mm	1.3	4.1	4.1	1.5	1.6	1.6	1.7	1.8	2
Steel Tape Thickness (Nominal)	mm	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.8
Outersheath Thickness (Nominal)	mm	2.4	2.5	2.7	2.8	2.9	င	3.2	3.4	3.7
Approximate Overall Diameter	mm	47.0	50.5	54.5	58.0	61.5	65.5	71.5	77.5	86.0
Approximate Cable Weight	Kg/Km	3650	4500	2290	6510	0692	0006	11210	14010	18330
Standard Drum Length	٤	200	200	200	200	200	400	300	300	200
Minimum Bending Radius of Cable (during installation)	mm	260	604	652	692	736	781	853	928	1028
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.493	0.343	0.247	0.196	0.159	0.128	0.099	0.080	0.064
Approximate Reactance at 50 Hertz	ohm/Km	0.11	0.10	0.10	60.0	60.0	60.0	60.0	0.08	0.08
Approximate Impedance at 50 Hertz	ohm/Km	0.50	0.36	0.26	0.22	0.18	0.15	0.13	0.12	0.10
Approximate Capacitance of Cable	µf/Km	0.34	0.38	0.43	0.47	0.51	0.56	0.61	0.63	0.65
Approx. Charging Current per phase at Uo = 3.6kV and f = 50Hz	mA/m	0.38	0.43	0.49	0.53	0.58	0.63	69.0	0.71	0.74
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	<	187	227	267	303	338	383	436	481	534
2. Drawn into Ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	161	191	227	258	294	329	378	418	472
3. Laid singly in Air, Ambient Temp. 35° C	A	203	248	304	345	396	451	524	298	681
One Second Short Circuit Current Rating of Conductor	₹	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20
, control of the cont					0					

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

3.6/6 (7.2)kV

**Steel Tape Armoured Copper Conductors XLPE Insulated to** IEC 60502-2 Three Core



1.HCC⁺™ Copper Conductor

2.Semiconductive conductor screen

3.DFI™ XLPE Insulation

4. Semiconductive insulation screen

5.Copper tape screen 6. Fillers

7. Tape binder

8. Bedding

9. Galvanised steel tape armour



# Cable Data

### Table 6

Nominal Area of Conductor	mm²	20	20	92	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	420	909	839	1056	1297	1629	2141	2686	3421	4335	5855	7346	9160
Insulation Thickness (Nominal)	mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Outersheath Thickness (Nominal)	mm	1.6	1.7	1.7	1.8	1.8	1.9	2	2	2.1	2.2	2.3	2.5	2.6
Approximate Overall Diameter	mm	22.0	23.5	25.5	27.0	28.5	30.0	32.5	35.0	38.0	41.5	44.5	49.0	53.0
Approximate Cable Weight	Kg/Km	006	1150	1470	1730	2040	2460	3070	3710	4600	2690	7150	8650	10530
Standard Drum Length	٤	200	200	200	200	200	200	200	200	200	200	200	400	300
Minimum Bending Radius of Cable (during installation)	mm	434	466	505	532	564	298	648	694	092	822	890	972	1056
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047	0.0366	0.0283	0.0221	0.0176
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.494	0.342	0.247	0.196	0.159	0.128	0.098	0.079	0.063	0.050	0.041	0.039	0.029
Approximate Reactance at 50 Hertz	ohm/Km	0.13	0.12	0.11	0.11	0.11	0.10	0.10	0.10	60.0	0.09	60.0	0.08	0.08
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.36	0.27	0.22	0.19	0.16	0.14	0.12	0.11	0.10	0.10	0.09	60.0
Approximate Capacitance of Cable	µf/Km	0.25	0.29	0.35	0.38	0.41	0.47	0.51	0.54	0.58	99.0	0.74	0.78	0.8
Approx. Charging Current per phase at Uo = 6kV and f = 50Hz	m/\m	0.47	0.55	99.0	0.72	0.77	0.89	96.0	1.0	1:	1.2	1.4	1.5	1.5
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	<	196	240	285	320	365	409	472	534	605	899	739	819	890
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	4	200	240	285	320	356	392	449	498	543	909	899	739	810
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	<	217	262	331	382	432	497	589	681	773	865	1021	1168	1288
One Second Short Circuit Current Rating of Conductor	kA	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20	71.50	90.10	115	143

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 6/10 (12)kV

Single Core Copper Conductors XLPE Insulated to IEC 60502-2 Unarmoured



1.HCC⁺™ Copper Conductor

2.Semiconductive conductor screen 3.DFI™ XLPE Insulation

4. Semiconductive insulation screen

5.Copper wire screen6. Tape binder

### Table 7

		ĺ	I				İ			
Nominal Area of Conductor	mm <sub>2</sub>	20	20	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	1281	1845	2558	3219	3954	4966	6526	8187	10428
Insulation Thickness (Nominal)	mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Outersheath Thickness (Nominal)	mm	2.4	2.5	2.6	2.7	2.8	2.9	3.1	3.2	3.5
Approximate Overall Diameter	mm	45.0	48.5	52.5	52.5	29.0	62.5	0.89	73.0	80.5
Approximate Cable Weight	Kg/Km	3230	4070	2090	0809	7070	8400	10570	12790	14290
Standard Drum Length	Е	200	200	200	200	200	200	400	300	250
Minimum Bending Radius of Cable (during installation)	mm	671	726	782	831	882	938	1017	1094	1202
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.493	0.342	0.247	0.196	0.159	0.128	0.098	0.080	0.064
Approximate Reactance at 50 Hertz	ohm/Km	0.11	0.11	0.10	0.10	60.0	60.0	60.0	60.0	0.08
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.36	0.27	0.22	0.18	0.16	0.13	0.12	0.10
Approximate Capacitance of Cable	µf/Km	0.25	0.29	0.35	0.38	0.41	0.47	0.51	0.54	0.58
Approx. Charging Current per phase at Uo = 6kV and f = 50Hz	mA/m	0.47	0.55	99.0	0.72	0.77	0.89	96.0	1.0	1.1
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	<	198	241	283	321	358	406	462	510	999
2. Drawn into Ducts, Ground Temp. 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	A	170	202	241	273	312	349	401	443	200
3. Laid singly in Air, Ambient Temp. 35° C	⋖	210	258	316	359	412	469	545	622	708
One Second Short Circuit Current Rating of Conductor	\$	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

6/10 (12) kV

**Copper Conductors XLPE Insulated to** IEC 60502-2 Unarmoured **Three Core** 



1.HCC⁺™ Copper Conductor

2. Semiconductive conductor screen 3.DFI™ XLPE Insulation

4. Semiconductive insulation screen 5.Copper tape screen

6. Fillers

7. Tape binder

# Cable Data

### Table 8

Nominal Area of Conductor	mm²	20	20	92	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	420	909	839	1056	1297	1629	2141	2686	3421	4335	5585	7346	9160
Insulation Thickness (Nominal)	mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Separation Sheath Thickness	mm	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	4.1	4.1	1.5
Armour Wire Diameter (Nominal)	mm	1.6	1.6	1.6	1.6	1.6	7	2	2	7	2.5	2.5	2.5	2.5
Outersheath Thickness (Nominal)	mm	1.8	1.8	1.9	1.9	2	2	2.1	2.2	2.3	2.5	2.6	2.7	2.9
Approximate Overall Diameter	mm	28.0	29.5	31.5	33.0	35.5	37.0	39.5	41.5	46.5	49.5	53.0	27.0	61.5
Approximate Cable Weight	Kg/Km	1200	1600	1950	2270	2690	3100	3800	4500	2650	6910	8560	10070	12120
Standard Drum Length	٤	200	200	200	200	200	200	200	200	200	200	400	300	250
Minimum Bending Radius of Cable (during installation)	mm	416	440	467	489	527	222	268	623	692	738	792	855	921
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047	0.0366	0.0283	0.0221	0.0176
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.493	0.342	0.246	0.196	0.160	0.127	0.098	0.079	0.063	0.050	0.041	0.039	0.029
Approximate Reactance at 50 Hertz	ohm/Km	0.14	0.13	0.12	0.12	0.12	0.11	0.11	0.10	0.10	0.10	0.10	60.0	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.37	0.27	0.23	0.20	0.17	0.15	0.13	0.12	0.11	0.10	0.10	0.091
Approximate Capacitance of Cable	µf/Km	0.25	0.29	0.35	0.38	0.41	0.47	0.51	0.54	0.58	99.0	0.74	0.78	0.80
Approx. Charging Current per phase at Uo = 6kV and f = 50Hz	mA/m	0.47	0.55	99.0	0.72	0.77	0.89	96.0	1.0	1.1	1.2	4.	1.5	1.5
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	⋖	196	240	285	320	365	405	463	516	629	632	929	721	765
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	196	231	271	303	334	365	418	445	472	202	552	287	614
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	⋖	230	285	345	396	451	206	298	681	773	856	957	1049	1132
One Second Short Circuit Current Rating of Conductor	kA	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20	71.50	90.10	115	143
FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C.	NG CONDUCTOR T	EMPERATUR	E AFTER SHO	RT CIRCUIT	s 250°C.									

For all cables the maximum conductor operating temperature is 90°C and limiting conductor temperature after short grouit is 250°C. Longer drum lengths are available to specific customer requirements.

## 6/10 (12)kV

Single Core
Copper Conductors
XLPE Insulated to
IEC 60502-2
Aluminium Wire



1.HCC⁺™ Copper Conductor

2. Semiconductive conductor screen

3.DFI™ XLPE Insulation 4.Semiconductive insulation screen

5.Copper tape screen

6. Bedding

o. Deddiilig 7. Aluminium Armour



## **Cable Data**

### Table 9

**Ducab Powerplus** 

Nominal Area of Conductor	mm <sup>2</sup>	20	02	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	1281	1845	2558	3219	3954	4966	6526	8187	10428
Insulation Thickness (Nominal)	mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Separation Sheath Thickness	mm	1.4	1.4	1.5	1.6	1.6	1.7	1.8	1.9	2
Armour Wire Diameter (Nominal)	mm	2.5	2.5	2.5	2.5	2.5	2.5	3.15	3.15	3.15
Outersheath Thickness (Nominal)	mm	2.6	2.7	2.9	က	3.1	3.2	3.4	3.6	3.8
Approximate Overall Diameter	mm	53.0	56.5	61.0	64.0	67.5	71.5	79.0	83.5	91.0
Approximate Cable Weight	Kg/Km	5250	6250	7350	8500	9550	11000	14250	16600	19750
Standard Drum Length	٤	200	200	200	400	300	300	250	200	200
Minimum Bending Radius of Cable (during installation)	mm	989	829	727	768	810	857	940	1002	1092
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.493	0.342	0.247	0.196	0.159	0.128	0.098	0.078	0.064
Approximate Reactance at 50 Hertz	ohm/Km	0.11	0.11	0.10	0.10	60.0	60.0	60.0	60.0	0.08
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.36	0.27	0.22	0.18	0.16	0.13	0.12	0.10
Approximate Capacitance of Cable	µf/Km	0.25	0.29	0.35	0.38	0.41	0.47	0.51	0.54	0.58
Approx. Charging Current per phase at Uo = 6kV and f = 50Hz	mA/m	0.47	0.55	99.0	0.72	0.77	0.89	96.0	1.0	1.1
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	∢	187	227	267	303	338	383	436	481	534
2. Drawn into ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	161	191	227	258	294	329	378	418	472
3. Laid singly in Air, Ambient Temp. 35° C	⋖	203	248	304	345	396	451	524	298	681
One Second Short Circuit Current Rating of Conductor	₹	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

ø **DUCAB POWERPLUS** 9

6/10 (12)kV

**Steel Wire Armoured Copper Conductors** XLPE Insulated to IEC 60502-2 **Three Core** 

1.HCC⁺™ Copper Conductor

2. Semiconductive conductor screen

3.DFI™ XLPE Insulation

4. Semiconductive insulation screen

5. Copper tape screen 6. Fillers

7. Tape binder

8. Bedding

9. Galvanised steel wire armour

### Table 10

Nominal Area of Conductor	mm²	20	02	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	1281	1845	2558	3219	3954	4966	6526	8187	10428
Insulation Thickness (Nominal)	mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Separation Sheath Thickness	mm	1.4	4.1	1.5	1.6	1.6	1.7	1.8	1.9	2
Steel Tape Thickness (Nominal)	mm	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	8.0
Outersheath Thickness (Nominal)	mm	2.6	2.7	2.8	2.9	3	3.1	3.3	3.5	3.7
Approximate Overall Diameter	mm	51.0	55.0	29.0	62.0	0.99	70.0	75.0	80.5	88.0
Approximate Cable Weight	Kg/Km	4050	4910	6010	7030	8120	9530	11810	14190	18680
Standard Drum Length	E	200	200	200	200	400	400	300	250	200
Minimum Bending Radius of Cable (during installation)	mm	612	655	704	744	787	833	899	962	1051
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.493	0.342	0.247	0.196	0.159	0.128	0.098	0.078	0.064
Approximate Reactance at 50 Hertz	ohm/Km	0.11	0.11	0.10	0.10	0.09	60.0	0.09	0.08	0.064
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.36	0.27	0.22	0.18	0.16	0.13	0.12	0.10
Approximate Capacitance of Cable	µf/Km	0.25	0.29	0.35	0.38	0.41	0.47	0.51	0.54	0.58
Approx. Charging Current per phase at Uo = 6kV and f = 50Hz	mA/m	0.47	0.55	99.0	0.72	0.77	0.89	96.0	1.0	1.1
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	4	187	227	267	303	338	383	436	481	534
2. Drawn into Ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	A	161	191	227	258	294	329	378	418	472
3. Laid singly in Air, Ambient Temp. 35° C	⋖	203	248	304	345	396	451	524	598	681
One Second Short Circuit Current Rating of Conductor	κA	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20
		i i			0.020					] (

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

6/10 (12)kV

Three Core Copper Conductors XLPE Insulated to IEC 60502-2 Steel Tape Armoured



1.HCC⁺™ Copper Conductor

2.Semiconductive conductor screen

3.DFI™ XLPE Insulation

4.Semiconductive insulation screen

5.Copper tape screen6. Fillers7. Tape binder

8. Bedding

9. Galvanised steel tape armour

18

# حهجاب باوربسلاس

### Table 11

							-							
Nominal Area of Conductor	mm <sup>2</sup>	20	20	92	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	420	909	839	1056	1297	1629	2141	2686	3421	4335	5855	7346	9160
Insulation Thickness (Nominal)	mm	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Outersheath Thickness (Nominal)	mm	1.8	1.8	1.8	1.9	1.9	2	2	2.1	2.2	2.3	2.4	2.5	2.7
Approximate Overall Diameter	mm	24.5	26.0	27.5	29.0	31.0	32.5	35.0	37.5	40.5	43.5	47.0	51.0	55.5
Approximate Cable Weight	Kg/Km	066	1270	1580	1850	2210	2620	3210	3870	4790	2880	7350	8830	10760
Standard Drum Length	٤	200	200	200	200	200	200	200	200	200	200	200	400	300
Minimum Bending Radius of Cable (during installation)	mm	482	514	220	280	612	645	969	742	808	870	938	1020	1106
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047	0.0366	0.0283	0.0221	0.0176
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.494	0.342	0.247	0.196	0.159	0.128	0.098	0.079	0.063	0.051	0.041	0.040	0.030
Approximate Reactance at 50 Hertz	ohm/Km	0.13	0.13	0.12	0.11	0.11	0.11	0.10	0.10	0.10	0.09	0.09	60.0	0.08
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.36	0.27	0.23	0.19	0.17	0.14	0.13	0.12	0.11	660.0	960.0	0.091
Approximate Capacitance of Cable	µf/Km	0.22	0.25	0.28	0.31	0.33	0.36	0.41	0.44	0.49	0.54	0.59	0.68	0.72
Approx. Charging Current per phase at Uo = 8.7kV and f = 50Hz	mA/m	09.0	0.68	0.77	0.85	06.0	1.0	1.7	1.2	1.3	1.5	1.6	1.9	2.0
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	<	196	240	285	320	365	409	472	534	605	899	739	819	890
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	200	240	285	320	356	392	449	498	543	909	899	739	810
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	4	217	262	331	382	432	497	589	681	773	865	1021	1168	1288
One Second Short Circuit Current Rating of Conductor	κĄ	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20	71.50	90.10	115	143

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 8.7/15 (17.5)kV

**Copper Conductors XLPE Insulated to** IEC 60502-2 Unarmoured Single Core



1.HCC⁺™ Copper Conductor

2. Semiconductive conductor screen

4. Semiconductive insulation screen 3.DFI™ XLPE Insulation

5.Copper wire screen

7. Outer sheath 6. Tape binder

### Table 12

Nominal Area of Conductor	mm <sup>2</sup>	20	20	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	1281	1845	2558	3219	3954	4966	6526	8187	10428
Insulation Thickness (Nominal)	mm	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Outersheath Thickness (Nominal)	mm	2.5	2.6	2.8	2.9	က	3.1	3.2	3.4	3.6
Approximate Overall Diameter	mm	20.0	53.5	57.5	60.5	64.0	0.89	73.0	78.0	85.5
Approximate Cable Weight	Kg/Km	2400	3130	4050	4910	5830	0602	9050	11030	14980
Standard Drum Length	٤	200	200	200	200	200	400	300	300	250
Minimum Bending Radius of Cable (during installation)	mm	749	800	828	806	959	1014	1094	1170	1277
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.493	0.342	0.247	0.196	0.159	0.128	860.0	0.079	0.064
Approximate Reactance at 50 Hertz	ohm/Km	0.12	0.11	0.11	0.10	0.10	0.10	60.0	60.0	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.36	0.27	0.22	0.19	0.16	0.14	0.12	0.11
Approximate Capacitance of Cable	µf/Km	0.22	0.25	0.28	0.31	0.33	0.36	0.41	0.44	0.49
Approx. Charging Current per phase at Uo = 8.7kV and f = 50Hz	m/ym	09.0	0.68	0.77	0.85	06.0	1.0	1.1	1.2	1.3
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	<	198	241	283	321	358	406	462	510	266
2. Drawn into Ducts, Ground Temp. 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	170	202	241	273	312	349	401	443	200
3. Laid singly in Air, Ambient Temp. 35° C	⋖	210	258	316	359	412	469	545	622	208
One Second Short Circuit Current Rating of Conductor	kΑ	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20
2	GOTOLIGIACO CIAL	1	0.10	TI OUL	0,040					

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

8.7/15 (17.5)kV

XLPE Insulated to IEC **Copper Conductors** Three Core 60502-2

Unarmoured



1.HCC⁺™ Copper Conductor

2.Semiconductive conductor screen

4. Semiconductive insulation screen 3.DFI™ XLPE Insulation

5.Copper tape screen

6. Fillers

7. Tape binder

**Cable Data** 

## **Ducab Powerplus**

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# حهجاب باوربسلاس

### Table 13

Nominal Area of Conductor	mm²	20	02	92	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	420	909	839	1056	1297	1629	2141	2686	3421	4335	5855	7346	9160
Insulation Thickness (Nominal)	mm	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Separation Sheath Thickness	mm	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.4	1.5	1.6
Armour Wire Diameter (Nominal)	mm	1.6	1.6	2	2	7	7	2	2	2.5	2.5	2.5	2.5	2.5
Outersheath Thickness (Nominal)	mm	1.9	2	2	2.1	2.1	2.2	2.3	2.3	2.5	2.6	2.7	2.8	က
Approximate Overall Diameter	mm	30.5	32.0	34.5	36.0	37.5	39.5	42.0	44.0	48.5	52.0	55.5	59.5	64.0
Approximate Cable Weight	Kg/Km	1400	1650	2050	2400	2750	3300	3850	4450	2200	6750	8250	10350	12450
Standard Drum Length	٤	200	200	200	200	200	200	200	200	200	200	400	300	300
Minimum Bending Radius of Cable (during installation)	mm	452	476	515	537	561	287	624	099	728	922	828	893	959
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047	0.0366	0.0283	0.0221	0.0176
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.078	0.063	0.050	0.041	0.039	0.029
Approximate Reactance at 50 Hertz	ohm/Km	0.14	0.14	0.13	0.12	0.12	0.12	0.11	0.11	0.11	0.10	0.10	60.0	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.36	0.27	0.20	0.19	0.16	0.14	0.13	0.11	0.11	0.11	60.0	60.0
Approximate Capacitance of Cable	uf/Km	0.22	0.25	0.28	0.31	0.33	0.36	0.41	0.44	0.49	0.54	0.59	0.68	0.72
Approx. Charging Current per phase at Uo = 8.7kV and f = 50Hz	mA/m	09.0	0.68	0.77	0.85	06.0	1.0	1.1	1.2	1.3	1.5	1.6	1.9	2.0
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	A	196	240	285	320	365	405	463	516	629	632	929	721	765
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	Α	196	231	271	303	334	365	418	445	472	202	552	287	614
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	4	230	285	345	396	451	909	298	681	773	856	957	1049	1132
One Second Short Circuit Current Rating of Conductor	ΚĄ	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20	71.50	90.10	115	143

For all cables the maximum conductor operating temperature is 90°C and limiting conductor temperature after short circuit is 250°C. Longer drum lengths are available to specific customer requirements.

## 8.7/15 (17.5)kV

**Copper Conductors** XLPE Insulated to IEC 60502-2 Aluminium Wire Single Core Armoured



1.HCC⁺™ Copper Conductor

2. Semiconductive conductor screen 3.DFI™ XLPE Insulation 4. Semiconductive insulation screen 5. Copper tape screen 6. Bedding

7. Aluminium Armour

### Table 14

Nominal Area of Conductor	mm²	20	70	95	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	1281	1845	2558	3219	3954	4966	6526	8187	10428
Insulation Thickness (Nominal)	mm	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Separation Sheath Thickness	mm	1.5	1.5	1.6	1.7	1.7	1.8	1.9	2	2.1
Armour Wire Diameter (Nominal)	шш	2.5	2.5	2.5	2.5	2.5	3.15	3.15	3.15	3.15
Outersheath Thickness (Nominal)	mm	2.8	2.9	က	3.2	3.3	3.4	3.6	3.8	4
Approximate Overall Diameter	mm	58.5	62.0	0.99	69.5	73.0	78.0	84.0	89.0	97.0
Approximate Cable Weight	Kg/Km	5950	6950	8150	9150	11190	12750	15000	17450	20800
Standard Drum Length	٤	200	200	400	400	300	250	250	200	200
Minimum Bending Radius of Cable (during installation)	mm	869	742	791	832	874	936	1003	1066	1154
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.493	0.342	0.247	0.196	0.159	0.128	0.098	0.079	0.064
Approximate Reactance at 50 Hertz	ohm/Km	0.12	0.11	0.11	0.10	0.10	0.10	60.0	60.0	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.36	0.27	0.22	0.19	0.16	0.14	0.12	0.11
Approximate Capacitance of Cable	µf/Km	0.22	0.25	0.28	0.31	0.33	0.36	0.41	0.44	0.49
Approx. Charging Current per phase at Uo = 8.7kV and f = 50Hz	mA/m	09'0	0.68	0.77	0.85	06.0	1.0	1.1	1.2	1.3
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	⋖	187	227	267	303	338	383	436	481	534
2. Drawn into ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	Α	161	191	227	258	294	329	378	418	472
3. Laid singly in Air, Ambient Temp. 35° C	⋖	203	248	304	345	396	451	524	298	681
One Second Short Circuit Current Rating of Conductor	\$	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C

LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

8.7/15 (17.5)kV

**Steel Wire Armoured Copper Conductors** XLPE Insulated to IEC 60502-2 **Three Core** 



1.HCC+ ™ Copper Conductor

2. Semiconductive conductor screen

4.Semiconductive insulation screen 3.DFI™ XLPE Insulation

5.Copper tape screen

6. Fillers

7. Tape binder

8. Bedding

9. Galvanised steel wire armour 10. Outer sheath

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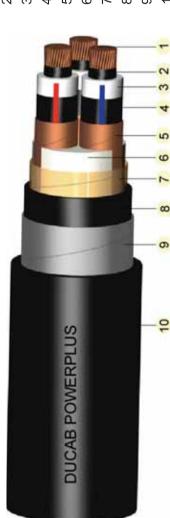
### Table 15

Nominal Area of Conductor	mm <sup>2</sup>	20	02	95	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	1281	1845	2558	3219	3954	4966	6526	8187	10428
Insulation Thickness (Nominal)	mm	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Separation Sheath Thickness	шш	1.5	1.05	1.6	1.7	1.7	1.8	1.9	2	2.1
Steel Tape Thickness (Nominal)	mm	0.5	0.5	0.5	0.5	0.5	0.5	0.5	8.0	0.8
Outersheath Thickness (Nominal)	mm	2.7	2.9	8	3.1	3.2	3.3	3.5	3.6	3.9
Approximate Overall Diameter	mm	56.5	0.09	64.0	67.5	71.0	75.0	80.5	85.5	93.0
Approximate Cable Weight	Kg/Km	4650	5510	6620	1660	8780	10320	12580	16010	19720
Standard Drum Length	٤	200	200	200	200	400	300	300	250	200
Minimum Bending Radius of Cable (during installation)	шш	929	719	292	808	851	968	396	1026	1115
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.493	0.342	0.247	0.196	0.159	0.128	0.098	0.079	0.064
Approximate Reactance at 50 Hertz	ohm/Km	0.12	0.11	0.11	0.10	0.10	0.10	0.09	0.09	0.09
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.36	0.27	0.22	0.19	0.16	0.14	0.12	0.11
Approximate Capacitance of Cable	µf/Km	0.22	0.25	0.28	0.31	0.33	0.36	0.41	0.44	0.49
Approx. Charging Current per phase at Uo = 8.7kV and f = 50Hz	mA/m	09.0	0.68	0.77	0.85	06.0	1.0	1.1	1.2	1.3
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	4	187	227	267	303	338	383	436	481	534
2. Drawn into Ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	161	191	227	258	294	329	378	418	472
3. Laid singly in Air, Ambient Temp. 35° C	⋖	203	248	304	345	396	451	524	298	681
One Second Short Circuit Current Rating of Conductor	₹	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20
	do con	i i		1000	٥٥٥					

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

8.7/15 (17.5)kV

**Steel Tape Armoured Copper Conductors XLPE Insulated** to IEC 60502-2 Three Core



1.HCC⁺™ Copper Conductor

2.Semiconductive conductor screen 3.DFI™ XLPE Insulation

4.Semiconductive insulation screen 5.Copper tape screen

6. Fillers

7. Tape binder

8. Bedding

9. Galvanised steel tape armour 10. Outer sheath



### Table 16

Nominal Area of Conductor	mm <sub>2</sub>	20	02	92	120	120	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	420	909	839	1056	1297	1629	2141	2686	3421	4335	5855	7346	9160
Insulation Thickness (Nominal)	mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Outersheath Thickness (Nominal)	mm	1.8	1.8	1.9	1.9	2	7	2.1	2.2	2.3	2.4	2.5	2.6	2.7
Approximate Overall Diameter	mm	26.3	27.9	29.7	31.2	32.8	34.5	36.9	39.3	42.6	45.7	49.1	53.1	57.4
Approximate Cable Weight	Kg/Km	1100	1380	1690	2030	2370	2750	3350	4060	4910	6170	0692	9040	10950
Standard Drum Length	٤	200	200	200	200	200	200	200	200	200	200	200	400	300
Minimum Bending Radius of Cable (during installation)	mm	526	258	594	624	959	069	738	786	852	914	962	1062	1148
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047	0.0366	0.0283	0.0221	0.0176
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.494	0.342	0.247	0.196	0.159	0.128	0.098	0.079	0.063	0.051	0.041	0.040	0.030
Approximate Reactance at 50 Hertz	ohm/Km	0.14	0.13	0.12	0.12	0.12	0.11	0.11	0.10	0.10	0.10	0.10	60.0	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.37	0.28	0.23	0.20	0.17	0.15	0.13	0.12	0.11	0.10	0.10	60.0
Approximate Capacitance of Cable	nf/Km	0.18	0.21	0.23	0.25	0.27	0.29	0.32	0.35	0.39	0.43	0.48	0.53	0.58
Approx. Charging Current per phase at Uo = 12kV and F = 50Hz	mA/m	0.68	0.79	0.87	0.94	1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	<b>A</b>	196	240	285	320	365	409	472	534	614	929	757	828	899
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	200	240	285	320	360	396	463	202	561	623	694	757	819
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	<	225	276	331	391	446	909	298	681	782	902	1040	1178	1306
One Second Short Circuit Current Rating of Conductor	κĄ	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20	71.50	90.10	115	143
FOR ALL CARLES THE MAXIMILIM CONDICTOR OPERATING TEMPERATING IS 90°C, AND LIMITING CONDICTOR TEMPERATING AFTER SHORT CIRCUIT IS 250°C.	T AOTOLICION TE	=MPERATI IRE	AFTER SHO	RT CIRCUIT I	s 250°C									

For all cables the maximum conductor operating temperature is 90°C and limiting conductor temperature after short circuit is 250°C. Longer drum lengths are available to specific customer requirements.

## 12/20 (24)kV

Single Core Copper Conductors XLPE Insulated to IEC 60502-2 Unarmoured



1.HCC⁺™ Copper Conductor

2.Semiconductive conductor screen 3.DFI™ XLPE Insulation

4.Semiconductive insulation screen

5.Copper wire screen

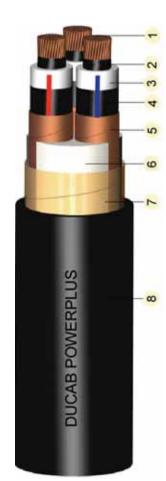
6. Tape binder

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### Table 17

Nominal Area of Conductor	mm²	20	20	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	1281	1845	2558	3219	3954	4966	6526	8187	10428
Insulation Thickness (Nominal)	mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Outersheath Thickness (Nominal)	mm	2.7	2.8	2.9	က	3.1	3.2	3.4	3.5	3.8
Approximate Overall Diameter	mm	54.5	58.0	62.0	65.5	68.5	72.5	77.5	83.0	89.0
Approximate Cable Weight	Kg/Km	4100	5010	0809	2090	8210	9620	11830	14140	15700
Standard Drum Length	٤	200	200	200	200	200	400	300	300	200
Minimum Bending Radius of Cable (during installation)	mm	818	869	929	226	1028	1083	1163	1239	1346
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.493	0.342	0.247	0.196	0.159	0.128	0.098	0.079	0.063
Approximate Reactance at 50 Hertz	ohm/Km	0.12	0.12	0.11	0.11	0.10	0.10	0.10	60.0	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.36	0.27	0.22	0.19	0.16	0.14	0.12	0.11
Approximate Capacitance of Cable	µf/Km	0.18	0.21	0.23	0.25	0.27	0.29	0.32	0.35	0.39
Approx. Charging Current per phase at Uo = 12kV and F = 50Hz	mA/m	0.68	0.79	0.87	0.94	1.0	1.1	1.2	1.3	1.5
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	⋖	198	241	279	316	354	396	453	200	222
2. Drawn into Ducts, Ground Temp. 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	∢	175	212	245	283	316	358	406	453	510
3. Laid singly in Air, Ambient Temp. 35° C	⋖	215	263	316	364	412	469	545	622	202
One Second Short Circuit Current Rating of Conductor	₹	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.



**Copper Conductors XLPE Insulated to** 

Unarmoured IEC 60502-2

12/20 (24)kV

Three Core

1.HCC⁺™ Copper Conductor

2.Semiconductive conductor screen

4. Semiconductive insulation screen 3.DFI™ XLPE Insulation

5.Copper tape screen

6 Fillers

7. Tape binder



## **Cable Data**

**Ducab Powerplus** 

# حهجاب باوربسلاس

### Table 18

Nominal Area of Conductor	mm <sup>2</sup>	20	70	92	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	420	605	839	1056	1297	1629	2141	2686	3421	4335	5885	7346	9160
Insulation Thickness (Nominal)	mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Separation Sheath Thickness	mm	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.4	1.5	1.5	1.6
Armour Wire Diameter (Nominal)	шш	1.6	2	2	2	2	2	7	2.5	2.5	2.5	2.5	2.5	2.5
Outersheath Thickness (Nominal)	mm	2	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.6	2.7	2.8	2.9	က
Approximate Overall Diameter	mm	32.5	35.0	36.5	38.0	39.5	41.5	44.0	47.5	51.0	54.0	57.5	62.0	66.5
Approximate Cable Weight	Kg/Km	1500	1800	2200	2500	2850	3250	4000	4800	2120	7500	8450	10600	12690
Standard Drum Length	E	200	200	200	200	200	200	200	200	200	200	400	300	300
Minimum Bending Radius of Cable (during installation)	mm	483	519	548	570	593	618	657	710	761	809	863	926	992
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047	0.0366	0.0283	0.0221	0.0176
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.079	0.063	0.050	0.040	0.039	0.029
Approximate Reactance at 50 Hertz	ohm/Km	0.15	0.14	0.13	0.13	0.12	0.12	0.12	0.11	0.11	0.11	0.10	0.10	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.52	0.37	0.28	0.23	0.2	0.17	0.15	0.14	0.12	0.12	0.11	0.10	0.10
Approximate Capacitance of Cable	µf/Km	0.18	0.21	0.23	0.25	0.27	0.29	0.32	0.35	0.39	0.43	0.48	0.53	0.58
Approx. Charging Current per phase at Uo = 12kV and F = 50Hz	mA/m	89.0	0.79	0.87	0.94	1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	<	196	240	285	320	365	401	454	202	220	623	929	721	765
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	187	231	271	303	329	356	401	436	472	202	543	596	614
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	<	239	294	350	405	451	515	298	672	764	865	996	1049	1132
One Second Short Circuit Current Rating of Conductor	ΚĄ	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20	71.50	90.10	115	143
					0.00									

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 12/20 (24)kV

**XLPE Insulated to IEC Copper Conductors Aluminium Wire** Single Core Armoured 60502-2



1.HCC⁺™ Copper Conductor

2. Semiconductive conductor screen 3.DFI™ XLPE Insulation

4. Semiconductive insulation screen

5.Copper tape screen

7. Aluminium Armour 6. Bedding

### Table 19

Nominal Area of Conductor	mm²	20	02	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	1281	1845	2558	3219	3954	4966	6526	8187	10428
Insulation Thickness (Nominal)	mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Separation Sheath Thickness	mm	1.6	1.6	1.7	1.7	1.8	1.9	2	2.1	2.2
Armour Wire Diameter (Nominal)	mm	2.5	2.5	2.5	3.15	3,15	3.15	3.15	3.15	3.15
Outersheath Thickness (Nominal)	mm	3	3.1	3.2	3.4	3.5	3.6	3.8	3.9	4.2
Approximate Overall Diameter	mm	63.5	0.79	71.0	75.5	79.0	83.0	88.5	94.0	101.5
Approximate Cable Weight	Kg/Km	6550	7550	8750	10700	11900	13500	15800	18300	21700
Standard Drum Length	٤	200	400	300	300	300	250	200	200	200
Minimum Bending Radius of Cable (during installation)	mm	757	799	848	906	948	966	1061	1123	1213
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.493	0.342	0.247	0.196	0.159	0.127	0.098	0.079	0.063
Approximate Reactance at 50 Hertz	ohm/Km	0.12	0.12	0.11	0.11	0.10	0.10	0.10	0.09	0.09
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.36	0.27	0.22	0.19	0.16	0.14	0.12	0.11
Approximate Capacitance of Cable	µf/Km	0.18	0.21	0.23	0.25	0.27	0.29	0.32	0.35	0.39
Approx. Charging Current per phase at Uo = 12kV and F = 50Hz	m/ym	0.68	0.79	0.87	0.94	1.0	1.1	1.2	1.3	1.5
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	⋖	187	227	263	298	334	374	427	472	525
2. Drawn into ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	165	200	231	267	298	338	383	427	481
3. Laid singly in Air, Ambient Temp. 35° C	⋖	207	253	304	350	396	451	524	298	681
One Second Short Circuit Current Rating of Conductor	kΑ	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AMILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

00 6 **DUCAB POWERPLUS** 

12/20 (24)kV

**Steel Wire Armoured Copper Conductors XLPE Insulated** to IEC 60502-2 Three Core

1.HCC⁺™ Copper Conductor

2.Semiconductive conductor screen

3.DFI™ XLPE Insulation

4.Semiconductive insulation screen

5.Copper tape screen 6. Fillers

7. Tape binder

8. Bedding

9. Galvanised steel wire armour

## Table 20

Nominal Area of Conductor	mm²	20	02	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	1281	1845	2558	3219	3954	4966	6526	8187	10428
Insulation Thickness (Nominal)	mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Separation Sheath Thickness	mm	1.6	1.6	1.7	1.7	1.8	1.9	2	2.1	2.2
Steel Tape Thickness (Nominal)	mm	0.5	0.5	0.5	0.5	0.5	0.5	0.8	8.0	0.8
Outersheath Thickness (Nominal)	mm	2.9	က	3.1	3.2	3.4	3.5	3.6	3.8	4
Approximate Overall Diameter	mm	61.5	65.0	0.69	72.5	78.5	0.08	85.5	90.5	98.0
Approximate Cable Weight	Kg/Km	5120	0609	7180	8250	9510	11020	14150	16590	20690
Standard Drum Length	٤	200	200	200	400	400	300	250	200	200
Minimum Bending Radius of Cable (during installation)	mm	734	778	826	998	910	922	1021	1085	1174
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.493	0.342	0.247	0.196	0.159	0.127	0.098	0.079	0.063
Approximate Reactance at 50 Hertz	ohm/Km	0.12	0.12	0.11	0.11	0.10	0.10	0.10	60.0	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.36	0.27	0.22	0.19	0.16	0.14	0.12	0.11
Approximate Capacitance of Cable	uf/Km	0.18	0.21	0.23	0.25	0.27	0.29	0.32	0.35	0.39
Approx. Charging Current per phase at Uo = 12kV and F = 50Hz	mA/m	0.68	0.79	0.87	0.94	1.0	1.1	1.2	1.3	1.5
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	A	187	227	263	298	334	374	427	472	525
2. Drawn into Ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	Α	165	200	231	267	298	338	383	427	481
3. Laid singly in Air, Ambient Temp. 35° C	A	207	253	304	350	396	451	524	298	681
One Second Short Circuit Current Rating of Conductor	\$	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20
C					0.010					

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

12/20 (24)kV

**Steel Tape Armoured Copper Conductors** XLPE Insulated to IEC 60502-2 Three Core



1.HCC⁺™ Copper Conductor

2. Semiconductive conductor screen

3.DFI™ XLPE Insulation

4.Semiconductive insulation screen

5.Copper tape screen 6. Fillers

7. Tape binder

8. Bedding

9. Galvanised steel tape armour

28



### Table 21

Nominal Area of Conductor	mm <sup>2</sup>	20	20	95	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	420	909	839	1056	1297	1629	2141	2686	3421	4335	5885	7346	9160
Insulation Thickness (Nominal)	mm	8	8	80	8	80	80	80	8	80	ω	80	80	80
Outersheath Thickness (Nominal)	mm	2	2	2.1	2.1	2.2	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9
Approximate Overall Diameter	mm	32.0	33.5	35.0	36.5	38.5	40.0	42.5	45.0	48.0	51.0	54.5	58.5	63.0
Approximate Cable Weight	Kg/Km	1410	1680	2030	2310	2690	3080	3730	4460	5380	6610	8170	0296	11520
Standard Drum Length	E	200	200	200	200	200	200	200	200	200	200	200	400	300
Minimum Bending Radius of Cable (during installation)	mm	632	664	200	730	762	962	846	892	958	1020	1088	1170	1254
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047	0.0366	0.0283	0.0221	0.0176
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.079	0.063	0.050	0.041	0.039	0.029
Approximate Reactance at 50 Hertz	ohm/Km	0.15	0.14	0.14	0.13	0.13	0.12	0.12	0.11	0.11	0.10	0.10	0.10	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.37	0.28	0.24	0.2	0.18	0.15	0.14	0.13	0.12	0.11	0.10	0.10
Approximate Capacitance of Cable	µf/Km	0.14	0.16	0.18	0.19	0.2	0.22	0.24	0.26	0.29	0.32	0.35	4.0	0.44
Approx. Charging Current per phase at Uo = 18kV and F = 50Hz	m/Vm	0.79	6.0	1.0	1.1	1.1	1.2	4.1	1.5	1.6	1.8	2.0	2.3	2.5
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	⋖	196	240	285	320	365	409	472	534	614	929	757	828	899
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	200	240	285	320	360	396	463	202	561	623	694	757	819
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	⋖	225	276	331	391	446	909	298	681	782	905	1040	1187	1316
One Second Short Circuit Current Rating of Conductor	kA	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20	71.50	90.10	115	143

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 18/30 (36)kV

**Copper Conductors XLPE Insulated** to IEC 60502-2 Unarmoured Single Core



1.HCC⁺™ Copper Conductor

2. Semiconductive conductor screen

3.DFI™ XLPE Insulation

4. Semiconductive insulation screen

5. Copper wire screen

6. Tape binder

### Table 22

Nominal Area of Conductor	mm²	20	20	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	1281	1845	2558	3219	3954	4966	6526	8187	10428
Insulation Thickness (Nominal)	mm	80	80	80	80	80	<sub>∞</sub>	80	80	80
Outersheath Thickness (Nominal)	mm	3.1	3.2	3.3	3.4	3.5	3.6	3.8	3.9	4.2
Approximate Overall Diameter	mm	0.99	69.5	73.5	77.0	80.5	84.0	89.5	94.5	101.5
Approximate Cable Weight	Kg/Km	5380	6410	7590	8650	0926	11210	13530	15930	17370
Standard Drum Length	٤	200	200	200	200	200	200	250	200	200
Minimum Bending Radius of Cable (during installation)	mm	1320	1390	1468	1532	1602	1676	1782	1882	2026
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.493	0.342	0.247	0.196	0.159	0.127	0.098	0.079	0.063
Approximate Reactance at 50 Hertz	ohm/Km	0.14	0.13	0.12	0.12	0.11	0.11	0.11	0.10	0.10
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.37	0.28	0.23	0.2	0.17	0.14	0.13	0.12
Approximate Capacitance of Cable	µf/Km	0.14	0.16	0.18	0.19	0.2	0.22	0.24	0.26	0.29
Approx. Charging Current per phase at Uo = 18kV and F = 50Hz	mA/m	0.79	06.0	1.0	1.1	1.1	1.2	1.4	1.5	1.6
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	⋖	198	241	283	321	358	406	462	510	999
2. Drawn into Ducts, Ground Temp. 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	170	202	241	273	312	349	401	443	200
3. Laid singly in Air, Ambient Temp. 35° C	⋖	210	258	316	359	412	469	545	622	708
One Second Short Circuit Current Rating of Conductor	ΚĄ	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20
			Ι '		0.010					

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 18/30 (36)kV

**Copper Conductors XLPE Insulated** to IEC 60502-2 Unarmoured **Three Core** 



1.HCC⁺™ Copper Conductor

2.Semiconductive conductor screen

3.DFI™ XLPE Insulation

4.Semiconductive insulation screen

5.Copper tape screen 6. Fillers

7. Tape binder

# **Cable Data**

# حهجاب باوربسلاس

### Table 23

Nominal Area of Conductor	mm²	20	20	92	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	420	909	839	1056	1297	1629	2141	2686	3421	4335	5885	7346	9160
Insulation Thickness (Nominal)	mm	80	<sub>∞</sub>	80	<sub>∞</sub>	80	<sub>∞</sub>	80	<b>∞</b>	8	80	80	<b>∞</b>	∞
Separation Sheath Thickness	m m	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.4	4.1	1.5	1.6	1.6	1.7
Armour Wire Diameter (Nominal)	mm	2	2	2	2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Outersheath Thickness (Nominal)	mm	2.2	2.2	2.3	2.3	2.4	2.5	2.6	2.6	2.7	2.85	2.9	3.1	3.2
Approximate Overall Diameter	mm	38.5	40.0	42.0	44.0	46.5	48.0	50.5	53.0	56.5	59.5	63.0	67.5	72.0
Approximate Cable Weight	Kg/Km	2030	2270	2640	3000	3200	3900	4600	2300	6400	7700	9150	11350	13750
Standard Drum Length	٤	200	200	200	200	200	200	200	200	200	200	300	250	200
Minimum Bending Radius of Cable (during installation)	mm	929	669	627	651	692	719	952	792	845	893	945	1008	1076
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047	0.0366	0.0283	0.0221	0.0176
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.494	0.342	0.247	0.196	0.159	0.128	0.098	0.079	0.063	0.050	0.041	0.039	0.029
Approximate Reactance at 50 Hertz	ohm/Km	0.16	0.15	0.14	0.14	0.13	0.13	0.12	0.12	0.11	0.11	0.11	60.0	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.52	0.37	0.28	0.24	0.21	0.18	0.16	0.14	0.13	0.12	0.11	0.10	60.0
Approximate Capacitance of Cable	µf/Km	0.14	0.16	0.18	0.19	0.2	0.22	0.24	0.26	0.29	0.32	0.35	0.4	0.44
Approx. Charging Current per phase at Uo = 18kV and F = 50Hz	m/Vm	0.79	6.0	1.0	1.1	<u></u>	1.2	4.1	1.5	1.6	1.8	2.0	2.3	2.5
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	⋖	196	240	285	320	365	401	454	202	220	623	929	721	765
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	187	231	267	303	329	356	401	436	472	202	543	969	623
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	⋖	207	254	305	360	411	466	250	979	719	829	926	1092	1210
One Second Short Circuit Current Rating of Conductor	kA	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20	71.50	90.10	115	143
Cocc					0									

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 18/30 (36)kV

**Copper Conductors Aluminium Wire XLPE Insulated** to IEC 60502-2 Single Core Armoured



1.HCC⁺™ Copper Conductor

2.Semiconductive conductor screen

3.DFI™ XLPE Insulation

4. Semiconductive insulation screen

5.Copper tape screen

6. Bedding

7. Aluminium Armour

8. Outer sheath

**Ducab Powerplus** 

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### Table 24

Nominal Area of Conductor	mm²	20	70	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	1281	1845	2558	3219	3954	4966	6526	8187	10428
Insulation Thickness (Nominal)	mm	80	8	∞	80	80	80	80	∞	8
Separation Sheath Thickness	mm	1.8	1.8	1.9	2	2	2.1	2.2	2.3	2.4
Armour Wire Diameter (Nominal)	mm	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15
Outersheath Thickness (Nominal)	mm	3.4	3.5	3.6	3.7	3.9	4	4.1	4.3	4.5
Approximate Overall Diameter	mm	76.5	80.0	84.5	87.5	91.5	95.0	100.5	106.0	113.5
Approximate Cable Weight	Kg/Km	9540	10300	11700	12900	14100	16100	18300	21500	25730
Standard Drum Length	٤	300	300	300	250	250	200	200	200	200
Minimum Bending Radius of Cable (during installation)	mm	918	096	1009	1050	1093	1139	1205	1267	1357
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.493	0.342	0.247	0.196	0.159	0.127	0.098	0.079	0.063
Approximate Reactance at 50 Hertz	ohm/Km	0.14	0.13	0.12	0.12	0.11	0.11	0.11	0.10	0.10
Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.37	0.28	0.23	0.2	0.17	0.14	0.13	0.12
Approximate Capacitance of Cable	µf/Km	0.14	0.16	0.18	0.19	0.2	0.22	0.24	0.26	0.29
Approx. Charging Current per phase at Uo = 18kV and F = 50Hz	m/Vm	0.79	06.0	1.0	1.1	1.1	1.2	4.1	1.5	1.6
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	⋖	187	227	267	303	338	383	436	481	534
2. Drawn into ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	160	191	227	258	294	329	378	418	472
3. Laid singly in Air, Ambient Temp. 35° C	⋖	202	248	304	345	396	451	524	298	681
One Second Short Circuit Current Rating of Conductor	ΚĄ	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20
					0.010					

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

18/30 (36)kV

Three Core
Copper Conductors
XLPE Insulated
to IEC 60502-2
Steel Wire Armoured



1.HCC⁺™ Copper Conductor

2.Semiconductive conductor screen

3.DFI™ XLPE Insulation

4.Semiconductive insulation screen

5.Copper tape screen

6. Fillers 7. Tape binder

7. Tape bind 8. Bedding

9. Galvanised steel wire armour



## **Cable Data**

### Table 25

Conductor Diameter (Max)         mm         8.4         9.9         1.1.6         1.3         14.5         16.1         13.5         16.5<	Nominal Area of Conductor	mm²	20	02	92	120	150	185	240	300	400
Kg/Km         1281         1845         2558         3219         3954         4966         6526         8187           mm         8 <td< td=""><td>Conductor Diameter (Max)</td><td>mm</td><td>8.4</td><td>6.6</td><td>11.6</td><td>13</td><td>14.5</td><td>16.1</td><td>18.4</td><td>20.6</td><td>23.7</td></td<>	Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
mm         8         9         9         9         9         9         9         9         9         9         9         9         9         9         9	Weight of Conductor (Approx)	Kg/Km	1281	1845	2558	3219	3954	4966	6526	8187	10428
mm 0.5 0.5 0.5 0.5 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8	Insulation Thickness (Nominal)	шш	œ	80	80	80	80	8	80	80	8
mm         0.5         0.5         0.6         0.8	Separation Sheath Thickness	mm	1.8	1.8	1.9	2	2	2.1	2.2	2.3	2.4
mm 73.5 77.0 81.0 84.5 88.0 92.0 97.5 102.5 Kg/Km 6580 7670 8910 10910 12140 13720 16170 18710 1	Steel Tape Thickness (Nominal)	mm	0.5	0.5	0.5	0.8	0.8	0.8	8.0	0.8	0.8
Mm         73.5         77.0         81.0         84.5         88.0         92.0         97.5         102.5           Kg/Km         6580         7670         8910         10910         12140         13720         16170         18710           stallation)         m         500         400         300         300         250         200         200           c         ohm/Km         0.387         0.268         0.193         0.153         0.124         1099         1166         1226           C         ohm/Km         0.387         0.268         0.193         0.153         0.124         0.099         1160         1076         1079         1076         0.009           OrC         ohm/Km         0.493         0.342         0.247         0.196         0.159         0.127         0.091         0.009	Outersheath Thickness (Nominal)	шш	3.3	3.4	3.5	3.6	3.7	3.8	4	4.1	4.4
Kg/Km         6580         7670         8910         10910         12140         13720         16170         18710           stallation)         m         500         400         300         300         250         200         200           c         ohm/Km         0.387         0.268         0.153         0.154         1099         1166         1226           C         ohm/Km         0.387         0.268         0.193         0.153         0.124         0.099         1166         1226           Or         ohm/Km         0.14         0.13         0.12         0.15         0.12         0.19         0.15         0.19         0.10         0.09         0.00           ohm/Km         0.14         0.13         0.12         0.12         0.11         0	Approximate Overall Diameter	mm	73.5	77.0	81.0	84.5	88.0	92.0	97.5	102.5	109.5
stallation) mm 878 922 971 1010 1054 1099 1166 1226  C Ohm/Km 0.387 0.268 0.193 0.153 0.124 0.0991 0.0754 0.0601  Ohm/Km 0.493 0.342 0.247 0.196 0.159 0.127 0.098 0.079  Ohm/Km 0.14 0.13 0.12 0.12 0.11 0.11 0.11 0.10  Inf/Km 0.14 0.16 0.18 0.20 0.20 0.17 0.14 0.13  SkV and F = 50Hz mA/m 0.79 0.90 1.0 1.1 1.1 1.1 1.2 1.4 1.5  Igly  A 160 191 227 267 303 338 383 436 481  Sonductor kA 7.15 10.01 13.60 17.20 21.50 26.50 34.30 42.90	Approximate Cable Weight	Kg/Km	0859	7670	8910	10910	12140	13720	16170	18710	23080
stallation) mm 878 922 971 1010 1054 1099 1166 1226  C Ohm/Km 0.387 0.268 0.193 0.153 0.124 0.0991 0.0754 0.0601  Ohm/Km 0.493 0.342 0.247 0.196 0.159 0.127 0.098 0.079  Ohm/Km 0.14 0.13 0.12 0.11 0.11 0.11 0.11 0.10  Ut/Km 0.14 0.13 0.12 0.12 0.11 0.11 0.11 0.10  SkV and F = 50Hz mA/m 0.79 0.90 1.0 1.1 1.1 1.2 1.4 1.5  Sm/W,  A 160 191 227 267 258 294 329 378 436 598  Conductor kA 7.15 1.0 13.60 17.20 21.50 26.50 34.30 42.90	Standard Drum Length	٤	200	400	300	300	300	250	200	200	200
C         Ohm/Km         0.387         0.268         0.193         0.153         0.124         0.0991         0.0754         0.06091           0°C         Ohm/Km         0.493         0.342         0.247         0.196         0.159         0.127         0.098         0.079           0°C         Ohm/Km         0.14         0.13         0.12         0.196         0.159         0.127         0.098         0.079           0hm/Km         0.14         0.14         0.18         0.12         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         1.11         1.11         1.12         1.4         1.5	Minimum Bending Radius of Cable (during installation)	mm	878	922	971	1010	1054	1099	1166	1226	1313
O°C         ohm/Km         0.493         0.342         0.247         0.196         0.159         0.127         0.098         0.079           Ohm/Km         0.14         0.13         0.12         0.12         0.11         0.11         0.11         0.11         0.10           W/V         0hm/Km         0.14         0.16         0.12         0.23         0.20         0.17         0.11         0.11         0.10           SkV and F = 50Hz         mA/m         0.79         0.90         1.0         1.1         1.1         1.2         1.4         1.5           SkV and F = 50Hz         mA/m         0.79         0.90         1.0         1.1         1.1         1.1         1.2         1.4         1.5           My         A         187         227         267         303         338         383         436         481           John W,         A         160         191         227         258         294         329         378         416           A         A         202         248         304         345         396         451         524         598           A         7.15         10.01         17.20	Maximum DC resistance of Conductor at 20°C	ohm/Km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.047
ohm/Km       0.14       0.13       0.12       0.11       0.11       0.11       0.11       0.11       0.11       0.10         skV and F = 50Hz       mA/m       0.51       0.37       0.28       0.23       0.20       0.17       0.14       0.13         stV and F = 50Hz       mA/m       0.79       0.90       1.0       1.1       1.1       1.1       1.2       1.4       0.26         stV and F = 50Hz       mA/m       0.79       0.90       1.0       1.1       1.1       1.1       1.2       1.4       1.5         stV and F = 50Hz       mA/m       0.79       0.90       1.0       1.1       1.1       1.1       1.2       1.4       1.5         stV and F = 50Hz       mA/m       0.79       0.90       1.0       1.1       1.1       1.1       1.2       1.4       1.5         stV and F = 50Hz       A       187       227       267       303       338       383       436       481         sqly       A       202       248       304       345       396       451       524       598         conductor       kA       7.15       10.01       13.60       17.20       21.50	Approximate AC resistance of Conductor at 90°C	ohm/Km	0.493	0.342	0.247	0.196	0.159	0.127	0.098	0.079	0.063
SkV and F = 50Hz mA/m 0.14 0.16 0.18 0.19 0.20 0.17 0.14 0.13 0.13 SkV and F = 50Hz mA/m 0.14 0.16 0.18 0.19 0.20 0.20 0.22 0.24 0.26 0.26 mA/m 0.79 0.90 1.0 1.1 1.1 1.1 1.2 1.4 1.5 skV mA/m 0.79 0.90 1.0 1.1 1.1 1.1 1.2 1.4 1.5 skV mA/m 1.87 227 267 303 338 383 436 481 skV mA/m 1.60 1.91 2.27 2.58 2.94 3.29 3.78 4.16 5.24 5.98 skV mA/m 1.3.60 1.7.20 2.1.50 26.50 34.30 42.90 82.90	Approximate Reactance at 50 Hertz	ohm/Km	0.14	0.13	0.12	0.12	0.11	0.11	0.11	0.10	0.10
MA/m       0.14       0.16       0.18       0.19       0.20       0.22       0.24       0.26         3kV and F = 50Hz       mA/m       0.79       0.90       1.0       1.1       1.1       1.2       1.4       1.5         3 m/k,       A       187       227       267       303       338       383       436       481         agly       A       160       191       227       258       294       329       378       416         A       202       248       304       345       396       451       524       598         Sonductor       KA       7.15       10.01       13.60       17.20       21.50       26.50       34.30       42.90	Approximate Impedance at 50 Hertz	ohm/Km	0.51	0.37	0.28	0.23	0.20	0.17	0.14	0.13	0.12
3kV and F = 50Hz       mA/m       0.79       0.90       1.0       1.1       1.1       1.2       1.4       1.5         mM/k,       A       187       227       267       303       338       383       436       481         gly       A       160       191       227       258       294       329       378       416         A       202       248       304       345       396       451       524       598         Sonductor       kA       7.15       10.01       13.60       17.20       21.50       26.50       34.30       42.90	Approximate Capacitance of Cable	µf/Km	0.14	0.16	0.18	0.19	0.20	0.22	0.24	0.26	0.29
ImMy,       A       187       227       267       303       338       383       436       481         Ingly       A       160       191       227       258       294       329       378       416         Conductor       A       202       248       304       345       396       451       524       598         Conductor       KA       7.15       10.01       13.60       17.20       21.50       26.50       34.30       42.90		mA/m	0.79	06.0	1.0	1.1	1.1	1.2	1.4	1.5	1.6
EmM,         A         187         227         267         303         338         383         436         481           Ingly         A         160         191         227         258         294         329         378         416           Conductor         A         202         248         304         345         396         451         524         598           Conductor         AA         7.15         10.01         13.60         17.20         21.50         26.50         34.30         42.90	Sustained Current Ratings										
ngly         A         160         191         227         267         303         338         383         436         481           conductor         A         160         191         227         258         294         329         378         416           A         202         248         304         345         396         451         524         598           Conductor         KA         7.15         10.01         13.60         17.20         21.50         26.50         34.30         42.90	1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
rigly         A         160         191         227         258         294         329         378         416           Conductor         A         202         248         304         345         396         451         524         598           Conductor         KA         7.15         10.01         13.60         17.20         21.50         26.50         34.30         42.90	depth of laying = 0.8m, laid singly	<	187	227	267	303	338	383	436	481	534
A         160         191         227         258         294         329         378         416           A         202         248         304         345         396         451         524         598           KA         7.15         10.01         13.60         17.20         21.50         26.50         34.30         42.90	2. Drawn into Ducts, Ground Temp. = 30°C &										
A 202 248 304 345 396 451 524 598 KA 7.15 10.01 13.60 17.20 21.50 26.50 34.30 42.90	g =1.2°C m/W, depth of laying = 0.8m, laid singly	A	160	191	227	258	294	329	378	416	472
KA 7.15 10.01 13.60 17.20 21.50 26.50 34.30 42.90	3. Laid singly in Air, Ambient Temp. 35° C	Α	202	248	304	345	396	451	524	598	681
	One Second Short Circuit Current Rating of Conductor	kA	7.15	10.01	13.60	17.20	21.50	26.50	34.30	42.90	57.20

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

18/30 (36)kV

**Steel Tape Armoured Copper Conductors XLPE Insulated** to IEC 60502-2 Three Core



1.HCC⁺™ Copper Conductor

2.Semiconductive conductor screen

3.DFI™ XLPE Insulation

4. Semiconductive insulation screen

5.Copper tape screen 6. Fillers

7. Tape binder

8. Bedding

9. Galvanised steel tape armour

### Table 26

Nominal Area of Conductor	mm²	20	70	92	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	125	180	250	313	386	486	637	800	1024	1318	1672	2231	2745
Insulation Thickness (Nominal)	шш	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8	ဗ	3.2	3.2	3.2	3.2
Outersheath Thickness (Nominal)	mm	1.6	1.6	1.7	1.7	1.8	1.8	1.9	2	2.1	2.2	2.3	2.5	2.6
Approximate Overall Diameter	mm	20.0	21.5	23.5	25.0	26.5	28.0	31.0	33.5	37.5	41.0	44.5	48.5	52.5
Approximate Cable Weight	Kg/Km	510	630	790	860	1000	1140	1430	1720	2140	2550	3110	3690	4090
Standard Drum Length	E	200	200	200	200	200	200	200	200	200	200	200	400	300
Minimum Bending Radius of Cable (during installation)	mm	396	428	464	494	526	260	614	899	744	814	882	964	1042
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.1	0.0778	0.0605	0.0469	0.0367	0.0291
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.13	0.102	0.080	0.064	0.051	0.043
Approximate Reactance at 50 Hertz	ohm/Km	0.12	0.12	0.11	0.11	0.10	0.10	0.10	60.0	60.0	60.0	60.0	0.08	0.08
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.24	0.19	0.16	0.14	0.13	0.11	0.1	0.091
Approximate Capacitance of Cable	µf/Km	0.34	0.38	0.43	0.47	0.51	0.56	0.61	0.63	0.65	69.0	0.73	0.79	0.85
Approx. Charging Current per phase at Uo = 3.6kV and F = 50Hz	m/Vm	0.38	0.43	0.49	0.53	0.58	0.63	69.0	0.71	0.74	0.78	0.83	0.89	96.0
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	⋖	151	187	223	249	285	320	369	423	481	543	909	685	757
2. Drawn into Ducts, Ground Temperature = 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	4	156	191	227	254	280	312	360	405	454	202	220	632	703
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	<	166	207	258	294	336	391	460	534	616	727	837	975	1095
One Second Short Circuit Current Rating of Conductor	kA	4.70	6.58	8.93	11.30	14.10	17.40	22.60	28.20	37.60	47.00	59.20	75.20	94.00
The state of the section of the sect	THE GOTOLIGIACOC OF	H 4 0 1 0 1	0	O. OEO.	J. 020°C									

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

3.6/6 (7.2)kV

**Aluminium Conductors XLPE Insulated** to IEC 60502-2 Unarmoured Single Core



1.HCC⁺™ Aluminium Conductor

2.Semiconductive conductor screen

4. Semiconductive insulation screen 3.DFI™ XLPE Insulation

5. Copper wire screen

6. Tape binder

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### Table 27

Kg/Km       8.4       9.9       11.6       13       14.5       16.1         Kg/Km       381       549       762       955       1177       1482         mm       2.5	Nominal Area of Conductor	mm²	20	70	92	120	150	185	240	300	400
Kg/Km       381       549       762       955       1177       1482         mm       2.5       2.5       2.5       2.5       2.5       2.5       2.5       2.5         mm       2.2       2.3       2.5       2.6       2.7       2.8         mm       40.5       44.0       48.0       51.0       54.5       58.0         Kg/Km       1720       2060       2460       2830       3270       3740         m       500       500       500       500       500       500       500         ohm/Km       0.641       0.443       0.32       0.253       0.206       0.164         ohm/Km       0.10       0.10       0.09       0.09       0.09       0.09         ohm/Km       0.34       0.38       0.43       0.47       0.51       0.56         mA/m       0.38       0.43       0.49       0.53       0.58       0.63         A       151       184       217       250       283       316         A       163       201       239       282       316       368	Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
mm       2.5       2.8       2.8       2.8       2.8       2.8       2.7       2.8       2.7       2.8       2.8       2.7       2.8       2.8       2.8       2.8       2.8       2.8       2.7       2.8       2.7       2.8       2.4       2.7       2.4       2.7       2.4       2.7       2.4       2.7       2.	Weight of Conductor (Approx)	Kg/Km	381	549	762	955	1177	1482	1942	2439	3122
mm       2.2       2.3       2.5       2.6       2.7       2.8         mm       40.5       44.0       48.0       51.0       54.5       58.0         Kg/Km       1720       2060       2460       2830       3270       3740         m       500       500       500       500       500       500         mm       605       656       716       764       815       870         ohm/Km       0.641       0.443       0.32       0.253       0.206       0.164         ohm/Km       0.010       0.10       0.09       0.09       0.09       0.09       0.09         ohm/Km       0.010       0.10       0.09       0.09       0.09       0.09       0.09         ohm/Km       0.034       0.58       0.43       0.44       0.28       0.24       0.28       0.63         mA/m       0.38       0.43       0.49       0.53       0.58       0.63         A       151       184       217       250       283       316         A       163       201       239       282       316       368	Insulation Thickness (Nominal)	шш	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8	က
mm       40.5       44.0       48.0       51.0       54.5       58.0         Kg/Km       1720       2060       2460       2830       3270       3740         m       500       500       500       500       500       500         mm       605       656       716       764       815       870         ohm/Km       0.641       0.443       0.32       0.253       0.206       0.164         ohm/Km       0.822       0.568       0.411       0.325       0.206       0.164         ohm/Km       0.010       0.10       0.09       0.09       0.09       0.09         ohm/Km       0.034       0.38       0.42       0.34       0.28       0.23         u/f/Km       0.38       0.43       0.43       0.47       0.51       0.56         mA/m       0.38       0.43       0.49       0.53       0.58       0.63         A       151       184       217       250       283       316         A       163       201       239       282       316       368	Outersheath Thickness (Nominal)	шш	2.2	2.3	2.5	2.6	2.7	2.8	က	3.1	3.4
Kg/Km       1720       2060       2460       2830       3270       3740         m       500       500       500       500       500       500       500         mm       605       656       716       764       815       870         ohm/Km       0.641       0.443       0.32       0.253       0.206       0.164         ohm/Km       0.822       0.568       0.411       0.325       0.206       0.09         ohm/Km       0.010       0.10       0.09       0.09       0.09       0.09       0.09         ohm/Km       0.034       0.38       0.43       0.43       0.47       0.21       0.56         mA/m       0.38       0.43       0.49       0.53       0.58       0.63         A       151       184       217       250       283       316         A       163       201       239       282       316       368	Approximate Overall Diameter	mm	40.5	44.0	48.0	51.0	54.5	58.0	64.0	70.0	78.0
mm 605 656 716 764 815 870 600 hm/Km 0.641 0.443 0.32 0.253 0.206 0.164 0.4M/Km 0.822 0.568 0.411 0.325 0.205 0.205 0.09 0.09 0.0m/Km 0.10 0.10 0.09 0.09 0.09 0.09 0.09 0.09	Approximate Cable Weight	Kg/Km	1720	2060	2460	2830	3270	3740	4550	5620	0989
mm         605         656         716         764         815         870           ohm/Km         0.641         0.443         0.32         0.253         0.206         0.164           ohm/Km         0.822         0.568         0.411         0.325         0.205         0.104           ohm/Km         0.10         0.10         0.09         0.09         0.09         0.09           ohm/Km         0.83         0.58         0.42         0.34         0.28         0.23           uf/Km         0.34         0.38         0.43         0.47         0.51         0.56           mA/m         0.38         0.43         0.49         0.53         0.58         0.63           A         151         184         217         250         283         316           A         163         201         239         282         316         368	Standard Drum Length	٤	200	200	200	200	200	200	400	300	250
ohm/Km         0.641         0.443         0.32         0.253         0.206         0.164           ohm/Km         0.822         0.568         0.411         0.325         0.265         0.211           ohm/Km         0.10         0.10         0.09         0.09         0.09         0.09           ohm/Km         0.83         0.58         0.42         0.34         0.28         0.23           µf/Km         0.34         0.38         0.43         0.43         0.47         0.51         0.56           mA/m         0.38         0.43         0.49         0.53         0.58         0.63           A         151         184         217         250         283         316           A         163         201         239         282         316         368	Minimum Bending Radius of Cable (during installation)	mm	909	929	716	764	815	870	957	1047	1169
ohm/km         0.822         0.568         0.411         0.325         0.265         0.211           ohm/km         0.10         0.10         0.09         0.09         0.09         0.09           ohm/km         0.83         0.58         0.42         0.34         0.28         0.23           µf/km         0.34         0.38         0.43         0.47         0.51         0.56           mA/m         0.38         0.43         0.49         0.53         0.58         0.63           A         151         184         217         250         283         316           A         127         156         189         212         241         274           A         163         201         239         282         316         368	Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778
ohm/Km 0.10 0.10 0.09 0.09 0.09 0.09 0.09 0.09	Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102
ohm/Km         0.83         0.58         0.42         0.34         0.28         0.23           µf/Km         0.34         0.38         0.43         0.47         0.51         0.56           mA/m         0.38         0.43         0.49         0.53         0.58         0.63           A         151         184         217         250         283         316           A         127         156         189         212         241         274           A         163         201         239         282         316         368	Approximate Reactance at 50 Hertz	ohm/Km	0.10	0.10	60.0	60'0	60.0	60.0	0.08	0.08	0.08
ht/lKm 0.34 0.38 0.43 0.47 0.51 0.56 mA/m 0.38 0.43 0.49 0.53 0.58 0.63    A 151 184 217 250 283 316 A 127 156 189 212 241 274 A 163 201 239 282 316 368	Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.42	0.34	0.28	0.23	0.18	0.15	0.13
MA/m 0.38 0.43 0.49 0.53 0.58 0.63   A 151 184 217 250 283 316   A 127 156 189 212 241 274   A 163 201 239 282 316 368	Approximate Capacitance of Cable	uf/Km	0.34	0.38	0.43	0.47	0.51	0.56	0.61	0.63	0.65
i°C m/W, A 151 184 217 250 283 316 singly A 127 156 189 212 241 274 A 163 201 239 282 316 368	Approx. Charging Current per phase at Uo = 3.6kV and F = 50Hz	mA/m	0.38	0.43	0.49	0.53	0.58	0.63	69.0	0.71	0.74
ingly A 157 156 189 212 241 274 singly A 163 201 239 282 316 368	Sustained Current Ratings										
singly A 157 156 189 212 241 274 Singly A 163 201 239 282 316 368	1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
singly A 127 156 189 212 241 274 A 163 201 239 282 316 368	depth of laying = 0.8m, laid singly	⋖	151	184	217	250	283	316	358	410	462
4 singly A 127 156 189 212 241 274 A 163 201 239 282 316 368	2. Drawn into Ducts, Ground Temp. 30°C &										
A 163 201 239 282 316 368	g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	127	156	189	212	241	274	316	354	406
	3. Laid singly in Air, Ambient Temp. 35° C	⋖	163	201	239	282	316	368	431	488	595
KA 4.70 6.58 8.93 11.30 14.10 17.40	One Second Short Circuit Current Rating of Conductor	ΚΆ	4.70	6.58	8.93	11.30	14.10	17.40	22.60	28.20	37.60

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 3.6/6 (7.2)kV

Three Core
Aluminium Conductors
XLPE Insulated
to IEC 60502-2
Unarmoured



1.HCC⁺™ Aluminium Conductor

2.Semiconductive conductor screen 3.DFI™ XLPE Insulation

4.Semiconductive insulation screen

5.Copper tape screen

6. Fillers

7. Tape binder

# حهكاب باوربكلاس

### Table 28

Nominal Area of Conductor	mm <sub>2</sub>	20	70	92	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	125	180	250	313	386	486	637	800	1024	1318	1672	2231	2745
Insulation Thickness (Nominal)	шш	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8	က	3.2	3.2	3.2	3.2
Separation Sheath Thickness	mm	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	4.1	4.1	1.5
Armour Wire Diameter (Nominal)	mm	1.6	1.6	1.6	1.6	1.6	7	7	7	2	2.5	2.5	2.5	2.5
Outersheath Thickness (Nominal)	mm	1.8	1.8	1.9	1.9	2	2	2.1	2.2	2.3	2.5	2.6	2.7	2.9
Approximate Overall Diameter	mm	26.0	28.0	29.5	31.0	32.5	35.0	37.5	40.5	44.0	49.0	52.5	27.0	61.0
Approximate Cable Weight	Kg/Km	810	086	1170	1260	1390	1660	1950	2320	2710	3440	4090	4890	2680
Standard Drum Length	E	200	200	200	200	200	200	200	200	200	200	400	300	250
Minimum Bending Radius of Cable (during installation)	mm	387	417	438	461	485	522	563	909	099	732	786	849	915
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.1	0.0778	0.0605	0.0469	0.0367	0.0291
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.13	0.102	0.080	0.064	0.051	0.043
Approximate Reactance at 50 Hertz	ohm/Km	0.13	0.12	0.12	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.09	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.29	0.24	0.19	0.16	0.14	0.13	0.13	0.11	0.10	60.0
Approximate Capacitance of Cable	uf/Km	0.34	0.38	0.43	0.47	0.51	0.56	0.61	0.63	0.65	69.0	0.73	0.79	0.85
Approx. Charging Current per phase at Uo = 3.6kV and F = 50Hz	mA/m	0.38	0.43	0.49	0.53	0.58	0.63	69.0	0.71	0.74	0.78	0.83	0.89	96.0
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	V	151	187	223	249	280	316	360	405	454	202	929	623	929
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	A	151	187	218	245	267	298	338	374	405	445	490	525	220
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	V	179	221	271	327	350	400	469	534	616	708	810	905	994
One Second Short Circuit Current Rating of Conductor	ΚĄ	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60	47.00	59.22	75.20	94.00

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 3.6/6 (7.2)kV

## Single Core Aluminium Conductors XLPE Insulated to IEC 60502-2 Aluminium Wire Armoured



1.HCC⁺ ™ Aluminium Conductor

2.Semiconductive conductor screen 3.DFI™ XLPE Insulation

4.Semiconductive insulation screen5.Copper tape screen

6. Bedding

o. beddirig 7. Aluminium armour

# حوطاب باوربسلاس

### Table 29

**Ducab Powerplus** 

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Nominal Area of Conductor	mm <sup>2</sup>	20	20	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	381	549	762	955	1177	1482	1942	2439	3122
Insulation Thickness (Nominal)	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8	3
Separation Sheath Thickness	mm	1.3	1.4	1.4	1.5	1.6	1.6	1.7	1.8	2
Armour Wire Diameter (Nominal)	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3,15	3.15
Outersheath Thickness (Nominal)	mm	2.5	2.6	2.7	2.8	2.9	3.1	3.3	3.5	3.8
Approximate Overall Diameter	mm	49.0	52.5	56.5	0.09	63.5	67.5	73.5	81.0	89.0
Approximate Cable Weight	Kg/Km	3800	4310	4910	5440	0209	6920	8920	10360	12000
Standard Drum Length	E	200	200	200	400	400	300	250	250	250
Minimum Bending Radius of Cable (during installation)	mm	583	626	929	715	758	804	876	296	1068
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102
Approximate Reactance at 50 Hertz	ohm/Km	0.10	0.10	0.10	0.10	60.0	60.0	0.08	0.08	0.08
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.42	0.34	0.28	0.23	0.18	0.15	0.13
Approximate Capacitance of Cable	µf/Km	0.34	0.38	0.43	0.47	0.51	0.56	0.61	0.63	0.65
Approx. Charging Current per phase at Uo = 3.6kV and F = 50Hz	mA/m	0.38	0.43	0.49	0.53	0.58	0.63	69.0	0.71	0.74
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	<	142	174	205	236	267	298	338	387	436
2. Drawn into ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	A	120	147	178	200	227	258	298	334	383
3. Laid Singly in Air, Ambient Temp. 35° C	A	156	193	230	271	304	354	414	469	543
One Second Short Circuit Current Rating of Conductor	ΚĀ	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

1.HCC⁺ ™ Aluminium Conductor

2.Semiconductive conductor screen

3.DFI™ XLPE Insulation

4.Semiconductive insulation screen

5.Copper tape screen

7. Tape binder 6. Fillers

8. Bedding

9. Galvanised steel wire armour

10. Outer sheath



**Aluminium Conductors** 

**Three Core** 

**XLPE Insulated** to IEC 60502-2 **Steel Wire Armoured** 

### Table 30

**Ducab Powerplus** 

Nominal Area of Conductor	mm²	20	20	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	381	549	762	955	1177	1482	1942	2439	3122
Insulation Thickness (Nominal)	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8	က
Separation Sheath Thickness	mm	1.3	4.1	4.1	1.5	1.6	1.6	1.7	1.8	2
Steel Tape Thickness (Nominal)	mm	0.5	9.0	0.5	0.5	0.5	0.5	0.5	0.5	0.8
Outersheath Thickness (Nominal)	mm	2.4	2.5	2.7	2.8	2.9	8	3.2	3.4	3.7
Approximate Overall Diameter	mm	47.0	50.5	54.5	58.0	61.5	65.5	71.5	77.5	86.0
Approximate Cable Weight	Kg/Km	2750	3210	3800	4250	4920	5520	0699	8270	11030
Standard Drum Length	٤	200	200	200	400	400	300	250	250	250
Minimum Bending Radius of Cable (during installation)	m m	260	604	652	692	736	781	853	928	1028
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102
Approximate Reactance at 50 Hertz	ohm/Km	0.10	0.10	60.0	60.0	0.09	60.0	0.08	0.08	0.08
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.42	0.34	0.28	0.23	0.18	0.15	0.13
Approximate Capacitance of Cable	µf/Km	0.34	0.38	0.43	0.47	0.51	0.56	0.61	0.63	0.65
Approx. Charging Current per phase at Uo = 3.6kV and F = 50Hz	m/Vm	0.38	0.43	0.49	0.53	0.58	0.63	69.0	0.71	0.74
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	⋖	142	174	205	236	267	298	338	387	436
2. Drawn into Ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	120	147	178	200	227	258	298	334	383
3. Laid singly in Air, Ambient Temp. 35° C	⋖	156	193	230	271	304	354	414	469	543
One Second Short Circuit Current Rating of Conductor	₹	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 3.6/6 (7.2)kV

**Aluminium Conductors Steel Tape Armoured XLPE Insulated** to IEC 60502-2 **Three Core** 



1.HCC<sup>+</sup> ™ Aluminium Conductor

2.Semiconductive conductor screen 3.DFI™ XLPE Insulation

4. Semiconductive insulation screen 5.Copper tape screen

6. Fillers

7. Tape binder

8. Bedding

9. Galvanised steel tape armour

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### Table 31

								İ	I		ŀ			
Nominal Area of Conductor	mm <sup>2</sup>	20	20	92	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	125	180	250	313	386	486	637	800	1024	1318	1672	2231	2745
Insulation Thickness (Nominal)	mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Outersheath Thickness (Nominal)	mm	1.6	1.7	1.7	1.8	1.8	1.9	2	2	2.1	2.2	2.3	2.5	2.6
Approximate Overall Diameter	mm	22.0	23.5	25.5	27.0	28.5	30.0	32.5	35.0	38.0	41.5	44.5	49.0	53.0
Approximate Cable Weight	Kg/Km	610	730	890	066	1130	1320	1570	1830	2210	2720	3360	3540	4120
Standard Drum Length	٤	200	200	200	200	200	200	200	200	200	200	200	400	300
Minimum Bending Radius of Cable (during installation)	mm	434	466	505	532	564	298	648	694	760	822	890	972	1056
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.1	0.0778	0.0605	0.0469	0.0367	0.0291
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.13	0.102	0.080	0.064	0.051	0.043
Approximate Reactance at 50 Hertz	ohm/Km	0.13	0.12	0.11	0.11	0.11	0.10	0.10	0.10	60.0	60.0	60.0	0.08	0.08
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.23	0.19	0.16	0.14	0.12	0.11	0.10	0.09
Approximate Capacitance of Cable	pf/Km	0.25	0.29	0.35	0.38	0.41	0.47	0.51	0.54	0.58	99.0	0.74	0.78	0.80
Approx. Charging Current per phase at Uo = 6kV and f = 50Hz	m/Vm	0.47	0.55	99.0	0.72	0.77	0.89	96.0	1.0	1.	1.2	4.1	1.5	1.5
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	⋖	151	187	223	249	285	320	369	423	481	543	605	685	757
2. Drawn into Ducts, Ground Temp. = 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	156	191	227	254	280	312	360	405	454	202	220	632	703
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	⋖	166	207	258	294	336	391	460	534	919	727	837	975	1095
One Second Short Circuit Current Rating of Conductor	\$	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60	47.00	59.22	75.20	94.00
					0.010									

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 6/10 (12)kV

**Aluminium Conductors XLPE Insulated** to IEC 60502-2 Unarmoured Single Core



1.HCC⁺™ Aluminium Conductor

2.Semiconductive conductor screen

4.Semiconductive insulation screen 3.DFI™ XLPE Insulation

5.Copper wire screen

6. Tape binder

### Table 32

Nominal Area of Conductor	mm²	20	02	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	381	549	762	955	1177	1482	1942	2439	3122
Insulation Thickness (Nominal)	mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Outersheath Thickness (Nominal)	mm	2.4	2.5	2.6	2.7	2.8	2.9	3.1	3.2	3.5
Approximate Overall Diameter	mm	45.0	48.5	52.5	52.5	29.0	62.5	0.89	73.0	80.5
Approximate Cable Weight	Kg/Km	2330	2780	3300	3820	4300	4920	2990	7050	0669
Standard Drum Length	ш	200	200	200	200	200	200	400	300	250
Minimum Bending Radius of Cable (during installation)	mm	671	723	782	831	882	938	1017	1094	1202
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.41	0.325	0.265	0.211	0.161	0.130	0.102
Approximate Reactance at 50 Hertz	ohm/Km	0.11	0.11	0.10	0.10	60.0	60.0	60.0	60.0	0.08
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.23	0.19	0.16	0.14
Approximate Capacitance of Cable	µf/Km	0.25	0.29	0.35	0.38	0.41	0.47	0.51	0.54	0.58
Approx. Charging Current per phase at Uo = 6kV and f = 50Hz	mA/m	0.47	0.55	99.0	0.72	0.77	0.89	96.0	1.0	1.1
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	∢	151	184	217	250	283	316	358	410	462
2. Drawn into Ducts, Ground Temp. 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	∢	127	156	189	212	241	274	316	354	406
3. Laid singly in Air, Ambient Temp. 35° C	∢	163	201	239	282	316	368	431	488	565
One Second Short Circuit Current Rating of Conductor	kA	4.70	6.58	8.93	11.30	14.10	17.40	22.60	28.20	37.60

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

6/10 (12)kV

**Aluminium Conductors XLPE Insulated** to IEC 60502-2 Unarmoured Three Core



1.HCC⁺ ™ Aluminium Conductor

2. Semiconductive conductor screen 3.DFI™ XLPE Insulation

4. Semiconductive insulation screen

5 Copper tape screen

7. Tape binder 6. Fillers



**Ducab Powerplus** 

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## حوطاب باوربسلاس

### Table 33

Nominal Area of Conductor	mm²	20	70	92	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	m m	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	125	180	250	313	386	486	637	800	1024	1318	1672	2231	2745
Insulation Thickness (Nominal)	mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Separation Sheath Thickness	mm	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	4.1	4.	1.5
Armour Wire Diameter (Nominal)	mm	1.6	1.6	1.6	1.6	2	2	2	7	2.5	2.5	2.5	2.5	2.5
Outersheath Thickness (Nominal)	mm	1.8	1.9	1.9	2	2.1	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.9
Approximate Overall Diameter	mm	28.0	29.5	31.5	33.0	35.5	37.0	39.5	41.5	46.5	49.5	53.0	57.5	61.5
Approximate Cable Weight	Kg/Km	910	1180	1370	1530	1780	1960	2300	2620	3260	3900	4650	4960	5710
Standard Drum Length	٤	200	200	200	200	200	200	200	200	200	200	400	300	300
Minimum Bending Radius of Cable (during installation)	mm	416	440	467	489	527	222	588	623	692	738	792	855	921
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469	0.0367	0.0291
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.13	0.102	0.080	0.064	0.051	0.043
Approximate Reactance at 50 Hertz	ohm/Km	0.14	0.13	0.12	0.12	0.12	0.11	0.11	0.10	0.10	0.10	0.10	60.0	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.23	0.19	0.16	0.14	0.12	0.11	0.10	0.10
Approximate Capacitance of Cable	µf/Km	0.25	0.29	0.35	0.38	0.41	0.47	0.51	0.54	0.58	99.0	0.74	0.78	0.80
Approx. Charging Current per phase at Uo = 6kV and f = 50Hz	mA/m	0.47	0.55	99.0	0.72	0.77	0.89	96.0	1.0	1.7	1.2	4.1	1.5	1.5
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	∢	151	187	223	249	280	316	360	405	454	202	220	623	929
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	∢	151	187	218	245	267	298	338	374	405	445	490	525	220
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	∢	179	221	271	327	350	400	469	534	616	708	810	902	994
One Second Short Circuit Current Rating of Conductor	ΚĀ	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60	47.00	59.22	75.20	94.00

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 6/10 (12)kV

**Aluminium Conductors Aluminium Wire XLPE Insulated** to IEC 60502-2 Single Core Armoured



1.HCC⁺™ Aluminium Conductor

2.Semiconductive conductor screen

3.DFI™ XLPE Insulation

4. Semiconductive insulation screen 5.Copper tape screen

6. Bedding

7. Aluminium armour

### Table 34

Nominal Area of Conductor	mm <sub>2</sub>	20	70	95	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	381	549	762	955	1177	1482	1942	2439	3122
Insulation Thickness (Nominal)	mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Separation Sheath Thickness	mm	1.4	1.4	1.5	1.6	1.6	1.7	1.8	1.9	2
Armour Wire Diameter (Nominal)	mm	2.5	2.5	2.5	2.5	2.5	2.5	3.15	3.15	3.15
Outersheath Thickness (Nominal)	mm	2.6	2.7	2.9	က	3.1	3.2	3.4	3.6	3.8
Approximate Overall Diameter	mm	53.0	56.5	61.0	64.0	67.5	71.5	78.5	83.5	91.0
Approximate Cable Weight	Kg/Km	4350	4960	5360	6240	6780	7520	0296	10860	12450
Standard Drum Length	E	200	200	200	400	300	300	250	200	200
Minimum Bending Radius of Cable (during installation)	mm	989	678	727	768	810	857	940	1002	1092
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102
Approximate Reactance at 50 Hertz	ohm/Km	0.11	0.11	0.10	0.10	60.0	0.09	0.09	60.0	0.08
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.23	0.19	0.16	0.14
Approximate Capacitance of Cable	pf/Km	0.25	0.29	0.35	0.38	0.41	0.47	0.51	0.54	0.58
Approx. Charging Current per phase at Uo = 6kV and f = 50Hz	mA/m	0.47	0.55	99.0	0.72	0.77	0.89	0.96	1.0	1.1
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	⋖	142	174	205	236	267	298	338	387	436
2. Drawn into ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	120	147	178	200	227	258	298	334	383
3. Laid singly in Air, Ambient Temp. 35° C	⋖	156	193	230	271	304	354	414	469	543
One Second Short Circuit Current Rating of Conductor	kA	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

1.HCC⁺™ Aluminium Conductor

2.Semiconductive conductor screen

3.DFI™ XLPE Insulation

4.Semiconductive insulation screen

6. Fillers

5.Copper tape screen

7. Tape binder

8. Bedding

9. Galvanised steel wire armour

10. Outer sheath

### **DUCAB POWERPLUS Aluminium Conductors XLPE Insulated** to IEC 60502-2 6/10 (12)kV Three Core

**Steel Wire Armoured** 

## Table 35

Nominal Area of Conductor	mm²	20	20	96	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	381	549	762	955	1177	1482	1942	2439	3122
Insulation Thickness (Nominal)	mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Separation Sheath Thickness	mm	1.4	1.4	1.5	1.6	1.6	1.7	1.8	1.9	2
Steel Tape Thickness (Nominal)	шш	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.8
Outersheath Thickness (Nominal)	шш	2.6	2.7	2.8	2.9	က	3.1	3.3	3.5	3.7
Approximate Overall Diameter	mm	51.0	55.0	29.0	62.0	0.99	69.5	75.0	80.5	88.0
Approximate Cable Weight	Kg/Km	3150	3620	4220	4770	5350	0909	7230	8450	11380
Standard Drum Length	٤	200	200	200	200	400	400	300	250	200
Minimum Bending Radius of Cable (during installation)	mm	612	655	704	744	787	833	899	962	1051
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102
Approximate Reactance at 50 Hertz	ohm/Km	0.11	0.11	0.10	0.10	60.0	60.0	60.0	60.0	0.08
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.23	0.19	0.16	0.14
Approximate Capacitance of Cable	µf/Km	0.25	0.29	0.35	0.38	0.41	0.47	0.51	0.54	0.58
Approx. Charging Current per phase at Uo = 6kV and f = 50Hz	mA/m	0.47	0.55	99.0	0.72	0.77	0.89	96.0	1.0	1.1
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	⋖	142	174	205	236	267	298	338	387	436
2. Drawn into Ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	4	120	147	178	200	227	258	298	334	383
3. Laid singly in Air, Ambient Temp. 35° C	⋖	156	193	230	271	304	354	414	469	543
One Second Short Circuit Current Rating of Conductor	κA	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60
					0000					

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

6/10 (12)kV

**Aluminium Conductors Steel Tape Armoured XLPE Insulated** to IEC 60502-2 **Three Core** 



1.HCC⁺ ™ Aluminium Conductor

2.Semiconductive conductor screen

3.DFI™ XLPE Insulation

4.Semiconductive insulation screen

5.Copper tape screen 6. Fillers

7. Tape binder

8. Bedding

9. Galvanised steel tape armour

## **Ducab Powerplus**

# حوطاب باوربسلاس

### Table 36

Kg/Km         8.4         9.9         11.6         13         14.5         16.1         18.4         20.6         23.7         26.6           Kg/Km         125         180         250         313         386         486         637         800         1024         1318           mm         4.5	Nominal Area of Conductor	mm²	20	20	92	120	150	185	240	300	400	200	630	800	1000
Kg/Km         125         180         250         313         386         486         637         800         1024         1318           mm         4,5 <td>Conductor Diameter (Max)</td> <td>mm</td> <td>8.4</td> <td>6.6</td> <td>11.6</td> <td>13</td> <td>14.5</td> <td>16.1</td> <td>18.4</td> <td>20.6</td> <td>23.7</td> <td>26.6</td> <td>29.8</td> <td>33.6</td> <td>37.6</td>	Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
mm         4.5	Weight of Conductor (Approx)	Kg/Km	125	180	250	313	386	486	637	800	1024	1318	1672	2231	2745
mm         1.8         1.8         1.9         2         2         2.1         2.2         2.3           mm         24.5         26.0         27.5         29.0         31.0         32.5         35.0         37.5         40.5         43.5           Kg/Km         700         850         1000         1110         1300         1480         1710         1990         2400         2870           ation)         mm         482         514         550         500         <	Insulation Thickness (Nominal)	mm	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
kg/Km         700         850         11.0         13.0         32.5         35.0         37.5         40.5         43.5           ation)         mm         24.5         26.0         27.5         29.0         31.0         32.5         35.0         37.5         40.5         43.5           ation)         m         500	Outersheath Thickness (Nominal)	mm	1.8	1.8	1.8	1.9	1.9	2	2	2.1	2.2	2.3	2.4	2.5	2.7
High Mark Mark Mark Mark Mark Mark Mark Mark	Approximate Overall Diameter	mm	24.5	26.0	27.5	29.0	31.0	32.5	35.0	37.5	40.5	43.5	47.0	51.0	55.5
ation) mm 500 500 500 500 600 500 500 500 500 500	Approximate Cable Weight	Kg/Km	200	850	1000	1110	1300	1480	1710	1990	2400	2870	3440	3720	4350
ation) mm 482 514 550 580 612 646 696 742 808 870 ohm/Km 0.641 0.443 0.32 0.253 0.206 0.164 0.125 0.100 0.0778 0.0605 ohm/Km 0.622 0.568 0.411 0.325 0.265 0.211 0.162 0.130 0.102 0.080 ohm/Km 0.13 0.13 0.12 0.11 0.11 0.11 0.10 0.10 0.10 0.09 ohm/Km 0.22 0.25 0.28 0.34 0.29 0.23 0.19 0.16 0.14 0.12  ut/Km 0.22 0.25 0.28 0.31 0.33 0.36 0.41 0.44 0.49 0.54  and f = 50Hz mA/m 0.60 0.68 0.77 0.85 0.90 1.0 1.1 1.2 1.3 1.5  W,  A 151 187 223 249 285 320 369 423 481 543  A 156 191 227 254 280 312 360 405 534 616 727  buttor kA 4.70 6.58 8.93 11.28 14.10 17.39 22.56 28.20 37.60 47.00	Standard Drum Length	E	200	200	200	200	200	200	200	200	200	200	200	400	300
ohm/Km 0.641 0.443 0.32 0.265 0.164 0.125 0.100 0.0778 0.0605 0.0000 ohm/Km 0.822 0.568 0.411 0.325 0.265 0.211 0.162 0.130 0.102 0.080 0.000 ohm/Km 0.83 0.58 0.411 0.325 0.265 0.211 0.162 0.130 0.102 0.080 0.000 ohm/Km 0.83 0.58 0.43 0.34 0.29 0.23 0.19 0.16 0.10 0.10 0.09 0.09 0.000 ohm/Km 0.22 0.25 0.28 0.31 0.33 0.36 0.41 0.44 0.49 0.54 0.54 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.1	Minimum Bending Radius of Cable (during installation)	mm	482	514	220	280	612	949	969	742	808	870	938	1020	1106
ohm/Km 0.822 0.568 0.411 0.325 0.265 0.211 0.162 0.130 0.102 0.080 ohm/Km 0.13 0.13 0.12 0.11 0.11 0.11 0.10 0.10 0.10 0.00 0.0	Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469	0.0367	0.0291
ohm/Km 0.13 0.13 0.12 0.11 0.11 0.11 0.10 0.10 0.10 0.09 0.09	Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102	0.080	0.064	0.051	0.043
w,         A         156         0.43         0.34         0.29         0.23         0.19         0.16         0.14         0.12           and f = 50Hz         µf/Km         0.22         0.25         0.28         0.31         0.33         0.36         0.41         0.49         0.49         0.54           W,         A         151         187         223         249         285         320         369         423         481         543           S° C         A         166         207         258         294         336         312         466         534         616         727           Luctor         KA         4.70         6.58         8.93         11.28         14.10         17.39         22.56         28.20         37.60         47.00	Approximate Reactance at 50 Hertz	ohm/Km	0.13	0.13	0.12	0.11	0.11	0.11	0.10	0.10	0.10	60.0	60'0	60.0	0.08
and f = 50Hz	Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.23	0.19	0.16	0.14	0.12	0.11	0.10	0.09
and f = 50Hz       mA/m       0.60       0.68       0.77       0.85       0.90       1.0       1.1       1.2       1.3       1.5         W,       A       151       187       223       249       285       320       369       423       481       543         S° C       A       156       191       227       254       280       312       360       405       454       507         Juctor       KA       4.70       6.58       8.93       11.28       14.10       17.39       22.56       28.20       37.60       47.00	Approximate Capacitance of Cable	pf/Km	0.22	0.25	0.28	0.31	0.33	0.36	0.41	0.44	0.49	0.54	0.59	0.68	0.72
W,       A       151       187       223       249       285       320       369       423       481       543         S° C       A       156       191       227       254       280       312       360       405       454       507         S° C       A       166       207       258       294       336       391       460       534       616       727         Button       KA       4.70       6.58       8.93       11.28       14.10       17.39       22.56       28.20       37.60       47.00	Approx. Charging Current per phase at Uo = 8.7kV and f = 50Hz	m/Vm	09.0	0.68	0.77	0.85	06.0	1.0	1.	1.2	1.3	1.5	1.6	1.9	2.0
W,       A       151       187       223       249       285       320       369       423       481       543         5° C       A       156       191       227       254       280       312       360       405       454       507         5° C       A       166       207       258       294       336       391       460       534       616       727         3uctor       KA       4.70       6.58       8.93       11.28       14.10       17.39       22.56       28.20       37.60       47.00	Sustained Current Ratings														
A 151 187 223 249 285 320 369 423 481 543 543 55 55 55 55 55 585 545 50 55 55 55 585 55 55 55 55 55 55 55 55 55	1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
312 360 405 454 507 258 294 336 312 460 534 616 727 251 254 280 312 360 405 454 507 251 254 280 312 360 405 454 507 251 254 336 391 460 534 616 727 201 201 201 201 201 201 201 201 201 201	depth of laying = 0.8m, laid in trefoil touching	⋖	151	187	223	249	285	320	369	423	481	543	605	685	757
5°C A 156 191 227 254 280 312 360 405 454 507 507 258 294 336 391 460 534 616 727 2104ctor	2. Drawn into Ducts, Ground Temp. 30°C &														
A 166 207 258 294 336 391 460 534 616 727 KA 4.70 6.58 8.93 11.28 14.10 17.39 22.56 28.20 37.60 47.00	g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	156	191	227	254	280	312	360	405	454	202	220	632	703
KA 4.70 6.58 8.93 11.28 14.10 17.39 22.56 28.20 37.60 47.00	3. Laid in Air in trefoil touching, Ambient Temp. 35° C	⋖	166	207	258	294	336	391	460	534	616	727	837	975	1095
	One Second Short Circuit Current Rating of Conductor	\$	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60	47.00	59.22	75.20	94.00

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90"C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250"C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 8.7/15 (17.5)kV

**Aluminium Conductors XLPE Insulated** to IEC 60502-2 Unarmoured Single Core



1.HCC<sup>+</sup>™ Aluminium Conductor

2.Semiconductive conductor screen 3.DFI™ XLPE Insulation 4.Semiconductive insulation screen 5.Copper wire screen

6. Tape binder

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# حوطاب باوربسلاس

## Table 37

Nominal Area of Conductor	mm <sub>2</sub>	50	02	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	381	549	762	922	1177	1482	1942	2439	3122
Insulation Thickness (Nominal)	mm	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Outersheath Thickness (Nominal)	mm	2.5	2.6	2.8	2.9	က	3.1	3.2	3.4	3.6
Approximate Overall Diameter	mm	20.0	53.5	57.5	60.5	64.0	68.0	73.0	78.0	85.5
Approximate Cable Weight	Kg/Km	1500	1840	2260	2650	3060	3610	4470	5290	7680
Standard Drum Length	E	200	200	200	200	200	400	300	300	250
Minimum Bending Radius of Cable (during installation)	mm	749	800	858	806	929	1014	1094	1170	1277
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102
Approximate Reactance at 50 Hertz	ohm/Km	0.12	0.11	0.11	0.10	0.10	0.10	60.0	60.0	0.09
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.23	0.19	0.16	0.14
Approximate Capacitance of Cable	µf/Km	0.22	0.25	0.28	0.31	0.33	0.36	0.41	0.44	0.49
Approx. Charging Current per phase at Uo = 8.7kV and f = 50Hz	mA/m	09.0	0.68	0.77	0.85	06.0	1.0	1.1	1.2	1.3
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	<	151	184	217	250	283	316	358	410	462
2. Drawn into Ducts, Ground Temp. 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	127	156	189	212	241	274	316	354	406
3. Laid singly in Air, Ambient Temp. 35° C	<	163	201	239	282	316	368	431	488	292
One Second Short Circuit Current Rating of Conductor	kA	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 8.7/15 (17.5)kV

**Aluminium Conductors XLPE Insulated** to IEC 60502-2 Unarmoured **Three Core** 



1.HCC⁺ ™ Aluminium Conductor

2.Semiconductive conductor screen

4. Semiconductive insulation screen 3.DFI™ XLPE Insulation

5.Copper tape screen

6. Fillers

7. Tape binder

# حوطاب باوربسلاس

### Table 38

Nominal Area of Conductor	mm <sup>2</sup>	20	20	92	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	шш	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	125	180	250	313	386	486	637	800	1024	1318	1672	2231	2745
Insulation Thickness (Nominal)	шш	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Separation Sheath Thickness	mm	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.4	1.5	1.6
Armour Wire Diameter (Nominal)	mm	1.6	1.6	2	2	2	2	7	2	2.5	2.5	2.5	2.5	2.5
Outersheath Thickness (Nominal)	mm	1.9	2	2	2.1	2.1	2.2	2.3	2.3	2.5	2.6	2.7	2.8	က
Approximate Overall Diameter	mm	30.5	32.0	34.5	36.0	37.5	39.5	42.0	44.0	48.5	52.0	55.5	59.5	64.0
Approximate Cable Weight	Kg/Km	1110	1230	1470	1660	1840	1960	2350	2570	3110	3740	4340	5240	6040
Standard Drum Length	E	200	200	200	200	200	200	200	200	200	200	400	300	300
Minimum Bending Radius of Cable (during installation)	mm	452	476	515	537	561	282	624	099	728	922	828	893	959
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469	0.0367	0.0291
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.13	0.102	0.080	0.064	0.051	0.043
Approximate Reactance at 50 Hertz	ohm/Km	0.14	0.13	0.13	0.12	0.12	0.12	0.11	0.11	0.11	0.10	0.10	0.09	0.09
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.23	0.19	0.16	0.14	0.12	0.11	0.10	0.10
Approximate Capacitance of Cable	µf/Km	0.22	0.25	0.28	0.31	0.33	0.36	0.41	0.44	0.49	0.54	0.59	0.68	0.72
Approx. Charging Current per phase at Uo = 8.7kV and f = 50Hz	mA/m	09.0	0.68	0.77	0.85	06.0	1.0	1.1	1.2	1.3	1.5	1.6	1.9	2.0
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	⋖	151	187	223	249	280	316	360	405	454	202	220	623	929
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	V	151	187	218	245	267	298	338	374	405	445	490	525	920
3. Laid in Air in trefoil touching, Ambient Temp, 35° C	⋖	179	221	271	327	350	400	469	534	616	708	810	905	994
One Second Short Circuit Current Rating of Conductor	₹	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37 60	47.00	59.22	75.20	94.00

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

8.7/15 (17.5)kV

**Aluminium Conductors Aluminium Wire XLPE Insulated** to IEC 60502-2 Single Core Armoured



1.HCC⁺™ Aluminium Conductor

2.Semiconductive conductor screen

3.DFI™ XLPE Insulation

4. Semiconductive insulation screen

5.Copper tape screen

6. Bedding

7. Aluminium armour

**Ducab Powerplus** 

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### Table 39

Nominal Area of Conductor	mm <sup>2</sup>	20	20	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	381	549	762	922	1177	1482	1942	2439	3122
Insulation Thickness (Nominal)	mm	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Separation Sheath Thickness	mm	1.5	1.5	1.6	1.7	1.7	1.8	1.9	2	2.1
Armour Wire Diameter (Nominal)	mm	2.5	2.5	2.5	2.5	2.5	3.15	3.15	3.15	3.15
Outersheath Thickness (Nominal)	mm	2.8	2.9	8	3.2	3.3	3.4	3.6	3.8	4
Approximate Overall Diameter	mm	58.5	62.0	0.99	69.5	73.0	78.5	84.0	89.0	96.5
Approximate Cable Weight	Kg/Km	5050	2660	0989	0689	8420	9270	10420	11710	13500
Standard Drum Length	E	200	200	400	400	300	250	250	200	200
Minimum Bending Radius of Cable (during installation)	mm	869	742	791	832	874	936	1003	1066	1154
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102
Approximate Reactance at 50 Hertz	ohm/Km	0.12	0.11	0.11	0.10	0.10	0.010	60.0	60.0	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.23	0.19	0.16	0.14
Approximate Capacitance of Cable	µf/Km	0.22	0.25	0.28	0.31	0.33	0.36	0.41	0.44	0.49
Approx. Charging Current per phase at Uo = 8.7kV and f = 50Hz	mA/m	09.0	0.68	0.77	0.85	06.0	1.0	1.1	1.2	1.3
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	⋖	142	174	205	236	267	298	338	387	436
2. Drawn into ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	۷	120	147	178	200	227	258	298	334	383
3. Laid singly in Air, Ambient Temp. 35° C	<	156	193	230	271	304	354	414	469	543
One Second Short Circuit Current Rating of Conductor	ΚĀ	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60
FOR ALL CARLES THE MAXIMILIM CONDITIONS OPERATING TEMPERATIBE IS 90°C AND LIMITING CONDITIONS TEMPERATIBE AFTER SHORT CIRCUIT IS 250°C	NG CONDITION TH	MPERATIRE	AFTER SHO	RT CIRCUIT IS	\$ 250°C					

For all cables the maximum conductor operating temperature is 90°C and limiting conductor temperature after short circuit is 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

8.7/15 (17.5)kV

**Aluminium Conductors Steel Wire Armoured XLPE Insulated** to IEC 60502-2 **Three Core** 



- 2.Semiconductive conductor screen
  - 3.DFI™ XLPE Insulation
- 4. Semiconductive insulation screen 5.Copper tape screen
  - 6. Fillers
- 7. Tape binder
- 9. Galvanised steel wire armour 8. Bedding
- 10. Outer sheath



## **Ducab Powerplus**

## Table 40

Nominal Area of Conductor	mm²	50	7.0	95	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	381	549	762	922	1177	1482	1942	2439	3122
Insulation Thickness (Nominal)	mm	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Separation Sheath Thickness	mm	1.5	1.5	1.6	1.7	1.7	1.8	1.9	2	2.1
Steel Tape Thickness (Nominal)	mm	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.8	0.8
Outersheath Thickness (Nominal)	mm	2.7	2.9	က	3.1	3.2	3.3	3.5	3.6	3.9
Approximate Overall Diameter	mm	56.5	0.09	64.0	67.5	71.0	75.0	80.5	85.5	93.0
Approximate Cable Weight	Kg/Km	3750	4220	4830	5400	6010	6840	8000	10270	12420
Standard Drum Length	٤	200	200	200	200	400	300	300	250	200
Minimum Bending Radius of Cable (during installation)	mm	929	719	768	808	851	968	962	1026	1115
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102
Approximate Reactance at 50 Hertz	ohm/Km	0.12	0.11	0.11	0.10	0.10	0.10	60.0	60.0	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.23	0.19	0.16	0.14
Approximate Capacitance of Cable	µf/Km	0.22	0.25	0.28	0.31	0.33	0.36	0.41	0.44	0.49
Approx. Charging Current per phase at Uo = 8.7kV and f = 50Hz	mA/m	09.0	0.68	0.77	0.85	06.0	1.0	1.1	1.2	1.3
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	⋖	142	174	205	236	267	298	338	387	436
2. Drawn into ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	∢	120	147	178	200	227	258	298	334	383
3. Laid singly in Air, Ambient Temp. 35° C	∢	156	193	230	271	304	354	414	469	543
One Second Short Circuit Current Rating of Conductor	ΚA	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60
	0				0,040 %					

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

1.HCC⁺™ Aluminium Conductor

2. Semiconductive conductor screen

3.DFI™ XLPE Insulation

4.Semiconductive insulation screen

5.Copper tape screen 6. Fillers

7. Tape binder

8. Bedding

9. Galvanised steel tape armour

10. Outer sheath

**DUCAB POWERPLUS** 

**Aluminium Conductors** Steel Tape Armoured **XLPE Insulated** to IEC 60502-2 **Three Core** 

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### Table 41

Nominal Area of Conductor	mm²	20	70	92	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	125	180	250	313	386	486	637	800	1024	1318	1672	2231	2745
Insulation Thickness (Nominal)	mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Outersheath Thickness (Nominal)	mm	1.8	1.8	1.9	1.9	2	2	2.1	2.2	2.3	2.4	2.5	2.6	2.7
Approximate Overall Diameter	mm	26.5	28.0	30.0	31.5	33.0	34.5	37.0	39.5	43.0	46.0	49.5	53.5	57.5
Approximate Cable Weight	Kg/Km	810	096	1110	1250	1450	1610	1850	2110	2520	3000	3600	3930	4540
Standard Drum Length	٤	200	200	200	200	200	200	200	200	200	200	200	400	300
Minimum Bending Radius of Cable (during installation)	mm	526	258	294	624	929	069	738	786	852	914	982	1062	1148
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469	0.0367	0.0291
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102	0.080	0.064	0.051	0.043
Approximate Reactance at 50 Hertz	ohm/Km	0.14	0.13	0.12	0.12	0.12	0.11	0.11	0.10	0.10	0.10	0.10	60.0	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.23	0.19	0.16	0.14	0.12	0.11	0.10	0.10
Approximate Capacitance of Cable	µf/Km	0.18	0.21	0.23	0.25	0.27	0.29	0.32	0.35	0.39	0.43	0.48	0.53	0.58
Approx. Charging Current per phase at Uo = 12kV and F = 50Hz	mA/m	0.68	0.79	0.87	0.94	1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	4	151	187	223	249	285	320	369	423	490	543	614	685	765
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	156	187	223	249	285	369	409	463	202	629	685	712	703
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	V	175	216	258	304	345	396	469	534	979	727	846	975	1113
One Second Short Circuit Current Rating of Conductor	ΚΑ	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60	47.00	59.22	75.20	94.00

For all cables the maximum conductor operating temperature is 90°C and limiting conductor temperature after short circuit is 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

12/20 (24)kV

**Aluminium Conductors XLPE Insulated** to IEC 60502-2 Unarmoured Single Core



1.HCC⁺ ™ Aluminium Conductor

2.Semiconductive conductor screen 3.DFI™ XLPE Insulation

4. Semiconductive insulation screen

5.Copper wire screen 6. Tape binder

### Table 42

Nominal Area of Conductor	mm <sup>2</sup>	20	20	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	381	549	762	922	1177	1482	1942	2439	3122
Insulation Thickness (Nominal)	mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Outersheath Thickness (Nominal)	mm	2.7	2.8	2.9	က	3.1	3.2	3.4	3.5	3.8
Approximate Overall Diameter	mm	54.5	58.0	62.0	65.5	68.5	72.5	77.5	83.0	0.06
Approximate Cable Weight	Kg/Km	3200	3720	4290	4830	5440	6140	7250	8400	9630
Standard Drum Length	Е	200	200	200	200	200	400	300	300	200
Minimum Bending Radius of Cable (during installation)	mm	818	869	929	226	1028	1083	1163	1239	1346
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102
Approximate Reactance at 50 Hertz	ohm/Km	0.12	0.12	0.11	0.11	0.10	0.10	0.10	60.0	60'0
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.23	0.19	0.16	0.14
Approximate Capacitance of Cable	µf/Km	0.18	0.21	0.23	0.25	0.27	0.29	0.32	0.35	0.39
Approx. Charging Current per phase at Uo = 12kV and F = 50Hz	mA/m	0.68	0.79	0.87	0.94	1.0	1.1	1.2	1.3	1.5
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	<	151	184	217	245	274	311	358	401	453
2. Drawn into Ducts, Ground Temp. 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	۷	132	160	193	222	250	283	325	363	410
3. Laid singly in Air, Ambient Temp. 35° C	<	167	206	249	287	321	373	440	498	574
One Second Short Circuit Current Rating of Conductor	kA	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

12/20 (24)kV

Three Core
Aluminium Conductors
XLPE Insulated
to IEC 60502-2
Unarmoured



1.HCC⁺™ Aluminium Conductor

2.Semiconductive conductor screen 3.DFI™ XLPE Insulation

4.Semiconductive insulation screen

5.Copper tape screen

6. Fillers

7. Tape binder

# حهجاب باوربسلاس

### Table 43

Nominal Area of Conductor	mm²	20	02	95	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	125	180	250	313	386	486	637	800	1024	1318	1672	2231	2745
Insulation Thickness (Nominal)	mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Separation Sheath Thickness	mm	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	4.1	1.5	1.5	1.6
Armour Wire Diameter (Nominal)	mm	1.6	2	2	2	2	2	2	2.5	2.5	2.5	2.5	2.5	2.5
Outersheath Thickness (Nominal)	mm	2	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.6	2.7	2.8	2.9	က
Approximate Overall Diameter	mm	32.5	35.0	36.5	38.0	9 2	41.5	44.0	47.5	51.0	54.0	57.5	62.0	66.5
Approximate Cable Weight	Kg/Km	1210	1380	1620	1760	1940	2110	2500	2920	3360	3990	4540	2490	6280
Standard Drum Length	E	200	200	200	200	200	200	200	200	200	200	400	300	300
Minimum Bending Radius of Cable (during installation)	mm	483	519	548	929	593	618	657	710	761	808	863	926	992
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469	0.0367	0.0291
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102	0.080	0.064	0.051	0.043
Approximate Reactance at 50 Hertz	ohm/Km	0.15	0.14	0.13	0.13	0.12	0.12	0.11	0.11	0.11	0.10	0.10	0.10	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.23	0.19	0.16	0.14	0.13	0.12	0.12	0.11
Approximate Capacitance of Cable	µf/Km	0.18	0.21	0.23	0.25	0.27	0.29	0.32	0.35	0.39	0.43	0.48	0.53	0.58
Approx. Charging Current per phase at Uo = 12kV and F = 50Hz	m/Vm	0.68	0.79	0.87	0.94	1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	4	151	187	218	249	276	312	360	401	454	202	220	623	929
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	A	151	182	218	245	267	298	338	369	409	454	498	534	220
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	<	184	225	271	313	354	405	469	534	616	708	810	905	994
One Second Short Circuit Current Rating of Conductor	kΑ	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60	47.00	59.22	75.20	94.00

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 12/20 (24)kV

**Aluminium Conductors Aluminium Wire XLPE Insulated** to IEC 60502-2 Single Core Armoured



1.HCC⁺ ™ Aluminium Conductor

2.Semiconductive conductor screen

3.DFI™ XLPE Insulation

4. Semiconductive insulation screen 5.Copper tape screen

6. Bedding

7. Aluminium armour

**Ducab Powerplus** 

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## **Ducab Powerplus**

### Table 44

Nominal Area of Conductor	mm²	20	02	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	381	549	762	922	1177	1482	1942	2439	3122
Insulation Thickness (Nominal)	mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Separation Sheath Thickness	mm	1.6	1.6	1.7	1.7	1.8	1.9	2	2.1	2.2
Armour Wire Diameter (Nominal)	mm	2.5	2.5	2.5	3.15	3.15	3.15	3.15	3.15	3.15
Outersheath Thickness (Nominal)	mm	က	3.1	3.2	3.4	3.5	3.6	3.8	3.9	4.2
Approximate Overall Diameter	mm	63.5	0.79	71.0	75.5	79.0	83.0	89.0	94.0	101.5
Approximate Cable Weight	Kg/Km	2650	6260	0969	8440	9130	10020	11220	12560	14400
Standard Drum Length	E	200	400	300	300	300	250	200	200	200
Minimum Bending Radius of Cable (during installation)	mm	757	799	848	906	948	962	1061	1123	1213
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102
Approximate Reactance at 50 Hertz	ohm/Km	0.12	0.12	0.11	0.11	0.10	0.10	0.10	60.0	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.23	0.19	0.16	0.14
Approximate Capacitance of Cable	µf/Km	0.18	0.21	0.23	0.25	0.27	0.29	0.32	0.35	0.39
Approx. Charging Current per phase at Uo = 12kV and F = 50Hz	mA/m	0.68	0.79	0.87	0.94	1.0	1.1	1.2	1.3	1.5
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	<	142	174	205	231	258	294	338	378	427
2. Drawn into ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	A	124	151	182	209	236	267	307	343	387
3. Laid singly in Air, Ambient Temp. 35° C	<	161	198	239	276	308	359	423	478	552
One Second Short Circuit Current Rating of Conductor	Κ	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 12/20 (24)kV

**Aluminium Conductors Steel Wire Armoured XLPE Insulated** to IEC 60502-2 Three Core



1.HCC⁺™ Aluminium Conductor

2. Semiconductive conductor screen

4. Semiconductive insulation screen 3.DFI™ XLPE Insulation

5. Copper tape screen 6. Fillers

7. Tape binder 8. Bedding

9. Galvanised steel wire armour 10. Outer sheath

# حوطاب باوربسلاس

### Table 45

**Ducab Powerplus** 

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Nominal Area of Conductor	mm <sub>2</sub>	20	20	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	381	549	762	955	1177	1482	1942	2439	3122
Insulation Thickness (Nominal)	шш	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Separation Sheath Thickness	шш	1.6	1.6	1.7	1.7	1.8	1.9	2	2.1	2.2
Steel Tape Thickness (Nominal)	шш	0.5	0.5	0.5	0.5	0.5	0.5	0.8	0.8	0.8
Outersheath Thickness (Nominal)	mm	2.9	က	3.1	3.2	3.4	3.5	3.6	3.8	4
Approximate Overall Diameter	mm	61.5	0.59	0.69	72.5	76.0	80.0	85.5	90.5	98.0
Approximate Cable Weight	Kg/Km	4220	4800	5390	2990	6740	7540	9570	10850	13390
Standard Drum Length	Е	200	200	200	400	400	300	250	200	200
Minimum Bending Radius of Cable (during installation)	mm	734	778	826	998	910	955	1021	1085	1174
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102
Approximate Reactance at 50 Hertz	ohm/Km	0.12	0.12	0.11	0.11	0.10	0.10	0.10	60.0	0.09
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.23	0.19	0.16	0.14
Approximate Capacitance of Cable	µf/Km	0.18	0.21	0.23	0.25	0.27	0.29	0.32	0.35	0.39
Approx. Charging Current per phase at Uo = 12kV and F = 50Hz	mA/m	0.68	0.79	0.87	0.94	1.0	<del>-</del>	1.2	1.3	1.5
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	⋖	142	174	205	231	258	294	338	378	427
2. Drawn into Ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	4	125	151	182	209	236	267	307	343	387
3. Laid singly in Air, Ambient Temp. 35° C	∢	161	198	239	276	308	359	423	478	552
One Second Short Circuit Current Rating of Conductor	\$	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60
(°°C)					0.00					

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

12/20 (24)kV

**Aluminium Conductors Steel Tape Armoured XLPE Insulated** to IEC 60502-2 **Three Core** 



1.HCC⁺™ Aluminium Conductor

2.Semiconductive conductor screen

3.DFI™ XLPE Insulation

4.Semiconductive insulation screen

5.Copper tape screen 6. Fillers

7. Tape binder

8. Bedding

9. Galvanised steel tape armour

## Table 46

Nominal Area of Conductor	mm <sup>2</sup>	20	02	92	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	шш	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	125	180	250	313	386	486	637	800	1024	1318	1672	2231	2745
Insulation Thickness (Nominal)	шш	80	80	80	80	80	80	80	80	80	80	8	80	80
Outersheath Thickness (Nominal)	mm	7	2	2.1	2.1	2.2	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9
Approximate Overall Diameter	mm	32.0	33.5	35.0	36.5	38.5	40.0	42.5	45.0	48.0	51.0	54.5	58.5	63.0
Approximate Cable Weight	Kg/Km	1120	1260	1450	1570	1780	1940	2230	2580	2990	3600	4270	4460	5110
Standard Drum Length	٤	200	200	200	200	200	200	200	200	200	200	200	400	300
Minimum Bending Radius of Cable (during installation)	mm	632	664	200	730	762	962	846	892	928	1020	1088	1170	1254
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469	0.0367	0.0291
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.161	0.129	0.101	0.080	0.063	0.051	0.042
Approximate Reactance at 50 Hertz	ohm/Km	0.15	0.14	0.14	0.13	0.13	0.12	0.12	0.11	0.11	0.10	0.10	0.10	60.0
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.59	0.43	0.35	0.29	0.24	0.2	0.17	0.15	0.13	0.12	0.11	0.10
Approximate Capacitance of Cable	µf/Km	0.14	0.16	0.18	0.19	0.20	0.22	0.24	0.26	0.29	0.32	0.35	0.40	0.44
Approx. Charging Current per phase at Uo = 18kV and F = 50Hz	mA/m	0.79	6.0	1.0	1:1	1.1	1.2	4.1	1.5	1.6	1.8	2.0	2.3	2.5
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	⋖	151	187	223	249	285	320	369	423	490	543	614	694	292
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	A	156	182	218	245	267	298	338	369	409	454	498	534	220
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	4	175	216	258	304	345	396	469	534	929	727	846	984	1113
One Second Short Circuit Current Rating of Conductor	kA	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60	47.00	59.22	75.20	94.00

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

18/30 (36)kV

**Aluminium Conductors** XLPE Insulated to IEC 60502-2 Unarmoured Single Core



1.HCC⁺™ Aluminium Conductor

2. Semiconductive conductor screen

3.DFI™ XLPE Insulation

4. Semiconductive insulation screen

5.Copper wire screen 6. Tape binder

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### Table 47

Nominal Area of Conductor	mm²	20	20	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	381	549	762	922	1177	1482	1942	2439	3122
Insulation Thickness (Nominal)	mm	80	80	80	80	80	80	80	80	∞
Outersheath Thickness (Nominal)	mm	3.1	3.2	3.3	3.4	3.5	3.6	3.8	3.9	4.2
Approximate Overall Diameter	mm	99	69.5	73.4	9.97	80.1	83.8	89.1	94.1	101.3
Approximate Cable Weight	Kg/Km	4480	5120	2800	6390	0669	7730	8950	10190	10070
Standard Drum Length	٤	200	200	200	200	200	200	250	200	200
Minimum Bending Radius of Cable (during installation)	mm	066	1043	1101	1149	1202	1257	1337	1412	1520
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.1	0.0778
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.13	0.102
Approximate Reactance at 50 Hertz	ohm/Km	0.136	0.128	0.122	0.117	0.114	0.11	0.106	0.102	0.098
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.24	0.19	0.16	0.14
Approximate Capacitance of Cable	µf/Km	0.14	0.16	0.18	0.19	0.2	0.22	0.24	0.26	0.29
Approx. Charging Current per phase at Uo = 18kV and F = 50Hz	mA/m	0.79	06.0	1.0	1.1	1.1	1.2	4.1	1.5	1.6
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	⋖	151	184	217	245	274	311	358	401	453
2. Drawn into Ducts, Ground Temp. 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	132	160	193	222	250	283	325	363	410
3. Laid singly in Air, Ambient Temp. 35° C	⋖	167	206	249	287	321	373	440	498	574
One Second Short Circuit Current Rating of Conductor	kA	4.7	6.58	8.93	11.28	14.1	17.39	22.56	28.2	37.6

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT GIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

18/30 (36)kV

**Aluminium Conductors XLPE Insulated** to IEC 60502-2 Unarmoured **Three Core** 



1.HCC⁺™ Aluminium Conductor

2. Semiconductive conductor screen 3.DFI™ XLPE Insulation 4. Semiconductive insulation screen

5.Copper tape screen

7. Tape binder 6. Fillers

### Table 48

	_													
Nominal Area of Conductor	mm²	9	20	92	120	150	185	240	300	400	200	630	800	1000
Conductor Diameter (Max)	шш	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7	26.6	29.8	33.6	37.6
Weight of Conductor (Approx)	Kg/Km	125	180	250	313	386	486	637	800	1024	1318	1672	2231	2745
Insulation Thickness (Nominal)	mm	8	80	80	80	80	8	80	80	80	œ	80	80	80
Separation Sheath Thickness	mm	1.2	1.2	1.2	1.2	1.3	1.3	1.3	4.1	1.4	1.5	1.6	1.6	1.7
Armour Wire Diameter (Nominal)	mm	2	2	2	2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Outersheath Thickness (Nominal)	mm	2.2	2.2	2.3	2.3	2.4	2.5	2.6	2.6	2.7	2.85	2.9	3.1	3.2
Approximate Overall Diameter	шш	38.5	40.0	42.0	43.5	46.5	48.0	50.5	53.0	56.5	59.5	63.5	67.5	72.0
Approximate Cable Weight	Kg/Km	1740	1850	2060	2260	2590	2760	3100	3420	4000	4690	5240	6240	7340
Standard Drum Length	E	200	200	200	200	200	200	200	200	200	200	300	250	200
Minimum Bending Radius of Cable (during installation)	mm	929	299	627	651	692	719	756	792	845	893	945	1008	1076
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469	0.0367	0.0291
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102	0.080	0.064	0.051	0.043
Approximate Reactance at 50 Hertz	ohm/Km	0.16	0.15	0.14	0.13	0.13	0.13	0.12	0.12	0.11	0.11	0.11	0.10	0.10
Approximate Impedance at 50 Hertz	ohm/Km	0.84	0.59	0.43	0.35	0.3	0.25	0.2	0.17	0.15	0.14	0.12	0.11	0.10
Approximate Capacitance of Cable	µf/Km	0.14	0.16	0.18	0.19	0.2	0.22	0.24	0.26	0.29	0.32	0.35	0.4	0.44
Approx. Charging Current per phase at Uo = 18kV and F = 50Hz	mA/m	0.79	6.0	1.0	1.7	1:1	1.2	4.1	1.5	1.6	1.8	2.0	2.3	2.5
Sustained Current Ratings														
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,														
depth of laying = 0.8m, laid in trefoil touching	⋖	151	187	218	249	276	312	360	401	454	202	220	623	929
2. Drawn into Ducts, Ground Temp. 30°C &														
g =1.2°C m/W, depth of laying = 0.8m, laid singly	V	151	182	218	245	267	298	338	369	409	454	498	534	220
3. Laid in Air in trefoil touching, Ambient Temp. 35° C	4	184	225	271	313	354	405	469	534	616	208	810	905	994
One Second Short Circuit Current Rating of Conductor	kA	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60	47.00	59.22	75.20	94.00
					( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (									

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

## 18/30 (36)kV

### **Aluminium Conductors Aluminium Wire XLPE Insulated** to IEC 60502-2 Single Core Armoured



1.HCC⁺™ Aluminium Conductor

2.Semiconductive conductor screen

3.DFI™ XLPE Insulation

4.Semiconductive insulation screen

5.Copper tape screen

6. Bedding

7. Aluminium armour 8. Outer sheath

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### Table 49

Nominal Area of Conductor	mm <sup>2</sup>	20	20	98	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	381	549	762	922	1177	1482	1942	2439	3122
Insulation Thickness (Nominal)	mm	80	80	80	80	80	80	80	80	8
Separation Sheath Thickness	mm	1.8	1.8	1.9	2	2	2.1	2.2	2.3	2.4
Armour Wire Diameter (Nominal)	mm	3,15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3,15
Outersheath Thickness (Nominal)	mm	3.4	3.5	3.6	3.7	3.9	4	4.1	4.3	4.5
Approximate Overall Diameter	mm	76.5	80.0	84.5	87.5	91.5	95.0	100.5	106.0	113.5
Approximate Cable Weight	Kg/Km	8640	9010	9910	10640	11330	12620	13720	15760	18430
Standard Drum Length	E	300	300	300	250	250	200	200	200	200
Minimum Bending Radius of Cable (during installation)	mm	918	096	1009	1050	1093	1139	1205	1267	1357
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.41	0.324	0.265	0.211	0.161	0.129	0.102
Approximate Reactance at 50 Hertz	ohm/Km	0.14	0.13	0.12	0.12	0.11	0.11	0.10	0.10	0.10
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.24	0.19	0.16	0.14
Approximate Capacitance of Cable	µf/Km	0.14	0.16	0.18	0.19	0.2	0.22	0.24	0.26	0.29
Approx. Charging Current per phase at Uo = 18kV and F = 50Hz	m/Vm	0.79	06.0	1.0	1.1	1.1	1.2	1.4	1.5	1.6
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	4	142	174	205	231	258	294	338	378	427
2. Drawn into ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	⋖	125	151	182	209	236	267	307	343	387
3. Laid singly in Air, Ambient Temp. 35° C	∢	161	198	239	276	308	359	423	478	552
One Second Short Circuit Current Rating of Conductor	kA	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60
C					0 0					

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

18/30 (36)kV

**Aluminium Conductors Steel Wire Armoured XLPE Insulated** to IEC 60502-2 Three Core



1.HCC⁺™ Aluminium Conductor

2. Semiconductive conductor screen

3.DFI™ XLPE Insulation

4. Semiconductive insulation screen

5. Copper tape screen 6. Fillers

7. Tape binder

8. Bedding

9. Galvanised steel wire armour

### Table 50

**Ducab Powerplus** 

Nominal Area of Conductor	mm <sub>2</sub>	20	20	92	120	150	185	240	300	400
Conductor Diameter (Max)	mm	8.4	6.6	11.6	13	14.5	16.1	18.4	20.6	23.7
Weight of Conductor (Approx)	Kg/Km	381	549	762	955	1177	1482	1942	2439	3122
Insulation Thickness (Nominal)	mm	œ	œ	∞	8	œ	80	8	œ	80
Separation Sheath Thickness	mm	1.8	1.8	1.9	2	2	2.1	2.2	2.3	2.4
Steel Tape Thickness (Nominal)	mm	0.5	0.5	0.5	0.8	8.0	0.8	0.8	0.8	0.8
Outersheath Thickness (Nominal)	mm	3.3	3.4	3.5	3.6	3.7	3.8	4	4.1	4.4
Approximate Overall Diameter	mm	735.5	77.0	81.0	84.5	88.0	92.0	97.5	102.5	109.5
Approximate Cable Weight	Kg/Km	2680	6380	7120	8650	9370	10240	11590	12970	15780
Standard Drum Length	Е	200	400	300	300	300	250	200	200	200
Minimum Bending Radius of Cable (during installation)	mm	878	922	971	1010	1054	1099	1166	1229	1313
Maximum DC resistance of Conductor at 20°C	ohm/Km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778
Approximate AC resistance of Conductor at 90°C	ohm/Km	0.822	0.568	0.41	0.324	0.265	0.211	0.161	0.129	0.102
Approximate Reactance at 50 Hertz	ohm/Km	0.14	0.13	0.12	0.12	0.11	0.11	0.10	0.10	0.10
Approximate Impedance at 50 Hertz	ohm/Km	0.83	0.58	0.43	0.34	0.29	0.24	0.19	0.16	0.14
Approximate Capacitance of Cable	µf/Km	0.14	0.16	0.18	0.19	020	0.22	0.24	0.26	0.29
Approx. Charging Current per phase at Uo = 18kV and F = 50Hz	mA/m	0.79	06.0	1.0	1.1	1.1	1.2	1.4	1.5	1.6
Sustained Current Ratings										
1. Laid Direct, Ground Temp. 30°C & g =1.2°C m/W,										
depth of laying = 0.8m, laid singly	⋖	142	174	205	231	258	294	338	378	427
2. Drawn into Ducts, Ground Temp. = 30°C &										
g =1.2°C m/W, depth of laying = 0.8m, laid singly	V	125	151	182	209	236	267	307	343	387
3. Laid singly in Air, Ambient Temp. 35° C	V	161	198	239	276	308	359	423	478	552
One Second Short Circuit Current Rating of Conductor	₹	4.70	6.58	8.93	11.28	14.10	17.39	22.56	28.20	37.60
				-						

FOR ALL CABLES THE MAXIMUM CONDUCTOR OPERATING TEMPERATURE IS 90°C AND LIMITING CONDUCTOR TEMPERATURE AFTER SHORT CIRCUIT IS 250°C. LONGER DRUM LENGTHS ARE AVAILABLE TO SPECIFIC CUSTOMER REQUIREMENTS.

2.Semiconductive conductor screen 1.HCC⁺ ™ Aluminium Conductor

- 4. Semiconductive insulation screen 3.DFI™ XLPE Insulation 5.Copper tape screen
  - 7. Tape binder 6. Fillers
- 8. Bedding
- 9. Galvanised steel tape armour 10. Outer sheath

**Aluminium Conductors** Steel Tape Armoured **XLPE Insulated** to IEC 60502-2 18/30 (36)kV Three Core





### **Technical Data Current Ratings and Rating Factors**

The current ratings of copper and aluminium conductor cables stated in the tables in this catalogue are based on the IEC 287 Publication, assuming continuous conductor operating temperature of 90°C, for cables laid underground or in air, or drawn through ducts.

These ratings are applicable for conditions defined in the tables and derating factors need to be applied in case of variations in:

- · Ambient temperature
- · Ground temperature
- · Depth of buried cable
- · Thermal resistivity of soil
- · Multiple circuits and their configuration

Appropriate tables for derating factors are provided in the latter part of this catalogue.

### **Short Circuit Ratings**

The short circuit rating graphs given in this catalogue assume final conductor temperature of 250°C rising from 90°C i.e., in a fully loaded condition. It is therefore necessary that accessories used with the cables are also capable of operation at these values of fault current and temperature.

The tables also indicate the specific short circuit fault current rating for a duration of one second for each cable size and type. When the fault duration (t) is different, then the appropriate rating may be obtained by multiplying the 1 second rating by the factor 1/√t.

Short circuit forces should be taken into account when single core cables are installed touching each other. Cleating and strapping should be such that repulsive forces that occur under short circuit conditions are contained.

### Installation

Cables described in this publication are suitable for laying direct in ground, in air or drawn through ducts. Special construction features are needed when sustained wet conditions prevail in the ground.

Cable pulling forces have to be limited according to the total conductor cross section area (A) in mm2 and the maximum may be limited to A x 50 Newtons for copper and A x 30 Newtons for aluminium.

Cable bending radii are recommended as follows:

	Minimum Be	nding Radius
	During installation	Controlled bending
Single core unarmoured	20D	15D
Single core armoured	15D	12D
Three core unarmoured	15D	12D
Three core armoured	12D	10D

D is overall cable diameter.

### Voltage Tests After Installation

The following test levels are recommended for cables immediately after installation.

15 min. D.C. Voltage Test
kV
15
25
37
50
76

Repeated voltage tests of an installation, particularly with cables in service for more than 5 years can be detrimental and hence not recommended. If unavoidable, 50% of above voltages may be applied for tests.



### **Rating Factors**

Table 51

### Cables laid direct in ground

### VARIATION IN GROUND TEMPERATURE

Ground temperature° C	15	20	25	30	35	40	45
Cable Type				Rating factor			
All Cables	1.11	1.08	1.04	1.00	0.96	0.91	0.87

Table 52 Rating factors for depth of laying (to centre of cable or trefoil group of cables)

Depth of laying	3.6/6kV to 18/30kV cables							
m	Up to 300mm <sup>2</sup>	Above 300mm²						
0.50	-	-						
0.60	-	-						
0.80	1.00	1.00						
1.00	0.98	0.97						
1.25	0.96	0.95						
1.50	0.95	0.94						
1.75	0.94	0.92						
2.00	0.92	0.90						
2.50	0.91	0.89						
3.00	0.90	0.88						
or more								

Table 53 RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL (AVERAGE VALUES)

mm²         0.8         0.9         1.0         1.5         2.0         2.5           Single core         50         1.15         1.11         1.07         0.91         0.81         0.73           70         1.16         1.12         1.07         0.91         0.81         0.73           95         1.16         1.12         1.07         0.91         0.81         0.73           120         1.16         1.12         1.07         0.91         0.81         0.73           150         1.17         1.12         1.07         0.91         0.81         0.73           185         1.17         1.12         1.07         0.91         0.81         0.73           240         1.17         1.12         1.07         0.91         0.80         0.73           300         1.18         1.12         1.07         0.91         0.80         0.73           400         1.18         1.12         1.07         0.91         0.80         0.73           500         1.18         1.12         1.07         0.91         0.80         0.73           630         1.18         1.12         1.07         0.91         0.	Soil thermal resistivity in K.m./W						
50         1.15         1.11         1.07         0.91         0.81         0.73           70         1.16         1.12         1.07         0.91         0.81         0.73           95         1.16         1.12         1.07         0.91         0.81         0.73           120         1.16         1.12         1.07         0.91         0.81         0.73           150         1.17         1.12         1.07         0.91         0.81         0.73           185         1.17         1.12         1.07         0.91         0.81         0.73           240         1.17         1.12         1.07         0.91         0.80         0.73           300         1.18         1.12         1.07         0.91         0.80         0.73           400         1.18         1.12         1.07         0.91         0.80         0.73           500         1.18         1.12         1.07         0.91         0.80         0.73           630         1.18         1.12         1.07         0.91         0.80         0.73           800         1.18         1.12         1.07         0.91         0.80         0.7	3.0						
70         1.16         1.12         1.07         0.91         0.81         0.73           95         1.16         1.12         1.07         0.91         0.81         0.73           120         1.16         1.12         1.07         0.91         0.81         0.73           150         1.17         1.12         1.07         0.91         0.81         0.73           185         1.17         1.12         1.07         0.91         0.81         0.73           240         1.17         1.12         1.07         0.91         0.80         0.73           300         1.18         1.12         1.07         0.91         0.80         0.73           400         1.18         1.12         1.07         0.91         0.80         0.73           500         1.18         1.12         1.07         0.91         0.80         0.73           630         1.18         1.12         1.07         0.91         0.80         0.73           800         1.18         1.12         1.07         0.91         0.80         0.73							
95         1.16         1.12         1.07         0.91         0.81         0.73           120         1.16         1.12         1.07         0.91         0.81         0.73           150         1.17         1.12         1.07         0.91         0.81         0.73           185         1.17         1.12         1.07         0.91         0.81         0.73           240         1.17         1.12         1.07         0.91         0.80         0.73           300         1.18         1.12         1.07         0.91         0.80         0.73           400         1.18         1.12         1.07         0.91         0.80         0.73           500         1.18         1.12         1.07         0.91         0.80         0.73           630         1.18         1.12         1.07         0.91         0.80         0.73           800         1.18         1.12         1.07         0.91         0.80         0.73	0.68						
120         1.16         1.12         1.07         0.91         0.81         0.73           150         1.17         1.12         1.07         0.91         0.81         0.73           185         1.17         1.12         1.07         0.91         0.81         0.73           240         1.17         1.12         1.07         0.91         0.80         0.73           300         1.18         1.12         1.07         0.91         0.80         0.73           400         1.18         1.12         1.07         0.91         0.80         0.73           500         1.18         1.12         1.07         0.91         0.80         0.73           630         1.18         1.12         1.07         0.91         0.80         0.73           800         1.18         1.12         1.07         0.91         0.80         0.73	0.68						
150         1.17         1.12         1.07         0.91         0.81         0.73           185         1.17         1.12         1.07         0.91         0.81         0.73           240         1.17         1.12         1.07         0.91         0.80         0.73           300         1.18         1.12         1.07         0.91         0.80         0.73           400         1.18         1.12         1.07         0.91         0.80         0.73           500         1.18         1.12         1.07         0.91         0.80         0.73           630         1.18         1.12         1.07         0.91         0.80         0.73           800         1.18         1.12         1.07         0.91         0.80         0.72	0.68						
185         1.17         1.12         1.07         0.91         0.81         0.73           240         1.17         1.12         1.07         0.91         0.80         0.73           300         1.18         1.12         1.07         0.91         0.80         0.73           400         1.18         1.12         1.07         0.91         0.80         0.73           500         1.18         1.12         1.07         0.91         0.80         0.73           630         1.18         1.12         1.07         0.91         0.80         0.73           800         1.18         1.12         1.07         0.91         0.80         0.72	0.68						
240     1.17     1.12     1.07     0.91     0.80     0.73       300     1.18     1.12     1.07     0.91     0.80     0.73       400     1.18     1.12     1.07     0.91     0.80     0.73       500     1.18     1.12     1.07     0.91     0.80     0.73       630     1.18     1.12     1.07     0.91     0.80     0.73       800     1.18     1.12     1.07     0.91     0.80     0.72	0.68						
300     1.18     1.12     1.07     0.91     0.80     0.73       400     1.18     1.12     1.07     0.91     0.80     0.73       500     1.18     1.12     1.07     0.91     0.80     0.73       630     1.18     1.12     1.07     0.91     0.80     0.73       800     1.18     1.12     1.07     0.91     0.80     0.73       1.18     1.12     1.07     0.91     0.80     0.72	0.68						
400     1.18     1.12     1.07     0.91     0.80     0.73       500     1.18     1.12     1.07     0.91     0.80     0.73       630     1.18     1.12     1.07     0.91     0.80     0.73       800     1.18     1.12     1.07     0.91     0.80     0.73       0.72     0.91     0.80     0.72	0.68						
500         1.18         1.12         1.07         0.91         0.80         0.73           630         1.18         1.12         1.07         0.91         0.80         0.73           800         1.18         1.12         1.07         0.91         0.80         0.72	0.68						
630 1.18 1.12 1.07 0.91 0.80 0.73 800 1.18 1.12 1.07 0.91 0.80 0.72	0.67						
800 1.18 1.12 1.07 0.91 0.80 0.72	0.67						
1112 1101 0101 0102	0.67						
1000   1.18   1.12   1.07   0.91   0.80   0.72	0.66						
	0.66						
Multicore							
50 1.13 1.09 1.06 0.92 0.83 0.76	0.71						
70   1.14   1.09   1.06   0.92   0.83   0.75	0.70						
95 1.14 1.09 1.06 0.92 0.83 0.75	0.70						
120 1.14 1.10 1.06 0.92 0.82 0.75	0.69						
150 1.14 1.10 1.06 0.92 0.82 0.75	0.69						
185         1.14         1.10         1.06         0.92         0.82         0.74	0.69						
240 1.15 1.10 1.07 0.92 0.81 0.74	0.69						
300 1.15 1.10 1.07 0.92 0.81 0.74	0.69						
400 1.15 1.10 1.07 0.92 0.81 0.74	0.69						

### **Group Rating Factors**

GROUP RATING FACTORS FOR CIRCUITS OF THREE SINGLE CORE CABLES IN TREFOIL AND LAID Table 54 FLAT TOUCHING, HORIZONTAL FORMATION (AVERAGE VALUES)

		SPACING SPACING								
	Number			Spacing of	Circuits					
	of Circuits	Touch	ing +							
	Circuits	Trefoil	Laid flat	0.15 m*	0.30 m	0.45 m	0.60 m			
3.6/6 to 12/20kV cables	2 3 4 5 6	0.78 0.66 0.59 0.55 0.52	0.81 0.68 0.62 0.58 0.55	0.81 0.71 0.65 0.61 0.58	0.85 0.76 0.72 0.68 0.66	0.88 0.80 0.76 0.73 0.72	0.90 0.83 0.80 0.77 0.76			
18/30kV cables	2 3 4 5 6	0.79 0.67 0.62 0.57 0.54	0.81 0.70 0.65 0.60 0.57	0.81 0.71 0.65 0.60 0.57	0.85 0.76 0.72 0.68 0.66	0.88 0.80 0.76 0.73 0.72	0.90 0.83 0.80 0.77 0.76			

<sup>\*</sup> This configuration, at 0.15m spacing, may not be practical for the larger size cables.

Table 55 GROUP RATING FACTORS FOR MULTICORE CABLES IN HORIZONTAL FORMATION

		→ SPACING ←						
	Number of	3						
	Cables in Group	Touching	0.15 m	0.30 m	0.45 m	0.60 m		
3.6/6 to 12/20kV cables	2 3 4 5 6	0.80 0.68 0.62 0.57 0.55	0.85 0.75 0.70 0.66 0.63	0.89 0.80 0.77 0.73 0.71	0.90 0.84 0.80 0.78 0.76	0.92 0.86 0.84 0.81 0.80		
18/30kV cables	2 3 4 5 6	0.80 0.70 0.64 0.59 0.56	0.83 0.73 0.68 0.63 0.60	0.87 0.78 0.74 0.70 0.68	0.89 0.82 0.78 0.75 0.74	0.91 0.85 0.82 0.79 0.78		



### Cables installed in single way ducts:

The term 'ducts' applies to single earthenware, fibre or plastic pipes.

Table 56 Variation in Ground Temperature

Ground temperature° C	15	20	25	30	35	40	45
Cable Type	Rating factor						
All Cables	1.11	1.08	1.04	1.00	0.96	0.91	0.87

Table 57

RATING FACTORS FOR DEPTH OF LAYING (TO CENTRE OF CABLE OR TREFOIL GROUP OF CABLES)

Depth of laying	3.6/6kV to 18/30kV cables						
m	Up to 300mm <sup>2</sup>	Above 300mm <sup>2</sup>					
0.50	-	-					
0.60	-	-					
0.80	1.00	1.00					
1.00	0.98	0.99					
1.25	0.95	0.97					
1.50	0.93	0.96					
1.75	0.92	0.95					
2.00	0.90	0.94					
2.50	0.89	0.93					
3.00	0.88	0.92					
or more							

Table 58 RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL (AVERAGE VALUES)

Size of cables			Soil thern	nal resistivity in	K.m./W		
mm²	0.8	0.9	1.0	1.5	2.0	2.5	3.0
50 70 95 120 150 185 240 300 400 500 630 800 1000	1.08 1.09 1.09 1.10 1.10 1.10 1.11 1.11 1.11	1.06 1.06 1.06 1.07 1.07 1.07 1.07 1.08 1.08 1.08 1.08 1.09	1.04 1.04 1.04 1.04 1.04 1.04 1.05 1.05 1.05 1.05 1.05	0.94 0.94 0.94 0.94 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93	0.87 0.87 0.87 0.86 0.86 0.86 0.85 0.85 0.85 0.85 0.84 0.84	0.82 0.81 0.80 0.80 0.79 0.79 0.79 0.78 0.78 0.78 0.77	0.77 0.76 0.76 0.75 0.75 0.75 0.74 0.74 0.73 0.73 0.73 0.72 0.72
Multicore  50 70 95 120 150 185 240 300 400	1.05 1.05 1.06 1.06 1.06 1.07 1.07 1.07	1.03 1.04 1.04 1.04 1.05 1.05 1.05 1.05	1.02 1.02 1.02 1.03 1.03 1.03 1.03 1.03 1.03	0.96 0.96 0.95 0.95 0.95 0.95 0.95 0.95	0.91 0.91 0.91 0.90 0.90 0.89 0.89 0.88 0.88	0.87 0.86 0.86 0.85 0.85 0.84 0.84 0.83	0.83 0.82 0.82 0.81 0.80 0.80 0.79 0.78

### **Group Rating Factors**

GROUP RATING FACTORS FOR SINGLE CORE CABLES IN TREFOIL Table 59 SINGLE WAY DUCTS, HORIZONTAL FORMATION (AVERAGE VALUES)

		SPACING SPACING							
	Number of		Spacing						
	Circuits	Touching	0.45 m	0.60 m					
3.6/6 to 12/20 kV Cables	2 3 4 5 6	0.85 0.75 0.70 0.67 0.64	0.88 0.80 0.76 0.73 0.71	0.90 0.83 0.80 0.77 0.76					
18/30kV Cables	2 3 4 5 6	0.85 0.76 0.71 0.67 0.65	0.88 0.80 0.76 0.73 0.71	0.90 0.83 0.80 0.77 0.76					

GROUP RATING FACTORS FOR MULTICORE CABLES IN SINGLE WAY DUCTS, Table 60 HORIZONTAL FORMATION (AVERAGE VALUES)

	Number of	spacing Spacing								
	Ducts in Ground	Touching	0.30 m	0.45 m	0.60 m					
3.6/6 to 12/20kV cables	2 3 4 5 6	0.88 0.80 0.75 0.71 0.69	0.91 0.84 0.81 0.77 0.75	0.93 0.87 0.84 0.82 0.80	0.94 0.89 0.87 0.85 0.84					
18/30kV cables	2 3 4 5 6	0.87 0.78 0.73 0.69 0.67	0.89 0.82 0.78 0.75 0.73	0.92 0.85 0.82 0.79 0.78	0.93 0.87 0.85 0.83 0.82					



### **Group Rating Factors**

### Cables installed in free air:

All the ratings for cables run in air are based upon the assumption that they are shielded from direct sunlight and without restriction of ventilation.

Table 61 Variation in Air Temperature

Ambient temperature° C	25	30	35	40	45	50	55		
Cable Type		Rating factor							
All Types	1.09	1.04	1.00	0.95	0.90	0.85	0.80		

Effect of grouping cables: No reduction in rating is necessary where there is free circulation of air around the circuits provided that:

- 1. The horizontal clearance between circuits is not less than twice the overall diameter of an individual cable.
- 2. The vertical clearance between circuits is not less than four times the diameter of an individual cable.
- 3. If the number of circuits exceeds three, they are installed in a horizontal plane.

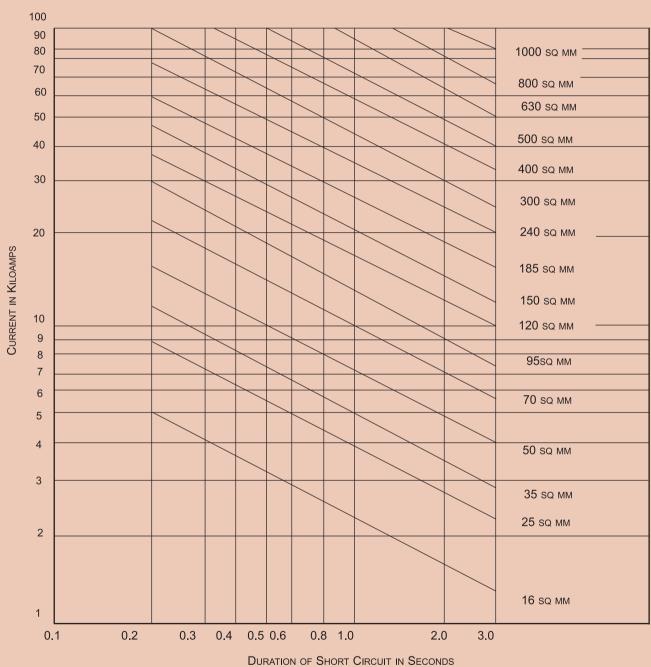
### Copper Screen for single core unarmoured cables:

It is common practice to provide copper screen of minimum cross-sectional area (as indicated below) for single core unarmoured cables, unless specific earth fault requirements of the system govern the same. In the latter case, it is advisable to design the copper screen to carry the specified earth fault current.

Table 62

	Conductor cross section mm <sup>2</sup>	Screen Area mm²
	50 - 120	16
	150 - 300	25
	400 and above	35
4		

### **Short Circuit Rating - Copper Conductor**



### Basis

1. Cable fully loaded at start of short circuit.

(Conductor temperature: 90°C)

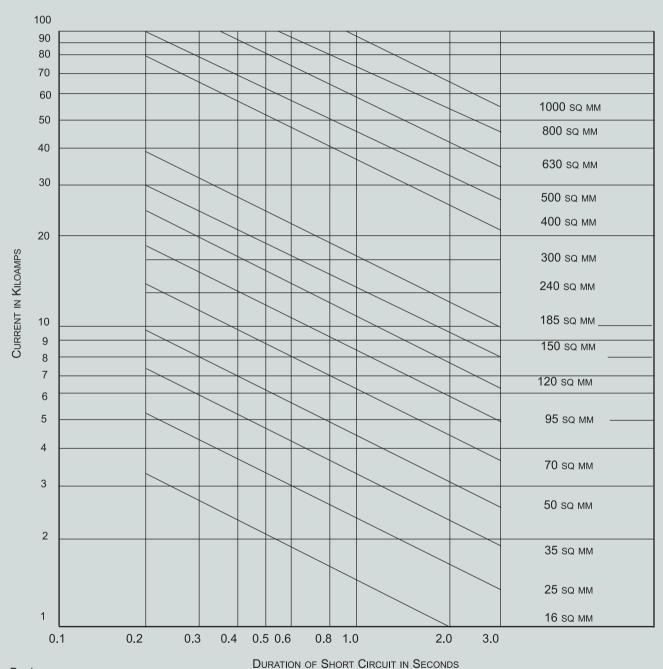
2. Conductor temperature at end of short circuit: 250°C

### Note:

It should be ensured that the accessories associated with the cable are also capable of operation at these values of fault current and temperature.



### **Short Circuit Rating - Aluminium Conductor**



### Basis

Dollarion of Short Sileon in Sec

1. Cable fully loaded at start of short circuit.

(Conductor temperature: 90°C)

2. Conductor temperature at end of short circuit: 250°C

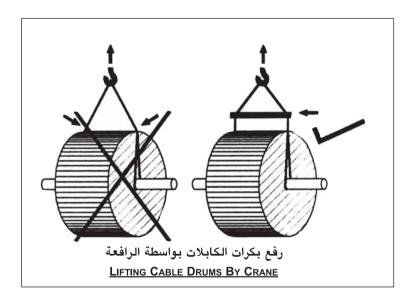
### Note:

It should be ensured that the accessories associated with the cable are also capable of operation at these values of fault current and temperature.

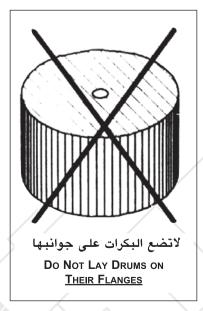
### **Cable Drum Handling**

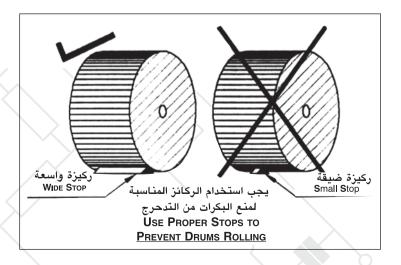
Ducab Medium Voltage cables should be installed by trained personnel in accordance with good engineering practices, recognised codes of practice, statutory local requirements, IEE wiring regulations and where relevant, in accordance with any specific instructions issued by the company. Cables are often supplied in heavy cable drums and handling these drums can constitute a safety hazard. In particular, dangers may arise during the removal of steel binding straps and during the removal of retaining battens and timbers which may expose projecting nails.

For detailed information, refer to Ducab's Drum Handling Instructions Catalogue.

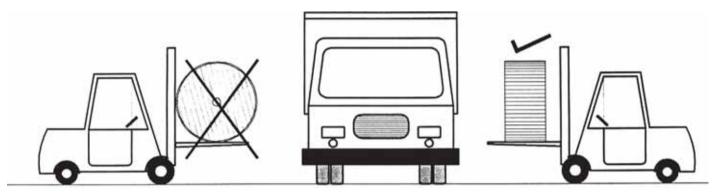




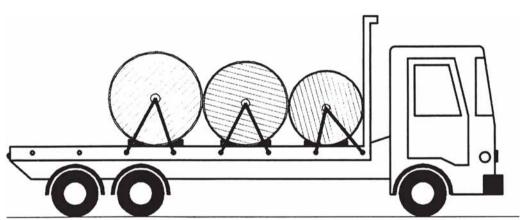




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