شركة هشام السويدي للتجارة المحدودة
HESHAM EL-SEWEDY TRADING CO. LTD.
A Company of Energya Engineering & Distribution

Jeddah Cable
Pre Qualification

FROM:
Hesham El Sewedy Trading Co. Ltd.

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HESHAM EL-SEWEDY TRADING CO. LTD.

A Company of Energya Engineering & Distribution

HSE COMPANY PROFILE

HSE PRODUCT PROFILE

Hesham El-Sewedy Trading Co.

Company Profile

THE COMPANY

Hesham El-Sewedy Trading Company (HSE) was established in the early 1960's in KSA specializing in the trading of cables and electric material supplies. Since then, HSE has grown manifold and today is recognized as one of the leaders and pioneers in the supply of various electrical materials in many of the countries in the Middle East and Africa. With 40 years of experience, extensive regional coverage, diversified product range, well qualified team, and partnerships with world class manufacturers, HSE has all the tools to guarantee the best products and services to our highly demanding customers across the region.

REGIONAL COVERAGE

Due to strong business base, sound financial status and distinguished reputation, HSE today is proud to serve its customers across the Middle East and Africa through direct and indirect presence in many countries of the region. HSE direct branches and warehouses in addition to the well established network of dealers gives the company a leading edge over competition to meet the expectations of the highly demanding customers.

- Saudi Arabia
- UAE
- Qatar
- Bahrain

SAUDI ARABIA & THE GCC

Qualified Staff

As a result of our commitment to offer the best customer service, we have a well qualified and experienced team of sales engineers which is available to support and follow-up on all the various project stages including design, specifications, material selection, submittals, etc.

Product Spectrum

We offer a “One-Stop Shop Concept” through our diversified product range. This covers all types of electrical materials required in the industrial, commercial, residential and lighting projects which are in accordance with European, American and other International standards.

We take extreme care in offering the best and most reliable products selected from world class manufacturers in order to satisfy our customers’ requirements.

The categories of products that we care are:

Cables & Wires	HV, MV, LV Cables. Control. Instrumentation & Specialty Cables. Building Wires. THHN Wires. Flat Wires. Flexible Wires.
Cable Accessories	Lugs. Joints. Tools. Tapes.
Switch Gears	LV Switchgear, MV Substations & Ring Main Units (RMU).
Lighting	Outdoor & Indoor Fixtures, Steel & Fiber Poles. Lamps. Ballasts & Lighting Components.
Cable Management	Steel, PVC & Flexible Conduits. Fittings. Boxes. Cable Trays, Cable Glands
Wiring Devices	BS & NEMA Standards.
Transformers	LV, MV & Auto Transformers.
Other Materials	Earthing Materials. Lightning Systems. Over Head Line Accessories. Change-over Switches. Fuse Boxes.




CUSTOMERS

Our diversified product spectrum accompanied with extensive geographical coverage and well qualified team of sales engineers are the key elements for our successful coverage of the various market segments in the region. Today, our customer base ranges from private end-users to the highly demanding oil fields projects. HSE Customer base is divided into the following categories.

OUR LOCATIONS

KSA OPERATIONS

HEAD OFFICE:		Tel: 02-2830034, Fax: 02-6647159, E-mail: info@el-sewedy.com
JEDDAH:	**Main Office.**	Tel: 02-2830034, Fax: 02-6647159
	Ganoubiya.	Tel: 02-6475206, Fax: 02-6477414
	Ghurab.	Tel: 02-6606652, Fax: 02-6606652
	Palestine.	Tel: 02-6729787, Fax: 02-6704160
	Senayia.	Tel: 02-6361600, Fax: 02-2310537
RIYADH:	**Main Office.**	Tel: 01-4024996, Fax: 01-4038447
	El-Kharij.	Tel: 01-4984612, Fax: 01-4983818
	Ghourabi.	Tel: 01-4028566, Fax: 01-4068697
	El-Malaz.	Tel: 01-4769170, Fax: 01-4777602
DAMMAM:	**Main Office.**	Tel: 03-8336961, Fax: 03-8336961 Ext: 110
	Showroom.	Tel: 03-8330069, Fax: 03-8336540
	Al Ahsa.	Tel: 03-5306584, Fax: 03-5306384
QASSIM:		Tel: 06-3258893, Fax: 06-3258895
MAKKAH:		Tel: 02-5591913, Fax: 02-5591913
MEDINA:		Tel: 04-8374659, Fax: 04-8374317
YANBU:		Tel: 04-3222232, Fax: 04-3227687

GCC

ABU DHABI:	Tel: +971–2-4434345, Fax: +971–2-443 3168
DUBAI:	Tel: +971-4-262 6605, Fax: +971-4-262 6608
QATAR:	Tel: +974-43 222 73, Fax: +974-4-322 283
BAHRAIN:	Tel: +973-39448487, Fax: +973-17490535

HSE Product Profile

Cables & Wires		1	Jeddah Cable Company
		2	HSE CABLES
		3	Energya Specialty Cables
		4	Giza Cables
Switch Gears		5	Mitsubishi
		6	GE
		7	LG
Lighting & Accessories		8	HSE Steels Poles
		9	HSE Fibre Glass Poles
		10	Cooper Lighting Fixtures
		11	Eclatec Street Lighting
		12	Tridonic ATCO
		13	Universal Ballasts
		14	GE Lamps
		15	Osram Lamps
		16	Gruppo Energia Capacitors
Conduits & Fittings		17	Saudi Ega PVC Conduits & Fittings
		18	Burn Steel Conduits
		19	Thomas & Betts / Steel City Steel Fittings
		20	Cooper Crouse-Hinds Fittings
		21	IMH/Sure Flexible Conduits & Fittings
Wiring Devices		22	Merlin Gerin Wiring Devices (BS Standard)
		23	Saudi Ega Wiring Devices (BS Standard)
		24	Edison Wiring Devices (BS Standard)
Cable Accessories		25	Legrand
		26	Nissad Cable Lugs & Accessories
		27	CMP Cable Glands
		28	CTL Cable Joints
		29	3M Tapes & Accessories
		30	Plymouth Tapes & Accessories
		31	Other Cable Accessories
Transformers		32	Manumag Dry-type LV Transformers
Other Materials		33	Conchiglia Fuse Boxes
		34	Thermoweld Earthing & Lightning Solutions
		35	EFEN Change Over Switches

JCC COMPANY PROFILE

JCC PRODUCT PROFILE

COMPANY BACKGROUND

Jeddah Cables Company is a leading manufacturer and innovator of a wide range of cable products; and with its extensive design and production capabilities, as well as a long-standing dedication to customer service. ***Jeddah Cables Company*** is a proven preferred choice of Cable clients throughout the region.

Jeddah Cables Company - a pioneer in R&D of Cable and Wire products, are prominent in the **Voice & Data, Communications, Electronic and Industrial; Commercial** and **Industrial Construction, HVAC, Automotive, Energy, Utilities** and **government market segments.**

In each of its diverse products, ***Jeddah Cables Company's*** distinct advantage is portrayed in its relentless commitment to quality, which is complemented by its superior technical expertise and extensive manufacturing capabilities. While we have always been known as a "quality" cable manufacturer, the drive for perfection has accelerated in recent years thanks to our rigorous accreditation process that is currently underway in our Laboratories. This is in addition to the aggressive quality control programs already in place. Continuous in-process inspections, full Laboratory verifications of product specifications and rigid life testing of finished products are all a routine. Rest assured that our products also meet all applicable international standards such as UL, NEC, IEC, and BS in addition to customer requirements.

Our Medium and High Voltage (MV&HV) plants are equipped with the latest CV line technology, as well as a recently commissioned HV-Lab. These high-tech machineries use triple XLPE extruders to meet all the requirements of MV/HV&EHV cable insulation extrusion.

At ***Jeddah Cables Company*** choosing a cable means more than selecting products from a catalogue, it means:

- ✓ Working with you, responding to technical problems with innovative solutions,
- ✓ Meeting your needs for dependable products, manufactured to your specifications with precision,
- ✓ Meeting tight deadlines and showing the kind of leadership and responsiveness that result in dependable service.

Our reputation for excellence has come from meeting the demanding performance needs of industrial control and instrument applications.

More than Two decades of experience in designing and manufacturing complex cable configurations has equipped ***Jeddah Cables Company*** with the right tools to tackle virtually any application. Our people have the knowledge, understanding and enthusiasm to satisfy your needs.

JEDDAH CABLES COMPANY IN BRIEF

Company Name:	Jeddah Cables Company
Postal Address:	P.O. Box 31248, Jeddah 21497 Kingdom of Saudi Arabia
Phone:	+966 2 6360770 +966 2 6380881 +966 2 6372299
Fax:	+966 2 6364695 +966 2 6350909 +966 2 6354754
E-mail Address:	info@cables.energya.com
Website:	http://www.jeddah-cable.com
Firm Classification:	Limited Liability Company
Industrial License Number:	491/S (Dated 10-05-1419 H)
Commercial Registration Number:	4030092405 (Dated 02-07-1413 H)
Date of company foundation:	28-06-1409 H 04-Feb-1989 G
Paid Up Capital:	SR 150,000,000.00
Bank Reference:	Saudi American Bank Saudi British Bank Saudi Holland Bank
Total Factory Area:	175,000 m²
Total Warehouse Area:	32,000 m²
Number of Employees:	1000 Persons

MANUFACTURING PLANTS

Jeddah Cables Company was established in 1989 as a startup plant in low voltage Cables. Today there are 5 major plants running under the certification of ISO 9001, 2000 which assures quality management and products.

1. Low Voltage Cables Plant:

We produce comprehensive products for the LV as well as Oil & Gas markets based on International standards and/or Client specifications. The product ranges in both size (0.5 mm² to 1000 mm²) and voltage rating (up to 0.6/1kV). These Cables also range in their applications, which include:

- ✓ Building Wires: Used for fixed indoor installations inside conduits and within the walls. Multi-core Cables can be used to connect the power supply with large loads such as air conditioning systems. Examples include copper with PVC insulation (NYA), and copper with PVC insulation and nylon coating (THHN).

- ✓ Control Cables: Used for outdoor/indoor installations for connecting signaling and control units in various industries, railways, and traffic signals. An example includes copper with two layers of PVC optional armoring.

- ✓ Power Cables: Used to transmit large amounts of current and voltage. They are employed in various aspects of the transmission and distribution of electricity to various loads. Example includes copper conductor covered with XLPE insulation, then assembled in a four-core manner, along with fillers and outer sheathing.

- ✓ Instrumentation Cables: These are basically control cables that can transmit sensitive signals, which cannot tolerate noise coming from other components.

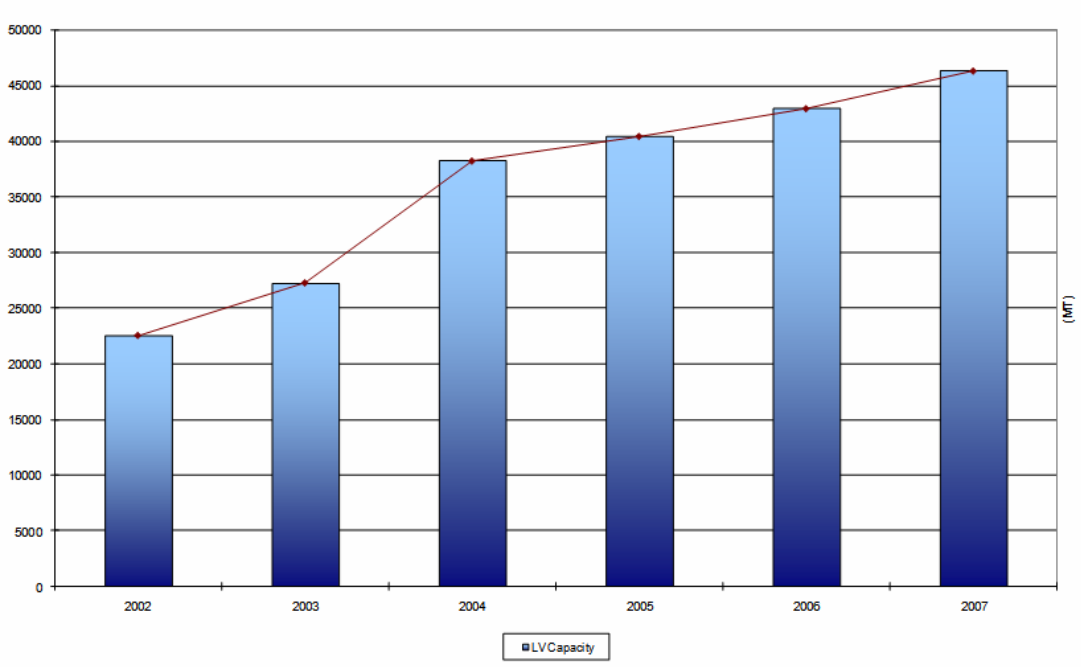
- ✓ Overhead lines: They come as bare conductors and used for earthing electrical systems (when soft drawn copper is used) and in

transmission/distribution of high voltage electricity (when hard drawn copper and aluminum is used) Examples comprise:

- AAC (All Aluminum Conductors) used in short spans
- AAAC (All-Aluminum-Alloy Conductors)
- ACSR (Aluminum Conductor Steel Reinforced) used in large spans
- ACAR (Aluminum Conductor, Alloy Reinforced)
- ACSR/AW (Aluminum Conductor Steel Reinforced with Aluminum Clad Steel)

✓ Pilot Cables: Used with high voltage transmission lines to relay data signals.

Our plant Capacity is continuously improved since year 2002 by installing state of the art machines and expanding our facilities.



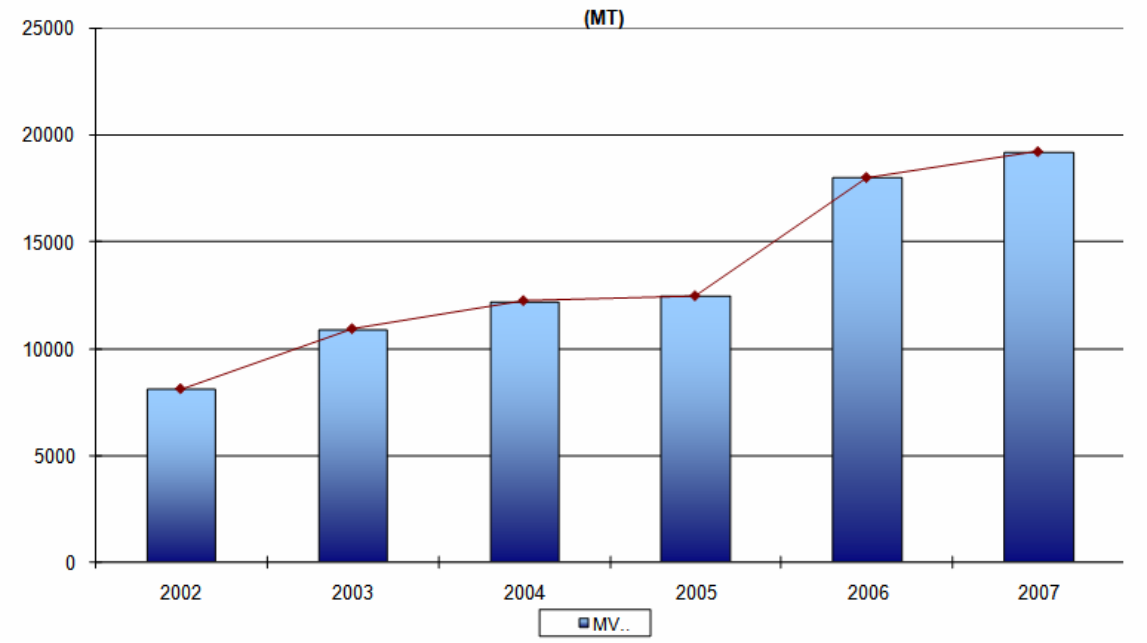
2. Medium & High Voltage Cables Plant:

Medium voltage cables are manufactured based on International Standards and/or client specifications. Our CV line - the largest in the Middle East, employs triple

extrusion technique (where three layers are added to a conductor simultaneously) to save both in time and money. This CV-line also uses dry curing technology for the XLPE to replace the older curing methods. This type of new technology uses heaters placed on the CV tube, while Nitrogen Gas is used to maintain pressure in the tube. It can insulate conductors up to 2000 mm² to reach an insulation level up to 400 kV. A new CV line was recently commissioned to increase the production capacity by 30%.

The products range both in size (35 to 2000 mm², compacted round and segmental), and in voltage rating (6 kV to 400 kV).

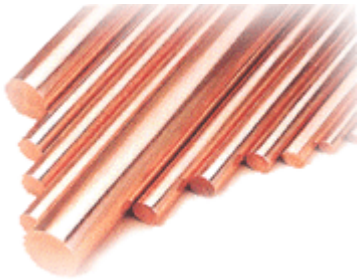
Our plants Capacity are continuously improved since year 2002 by installing state of the art machines, the most advanced CV lines and expanding our facilities.



3. **Copper Rod Plant**:

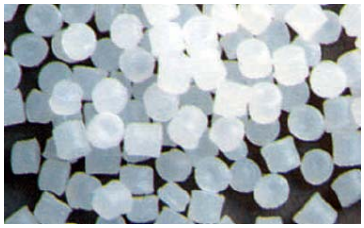
The plant produces Copper Rods using continuous casting technique with Copper Cathodes. The end product is a Copper Rod with the following characteristics:

- ✓ Diameter of 8 ± 0.38 mm
- ✓ Tensile strength of 250 N/mm²
- ✓ Elongation ≥ 30%



This plant supplies other external cable manufacturers with Copper Rods. It also takes scrap Copper refines and reprocesses them to make new Rods. Our Copper Rod plant capacity is around 50,000 MT per year.

4. PVC Granules Plant:



This plant manufactures various types of PVC (Polyvinyl chloride) compounds to be used at ***Jeddah Cable Company*** plants for insulation, bedding and sheathing, and also sold to other cable manufacturers. There are two lines that generate 13,000 MT per year.

5. Wooden Real Plant:

Wooden Reels are manufactured at our plants for cables to be stored and shipped to various locations and clients.

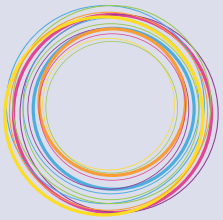
WAREHOUSES (LOCAL AND REGIONAL)

Jeddah Cables Company has a number of large warehouses in the vicinity of our local & regional offices. These warehouses remain fully stocked at all times to meet local demand on short notice. The warehouses are well ventilated, fully staffed, and subjected to rigorous inspections.

	Warehouse Name	Location	Number of Employees	Size (m^2)	Capacity
Raw Material	*Main Warehouse*	Industrial City, 3rd Phase Jeddah, Saudi Arabia	2	7000	4000 MT
Raw Material	*New Khomra*	Al-Khomra Warehouse Area Jeddah, Saudi Arabia	2	10240	2000 MT
Machinery	*Old Khomra*	Al-Khomra Warehouse Area Jeddah, Saudi Arabia	2	5000	
Finished Cable Drums	*Saudi American*	Industrial City, 3rd Phase Jeddah, Saudi Arabia	2	10350	1400 cable drums

energya®
INDUSTRIES

energya®
CABLES
A Division of Energya Industries



Jeddah cables COMPANY®
A Company of Energya Cables

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LV Power distribution (<1KV)

JCC Extensive line of copper and aluminum LV cables serve the total distribution needs of electric utilities, rural electric co-ops and the public power market for both traditional and renewable energy sources.

❖ Building Wires

Our wide range of quality low-voltage cables with capacities under 1kV provide safe and efficient energy links for all building needs. They are renowned for their protective coatings, new materials, flexibility, color coding, and multipurpose use. All the cables can be jacketed with either PVC or LSHF.

Type	Conductor		Insulation	Size Range (mm^2) From/To	Standards
Cu/ (PVC or LSHF)	Single Circular Core	▪ Annealed solid Cu Or ▪ Stranded Cu wires	PVC or LSHF	▪ 1.5 mm^2 /10 mm^2 ▪ 1.5 mm^2 /400 mm^2	IEC 60227 (450 V /750 V)
Cu/PVC Flx.	Single Circular Core	Annealed Flexible copper wires	PVC	0.5 mm^2 /240 mm^2	IEC 60227 (300V/500V & 450V/750V)
Cu/PVC/PVC Flx. Light	Multi Circular Core	Annealed Flexible copper wires	PVC	2 x 0.5 mm^2 /4*0.75 mm^2	IEC 60227 – 300/300 Volt Light
Cu/PVC/PVC Flx. Normal	Multi Circular Core	Annealed Flexible copper wires	PVC	2x0.75 mm^2 /5x2.5 mm^2	IEC 60227 – 300/500 Normal
Cu/PVC/PVC Light (Flat-Twin)	Multi Circular Core	Annealed solid or stranded copper wires	PVC	▪ 2x1.5 mm^2/2x16 mm^2 (no earth continuity conductor) ▪ 2x1.5+1 mm^2/2x16+6 mm^2 (with earth continuity conductor)	BS 6004 (300V/500V)
Cu/PVC/PVC Light (Flat-Three)	Multi Circular Core	Annealed solid or stranded copper wires	PVC	▪ 3x1.5 mm^2/3x16 mm^2 (no earth continuity conductor) ▪ 3x1.5+1 mm^2/3x16+6 mm^2 (with earth continuity conductor)	BS 6004 (300V/500V)
Cu/PVC/Nylon (THHN)	Single Circular Core	Annealed stranded copper wires	PVC + NYLON jacket	16 AWG/8 AWG	UL

❖ LV Underground Cables (0.6KV/1KV)

Underground low voltage cables provide the best of safety and environment-friendly conditions to subscribers. In creating, renewing, and extending power transmission and distribution networks worldwide JCC provides a wide range of LV underground power cables.

Type	Conductor		Insulation	Size Range (From/To)	Standards
(Cu or Al)/ XLPE/PVC	Single Circular Core	Annealed stranded Cu wires Or Stranded Al wires	XLPE or LSHF	4 mm^2/1000 mm^2	IEC 60502-1
Cu/ (PVC, or XLPE)/ PVC	Multi Circular Core	Annealed stranded Cu wires	PVC or XLPE or LSHF	▪ 2x1.5mm^2 /2x35 mm^2 ▪ 3x1.5mm^2 /3x35+16 mm^2 ▪ 4x1.5 mm^2 /4x35 mm^2 ▪ 5x1.5 mm^2/5x6 mm^2	IEC 60502-1
Cu/ XLPE/ (STA or SWA)/ PVC	Multi Circular Core	Annealed stranded Cu wires	XLPE or LSHF	▪ 2x1.5 mm^2 /2x35 mm^2 ▪ 3x1.5 mm^2 /3x35+16 mm^2 ▪ 4x1.5 mm^2 /4x35 mm^2 ▪ 5x1.5 mm^2 /5x6 mm^2	IEC 60502-1 Steel Tape Armored or Steel Wire Armored
(Cu or Al)/ XLPE/PVC	Multi Shaped Core	Annealed stranded Cu wires Or Stranded Al wires	XLPE or LSHF	▪ 3x50+25 mm^2 /3x500+240 mm^2 ▪ 4x50 mm^2 /4x500 mm^2	IEC 60502-1
(Cu or Al)/ XLPE/ (STA or SWA)/ PVC	Multi Shaped Core	Annealed stranded Cu wires Or Stranded Al wires	XLPE or LSHF	▪ 3x50+25 mm^2 /3x500+240 mm^2 ▪ 4x50 mm^2 /4x500 mm^2	IEC 60502-1

Overhead Lines

JCC Extensive line of copper and aluminum aerial lines, including bare and weather resistant insulated conductors, cables serve the total distribution and transmission needs of electric utilities, rural electric co-ops and the public power market for both traditional and renewable energy sources.

❖ Overhead Lines

Overhead conductors are subject to winds, temperature variations, and intense solar radiation. A range of bare and insulated overhead lines has been designed to withstand these demands as well as the increasing need to carry more current in the same diameter

Type	Conductor		Insulation	Size Range (From/To)	Standards
Bare Cu	Single Circular Core	▪ Soft annealed Cu Or ▪ Hard Drawn Cu	N/A	10 mm^2 /500 mm^2	▪ IEC 60228 ▪ DIN 48201
AAC	Single Circular Core	Hard Drawn Aluminum	N/A	16 mm^2 /630 mm^2	▪ DIN 48201 ▪ BS 215
ACSR	Single Circular Core	Al Conductor, Steel reinforced	N/A	40.5 mm^2 /806.2 mm^2	ASTM – B 232
(Cu or Al)/ PVC	Single Circular Core	▪ Copper Or ▪ Aluminum	PVC	10 mm^2 /185 mm^2	BS 6485 (Voltages ranging: 650V/11KV
AL / XLPE or PVC + ACSR/AW (Quadruplex)	Multi Circular Core	3 x Al conductor, + 1 x Aluminum-Clad Steel reinforced	▪ 3 insulated cores (XLPE + CB) + ▪ 1 core Bare	3x25+25 mm^2 /3x400+400 mm^2	ASTM – B 549

❖ Maximum Tensile Force during laying

- Using a pulling eye on the conductor:
  - Copper — 0.05KN/mm^2 of conductor (subject to a maximum of 22KN)
  - Aluminum Stranded — 0.03KN/mm^2 of conductor

- Using a pulling eye on the steel wire armor:
  - $P = 0.005 \times D^2$ where D = Cable diameter in mm, and P = tension in KN

MV and HV Power Cables (up to 220KV)

JCC Complete line of XLPE insulated medium and high voltage cables, from 6KV up to 220KV, enable us to provide turnkey design and engineering services for the global, systems-engineered, electric utility market.

❖ MV underground Cables [from 3.6/6 (7.2) KV up to 18/30 (36) KV]

Environmental and social issues are nowadays putting strong pressure on the growing need for upgrading and renewing power distribution and transmission grids. Our XLPE leading type of medium voltage cables are therefore custom designed to meet the highest performance standards. **All** cables are empowered with nonmetallic and metallic shields, water sealing capabilities and water treeing retardant characteristics.

Type	Conductor		Insulation	Size Range (From/To)	Standards
(Cu or Al) /XLPE/ (PVC or PE compounds)	Single Circular Core	Annealed stranded Cu wires Or Stranded Al wires	ISC/ XLPE or TR-XLPE /OSC	25 mm^2/800 mm^2	IEC 60502-2
(Cu or Al)/ XLPE/ (PVC or PE compounds)	Three Circular Core	Annealed stranded Cu wires Or Stranded Al wires	ISC/ XLPE or TR-XLPE /OSC	3x25 mm^2/3x500 mm^2	IEC 60502-2
(Cu or Al) /XLPE/ (ATA or AWA)/ PVC or PE compounds	Single Circular Core	Annealed stranded Cu wires Or Stranded Al wires	ISC/ XLPE or TR-XLPE /OSC	25 mm^2/800 mm^2	IEC 60502-2
Cu or Al /XLPE/ (STA or SWA)/ PVC or PE compounds	Three Circular Core	Annealed stranded Cu wires Or Stranded Al wires	ISC/ XLPE or TR-XLPE /OSC	3x25 mm^2/3x500 mm^2	IEC 60502-2

❖ HV Underground cables [Above 36KV up to 220KV]

The energy market has been changing dramatically, in the recent years, as a result of deregulation and privatization. To face the challenge of competition, energy transmission and distribution, and facing the constraints in dense urban areas where overhead lines are an impossibility, JCC has developed innovative designs and constructions to overcome these problems.

Type	Conductor		Insulation	Size Range (From/To)	Standards
Cu/XLPE/ (HDPE or LDPE or PVC) 	Single Round compacted Core	Annealed stranded Cu wires	ISC/Super Clean XLPE/OSC	300mm^2/1000mm^2	IEC 60840
Cu/XLPE/ (HDPE or LDPE or PVC) 	Segmental Core	Annealed stranded Cu wires	ISC/Super Clean XLPE/OSC	1000mm^2/2000mm^2	IEC 60840

1 All the HV cables are longitudinally and radially water sealed using water blocking powder/tapes and Al/PE tapes.

Special Cables (<1KV)

World demand for industrial cables has changed dramatically over recent years as our customers continue to respond to the global economy; Competition and deregulation require new technologies for new environment, an ability to comply with diverse norms, precise requirements and the need for customized services both in manufacturing and delivery.

From infrastructure, industry and building, JCC produces "made to measure" cables requiring very close collaboration with its customers to manufacture exactly according to the industries demands

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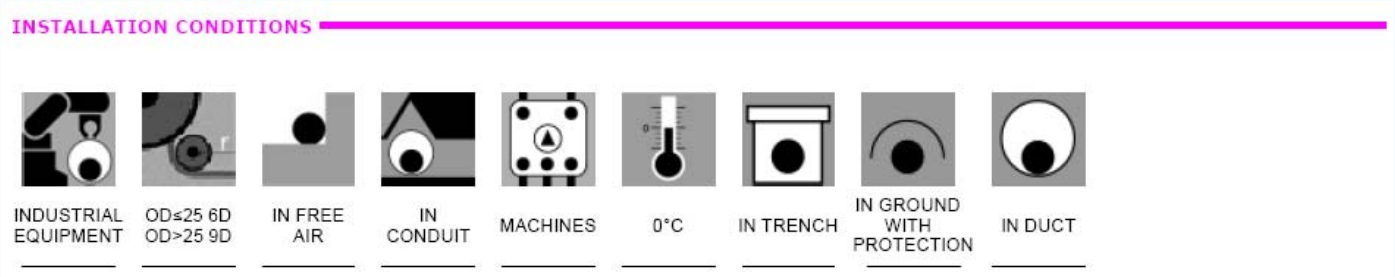
❖ Control Cables

For control circuits unenclosed, enclosed in conduit, buried direct or in underground ducts for commercial, industrial, mining and electricity authority systems where not subject to mechanical damage.

Type	Conductor		Insulation	Size Range (From/To)	Standards
Cu/PVC/PVC	Multi Circular Core	Annealed stranded Cu wires	PVC	▪ 5 to 37 cores ▪ Sizes from 1.5mm^2 to 4mm^2 per core	IEC 60502-1
Cu/PVC/STA/PVC	Multi Circular Core	Annealed stranded Cu wires	PVC	▪ 5 to 37 cores ▪ Sizes from 1.5mm^2 to 4mm^2 per core	IEC 60502-1
CU/PVC/SWA/PVC	Multi Circular Core	Annealed stranded Cu wires	PVC	▪ 5 to 37 cores ▪ Sizes from 1.5mm^2 to 4mm^2 per core	IEC 60502-1



❖ Pilot Cables

Pilot cables are used for control, protection, signaling, telecommunications and data transmission purposes associated with power distribution and transmission systems. Such systems are mainly operated by the electrical supply industry and similar applications occur in many industrial systems.

Pilot cables are insulated with special materials which are designed to protect them from the danger of induced voltages coming from other cable circuits in close proximity (for example, faults in high voltage power cable circuits).

Type	Conductor		Insulation	Size Range (From/To)	Standards
Cu/ (PE or PVC)/ (Al-PE tape or Cu tape)/ (SWA or STA/PVC)	Multi Pair-Cores	Annealed stranded Cu wires	PE or PVC	▪ 5, 10, 15, 20, 30 pairs of cores ▪ 1.5mm^2 or 2.5mm^2 per core	BS 6346

CABLE SELECTION

The following are some simplified procedures for the cables selection. The six main electrical criteria for cable selection are:

- Nominal and Maximum operating voltage
- Current rating: for continuous operation, for cyclic operation, and for emergency operation if any
- System Power frequency
- Voltage drop
- Earth loop impedance
- Expected symmetrical and asymmetrical Short-circuit capacity and duration

Generally speaking for:

1. Short route length, current-carrying capacity requirement will dedicate the cable size selection
2. Long route length, voltage drop or earth loop impedance will dictate the cable size selection
3. The short-circuit capacity of a cable shall be such that all short–circuit current occurring at any point of a circuit shall not cause the cable conductor temperature to exceed the maximum permissible limit

Current rating:

Current rating of a cable depends on:

1. Installation method, i.e., in air or ground, enclosed or unenclosed, etc.
2. Installation environment, i.e., ambient temperature, depth of laying, presence of other cables or circuits nearby, etc.
3. Limiting temperature of the cables for normal use, i.e., PVC and XLPE insulated cables are operating normally at 70°C and 90°C respectively.

Voltage drop:

Wiring rules stipulate a maximum voltage drop of 5% of the nominal voltage between the point of supply and any point in the installation when the conductors are carrying maximum demand.
The voltage drop of a feeder circuit may be calculated by the following formulae:

- For single phase circuit and where 'R' and 'X' are the resistance and reactance values respectively of the conductor:

$$V_d = R \times \cos\theta + X \times \sin\theta$$

- For a three phase circuit, using the voltage to neutral, and resistance 'R' and reactance 'X' of each conductor to neutral:

$$V_d = \sqrt{3} \times (R \times \cos\theta + X \times \sin\theta)$$

Where:

V_d	=	line-to-Line voltage drop in V/A.Km
θ	=	angle by which the load current lags the voltage across the load
$\cos\theta$	=	power factor of load
R	=	AC resistance of the conductor in Ω/Km
X	=	reactance of the conductor in Ω/Km

Standards and Certifications

JCC cables are custom designed to meet the highest and latest performance standards in the field. Among these standards are:

JCC cables are unleashed in the energy market backed-up with the best and well known certificates around the world:

Certifications	
KEMA	Founded in 1927, KEMA is a commercial enterprise, specializing in high-grade technical consultancy, inspection, testing and certification. Much of the company's work centers round innovative technology. As an independent organization, KEMA supports clients concerned with the supply and use of electrical power and other forms of energy
Underwriters Laboratories	UL is the trusted source across the globe for product compliance. Benefiting a range of customers - from manufacturers and retailers to consumers and regulating bodies – UL has tested products for public safety for more than a century. UL can offer one of the conformity assessment industry's broadest portfolios of capabilities and certification marks. Its unique mix of local expertise in global markets and deep industry knowledge helps bring safer products to markets faster than ever before
BSI	Since its foundation in 1901 as the Engineering Standards Committee, BSI Group has grown into a leading global independent business services organization. The Group now operates globally through its three divisions: BSI British Standards, BSI Management Systems and BSI Product Services
	Saudi Arabian standards org is the cooperation partner in maintaining the safety and public health protecting the consumer and environment and enhancing the competitive of national products through the application of the best international practices in different standardization fields in accordance with the Islamic law

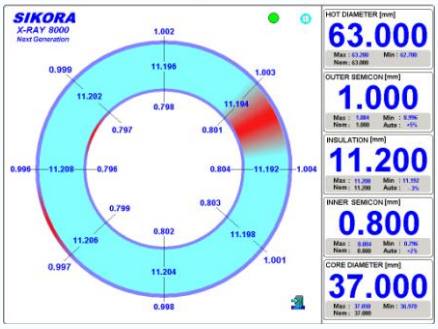
QC/QA TESTING

During their long journey in the factory, the cables are subject to a thorough test procedures and qualifications. These tests include:

- **Raw Materials' Quality Assurance**
  Raw materials are toughly inspected and tested prior to their use in the cable manufacturing processes. Therefore, cables are ensured to be free of defects due to non conforming raw materials.

- **Online QC testing of conductor**
  Resistance meter: Ideal for solid and stranded copper and aluminium conductors. This device measures the DC resistance of the conductor at the stranding process, and thus the conductor is ensured to be delivered with the right DC resistance.

- **Online Wall thickness of the insulation and other extruded layers**
  Thicknesses of all the extruded layers are controlled with the latest X-Ray measuring devices. Therefore, the recommended thicknesses values are ensured to be strictly as mentioned in international standards.



- **Final Tests before delivery**
  So as to ensure free-defect products, all the cables manufactured are subject to routine tests (i.e. High Voltage tests and partial discharge tests when applicable) and sample tests. All the test procedures are as described by the latest well known standards in the field.

Jeddah cables COMPANY

P.O.Box 31248 Jeddah 21497, KSA
Tel.: +966 2 636 0770
Fax: +966 2 636 4695
e-mail: info@cables.energya.com
www.cables.energya.com

ISO 9001:2000 CERTIFICATE

TEST REPORTS & CERTIFICATIONS

Certificate SA08/02006

The management system of

Jeddah Cable Company

P.O.Box 31248
Jeddah 21497
Kingdom of Saudi Arabia

has been assessed and certified as meeting the requirements of

ISO 9001:2000

For the following activities

Design, Development and Manufacture of Low Voltage, Medium Voltage control cables, Over head lines and Building wires. Manufacturer of Copper rods, PVC compounds and Fabrication of Wooden reels.

Further clarifications regarding the scope of this certificate and the applicability of ISO 9001:2000 requirements may be obtained by consulting the organization

This certificate is valid from 21 August 2008 until 05 July 2011
Issue 1. Certified since 05 July 2005

Authorised by

SGS United Kingdom Ltd Systems & Services Certification
Rossmore Business Park Ellesmere Port Cheshire CH65 3EN UK
t +44 (0)151 350-6666 f +44 (0)151 350-6600 www.sgs.com

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B • A • S • E • C

BRITISH APPROVALS SERVICE FOR CABLES

CERTIFICATE OF CONFORMITY

This is to certify that the

Quality Management System

of

Jeddah Cables Company
Energya Cables Middle East

conforms to the requirements of

ISO 9001: 2000

in respect of the sites, products and or services specified in the attached schedule(s).

Schedule nos:-

CS1-208/001

Certificate No: **CS1-208**

Issue date: 20th August 2008

Date of original certification: 20th August 2008

Expiry Date: 19th August 2011

This certificate is issued subject to and in accordance with BASEC Regulations and continued compliance.

BRITISH APPROVALS SERVICE FOR CABLES BASEC

Signed for and on behalf of the British Approvals Service for Cables

Graham R O'Gorman Date 10/9/08

QB/07A/99 A1693 /Copy No: 1

UKAS QUALITY MANAGEMENT 004

23 PresleyWay, Crownhill, Milton Keynes MK8 0ES
Telephone: +44 01908 267300 (2lines) Facsimile: +44 01908 267255
Website: www.basec.org.uk Email: mail@basec.org.uk

KEMA

TEST REPORT

This report replaces report number 32632.00-HSL 94-1090 dated March 23, 1994, which is hereby void.

Report no.	32632.00-HSL 94-1090 rev. 1
Client	Jeddah Cable Company P.O. Box 31248 Jeddah 21497 Kingdom of Saudi Arabia
Concerning	testing cable
Date	January 31 - March 18, 1994
Place	KEMA High Voltage Laboratory, Arnhem, The Netherlands
Object	power cable
Type	3x240 mm² CU/XLPE/SWA/PVC 18/30 kV
Manufacturer	Jeddah Cable Company, Saudi Arabia

REQUIREMENTS

The test was carried out in accordance with the standard IEC 502 (1983).

TEST PROGRAMME

For the programme we refer to page 3 to 4.

SUMMARY AND CONCLUSION

The test did not give rise to remarks.
The tests were passed succesfully.

Author H. van Dijk

KEMA Nederland B.V.

N. van Schaik

This B-report consists of:
24 pages
1 appendix

Arnhem, April 13, 1994

94-1606

HIGH-VOLTAGE TESTING & INSPECTION

Utrechtseweg 310 - 6812 AR Arnhem - the Netherlands

CERTIFICATE OF TYPE TESTS

OBJECT	a three-phase power cable
DESIGNATION	Cu/XLPE/SWA/PVC 3x240 mm^2 18/30 kV
Rated voltage Uo/U	18/30 kV
Rated frequency	50 Hz
MANUFACTURER	Jeddah Cable Company Industrial City, 3rd Region P.O. Box 31248, Jeddah 21497 Kingdom of Saudi Arabia
DATE OF TESTS	January 31 - March 18, 1994

The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with the complete type test requirements of IEC 502 (1983).

THE RESULTS ARE SHOWN IN THE RECORD OF PROVING TESTS AND THE OSCILLOGRAMS ATTACHED HERETO. THE VALUES OBTAINED AND THE GENERAL PERFORMANCE ARE CONSIDERED TO COMPLY WITH THE ABOVE STANDARD AND TO JUSTIFY THE RATINGS ASSIGNED BY THE MANUFACTURER LISTED ON SHEET 2.

This Certificate and Record of Proving Tests applies only to the specific piece of apparatus tested from the particular place of manufacture. The responsibility for conformity of any apparatus having the same designation with that tested rests with the manufacturer at the place of manufacture of that apparatus.

Author H. van Dijk

KEMA Nederland B.V.

THIS CERTIFICATE CONSISTS OF:
2 pag
1 pen

N. van Schaik
KEMA High-Voltage Testing & Inspection

Arnhem, June 6, 1995

95-1309

HIGH-VOLTAGE TESTING & INSPECTION
Utrechtseweg 310 - 6812 AR Arnhem - the Netherlands

CERTIFICATE OF TYPE TESTS

OBJECT	a three-phase power cable
DESIGNATION	3x185 mm² CU/XLPE/PVC 8.7/15 kV
Rated voltage	8.7/15 kV
Rated frequency	50 Hz
MANUFACTURER	Jeddah Cable Company P.O. Box 31248 Jeddah 21497, Kingdom of Saudi Arabia
DATE OF TESTS	February 23-28, 1995

The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with the complete type test requirements of IEC 502 (1994).

THE RESULTS ARE SHOWN IN THE RECORD OF PROVING TESTS AND THE OSCILLOGRAMS ATTACHED HERETO. THE VALUES OBTAINED AND THE GENERAL PERFORMANCE ARE CONSIDERED TO COMPLY WITH THE ABOVE STANDARD AND TO JUSTIFY THE RATINGS ASSIGNED BY THE MANUFACTURER LISTED ON SHEET 2.

This Certificate and Record of Proving Tests applies only to the specific piece of apparatus tested from the particular place of manufacture. The responsibility for conformity of any apparatus having the same designation with that tested rests with the manufacturer at the place of manufacture of that apparatus.

Author F.F.P. van den Broek

KEMA Nederland B.V.

HIS CERTIFICATE CONSISTS OF:

N. van Schaik
KEMA High-Voltage Testing & Inspection

Arnhem, August 11, 1995

TEST REPORT

WARRES NO. L14940

IEC 331: 1970
FIRE-RESISTING CHARACTERISTICS
OF ELECTRIC CABLES

SPONSORED BY

JEDDAH CABLE CO
PO Box 31248, Jeddah 21497, Saudi Arabia

THE PROFESSIONALS IN FIRE SAFETY
Warrington FIRE research
CONSULTANCY • TESTING
101 Marshgate Lane, London E15 2NQ • Tel: 0181 519 8297 • Telex: 628743 WARRES G • Fax: 0181 519 3029

TEST REPORT

WARRES NO. L14940

IEC 331: 1970
FIRE-RESISTING CHARACTERISTICS
OF ELECTRIC CABLES

SPONSORED BY

JEDDAH CABLE CO
PO Box 31248, Jeddah 21497, Saudi Arabia

PURPOSE OF TEST

To determine the performance of a specimen of a cable when it is subjected to the conditions of test specified in IEC 331: 1970 "Fire-resisting characteristics of electric cables".

SCOPE OF TEST

IEC 331: 1970 details a method of test for assessing the fire-resisting characteristics of a cable. The cable is defined as "fire-resisting" if, under the conditions of this test, it being assumed that the test flame intensity is of sufficient magnitude to destroy the organic material, no failure of any of the 3A fuses occurs and if the withstand voltage on completion is not less than the rated voltage of the cable.

DESCRIPTION OF TEST SPECIMEN

The description of the specimen given below has been prepared from information provided by the sponsor of the test. All values quoted are nominal, unless tolerances are given.

The product was a 600/1000V 4 core cable consisting of 240mm^2 aluminium conductors, XLPE insulation, SWA and PVC outersheath.

The outersheath of the cable war marked "JEDDAH CABLE CO 4 X 240MM^2 AL/XLPE/SWA/PVC".

The cable specimen was supplied by the sponsor of the test on 12 December 1995. Warrington Fire Research Centre was not involved in any selection or sampling procedure.

DATE OF TEST

The test was performed on 21 December 1995.

TEST PROCEDURE

The test was performed in accordance with the procedure specified in IEC 331: 1970, and this report should be read in conjunction with that Standard.

The test was carried out at 1000V.

TEST RESULTS

The test results relate only to the behaviour of the specimen of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

The test results relate only to the specimen of the product in the form in which it was tested. Small differences in the composition of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product which is supplied or used is fully represented by the specimen which was tested.

No fuse ruptured during the 3 hours test duration and on re-energising the cable after 16 hours.

CONCLUSION

When tested in accordance with the procedure specified in IEC 331: 1970, no fuse ruptured nor any lamps extinguished within the 3 hours test duration and on re-energising the cable after 16 hours. The specimens therefore, meet the performance requirements of IEC 331: 1970.

Responsible Officer

S. KUMAR
Manager - Standard Testing

Approved

pp R. J. SHAW
Director
for and on behalf of
WARRINGTON FIRE RESEARCH CENTRE

Date of issue: 17 February 1996

Warrington FIRE research
CONSULTANCY • TESTING

TEST REPORT

WARRES NO. L14939

IEC 332: PART 3: 1992
TESTS ON ELECTRIC CABLES
UNDER FIRE CONDITIONS
TESTS ON BUNCHED WIRES OR CABLES

SPONSORED BY

JEDDAH CABLE CO
PO Box 31248, Jeddah 21497, Saudi Arabia

THE PROFESSIONALS IN FIRE SAFETY

Warrington FIRE research
CONSULTANCY • TESTING

101 Marshgate Lane, London E15 2NQ • Tel: 0181 519 8297 • Telex: 628743 WARRES G • Fax: 0181 519 3029

TEST REPORT

WARRES NO. L14939

IEC 332: PART 3: 1992
TESTS ON ELECTRIC CABLES
UNDER FIRE CONDITIONS
TESTS ON BUNCHED WIRES OR CABLES

SPONSORED BY

JEDDAH CABLE CO
PO Box 31248, Jeddah 21497, Saudi Arabia

PURPOSE OF TEST

To determine the performance of a specimen of a cable when it is subjected to the conditions of test specified in IEC 332: Part 3: 1992 "Tests on electric cables under fire conditions. Tests on bunched wires or cables".

SCOPE OF TEST

IEC 332: Part 3: 1992 specifies a method of test for measuring the vertical flame propagation characteristics of a bunch of cables. The cable specimen, consisting of a number of 3.5m lengths of cable, is deemed to have met the requirements of the Standard if, after burning has ceased, the extent of charred or affected portion does not reach a height exceeding 2.5m above the bottom edge of the burner.

The Standard recommends the following three test categories, based on the amount of combustible materials contained in one metre of the cables being tested:

Category A:	7 litres per metre of combustible material
Category B:	3.5 litres per metre of combustible material
Category C:	1.5 litres per metre of combustible material

DESCRIPTION OF THE CABLE

The description of the cable given below has been prepared from information provided by the sponsor of the test. All values quoted are nominal, unless tolerances are given.

The product was a 600/1000V 4 core cable consisting of 240mm^2 aluminium conductors, XLPE insulation, SWA and PVC outersheath.

The outersheath of the cable was marked "JEDDAH CABLE CO 4 X 240MM^2 AL/SLPE.SWA/PVC".

The details of all the individual components are given in Appendix 1.

The cable was supplied by the sponsor of the test on 12 December 1995. Warrington Fire Research Centre was not involved in any selection or sampling procedure.

CONDITIONING OF SPECIMEN

Prior to the test the specimen was conditioned at a temperature of 25 ± 5°C for 3 hours.

DATE OF TEST

The test was performed on 21 December 1995.

TEST PROCEDURE

A 50cm long specimen of the cable was separated into its component parts and the volume of each type of combustible material was determined. The individual weights, densities and volumes are given in Appendix 1.

Cable Composition:-

Length of specimen:	3.5m
Weight of cable:	6938.80g/m
Weight of metallic materials:	5045.60g/m
Weight of non-metallic materials:	1893.20g/m
Volume of combustible material:	1.374l/m

The number of cable lengths to be mounted on the test ladder was calculated by dividing the sum of the volumes into the volume per metre value corresponding to the appropriate category and rounding off the result to the nearest whole number (0.50 and above is counted as 1).

Number of cables required to give C litres per metre of combustible material = 2.

Cable mounting:-

2 cable lengths were arranged on the ladder as follows:

Front: 2 cables with a gap of 20mm between cables.
Rear: N/A

The test was performed in accordance with the procedure specified in IEC 332: Part 3: 1992, Category C and this report should be read in conjunction with that Standard.

ATMOSPHERIC CONDITIONS DURING THE TEST

External temperature at the start of the test:	8°C
External temperature at the end of the test:	8°C
Atmospheric pressure:	764mmHg
Air flow through test rig:	5m³/min
External air speed:	1.2m/sec
Method of air flow measurement:	Anemometer
Period of flame application:	20 mins

TEST RESULTS

The test results relate only to the behaviour of the specimen of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

The test results relate only to the specimen of the product in the form in which it was tested. Small differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product which is supplied or used is fully represented by the specimen which was tested.

Visual observations made during the test are given in Appendix 2.

Photographs of the specimen before and after the test are given in Plates 1 and 2.

The maximum height of the cable charred or affected, as measured from the bottom of the burner, was as follows:-

In the front cable group: - 28cm
In the rear cable group: N/A

CONCLUSION

The specimen meets the performance requirement for IEC 332: Part 3: Category C.

Responsible Officer

S. KUMAR
Manager - Standard Testing

Approved

pp R. J. SHAW
Director
for and on behalf of
WARRINGTON FIRE RESEARCH CENTRE

Date of issue: 17 February 1996

Warrington FIRE research
CONSULTANCY • TESTING

APPENDIX 1

DETERMINATION OF VOLUME OF COMBUSTIBLE MATERIAL

COMPONENT	LENGTH cm	WT g	DENSITY g/cc	VOLUME cc
SHEATH	50	467.60	1.610	290.435
ARMOUR	50	1253.80	-	-
BEDDING	50	217.40	1.500	144.933
MELINEX	50	6.80	-	-
STRINGS	50	23.2	-	-
INSULATION	50	231.6	0.920	251.739
CONDUCTORS	50	1269.00	-	-
TOTAL TOTAL/METRE		3469.40 6938.80		687.107 1374.214

APPENDIX 2

OBSERVATIONS DURING TEST

TIME (MINS-SEC)	OBSERVATIONS
1-30	Flames reaching a height of 1m. One 500W flood light switched on. Smoke obscuring ladder above 1.4m.
2-45	Flames reaching a height of 1.1m. Only flames visible.
5-00	Flames at burner level visible.
15-00	No change from 5 minutes.
20-00	Burner turned off. Cables flaming.
21-15	Flaming ceases. Cables emitting smoke.
23-20	Smoking ceases.

All heights are estimated from floor level
The burner was positioned at a height of 0.6m from the floor.

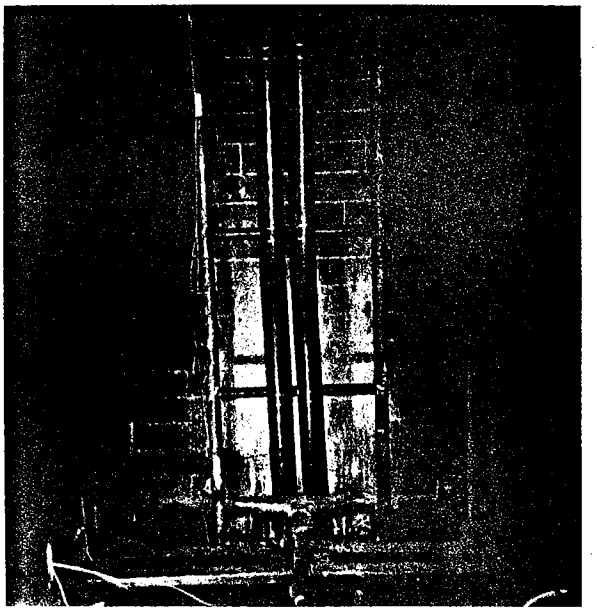


Plate 1: Specimen before test

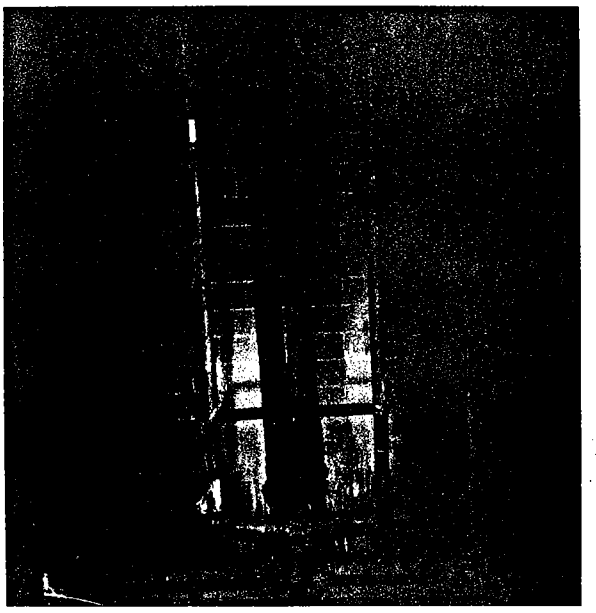


Plate 2: Specimen after test

97-1202

KEMA

HIGH-VOLTAGE LABORATORY

Utrechtseweg 310 - 6812 AR Arnhem - the Netherlands

CERTIFICATE OF TYPE TESTS

OBJECT	a three-phase power cable
DESIGNATION	8.7/15 kV 3 x 300 mm^2 AL/XLPE/STA/PVC
Rated voltage U_o/U	8.7/15 kV
Rated frequency	50 Hz
MANUFACTURER	Jeddah Cable Company PO Box 31248 Jeddah 21497 Kingdom of Saudi Arabia
DATE OF TESTS	August 21-September 24, 1997

The object, constructed in accordance with the description and drawing incorporated in this Certificate, has been subjected to the series of proving tests in accordance with the complete type test requirements of IEC 502 (1994).

THE RESULTS ARE SHOWN IN THE RECORD OF PROVING TESTS AND THE OSCILLOGRAMS ATTACHED HERETO. THE VALUES OBTAINED AND THE GENERAL PERFORMANCE ARE CONSIDERED TO COMPLY WITH THE ABOVE STANDARD AND TO JUSTIFY THE RATINGS ASSIGNED BY THE MANUFACTURER LISTED ON SHEET 2.

This Certificate and Record of Proving Tests applies only to the specific object tested from the particular place of manufacture. The responsibility for conformity of any object having the same designation with that tested rests with the manufacturer at the place of manufacture of that object.

ir L. Scheltinga

KEMA Nederland B.V.

p.o.

H. Kempen
KEMA High-Voltage Laboratory

Arnhem, October 21, 1997

THIS CERTIFICATE CONSISTS OF:
35 pages
1 appendix

KEMA

TEST REPORT

Report no.	98470423.000-HVL 98-1154
Client	Jeddah Cable Company P.O. Box 31248 Jeddah-21497 Saudi Arabia
Reference	fax message of 12 July 1998
Concerning	sample test
Date	26 July-10 August 1998
Place	KEMA High-Voltage Laboratory, Arnhem, the Netherlands
Object	power cable
Type	19/33 kV 3 x 240 mm2 Cu/XLPE/SWA/PVC
Manufacturer	Jeddah Cable Company

REQUIREMENTS

The requirements as specified in the standards IEC 60502-2, 1997, and AEIC CS5-94.

TEST PROGRAM

The program was specified by the client and was as follows:

1 measurement of thickness of insulation and non-metallic sheaths
IEC 60502-2, 1997, clause 17.5

2 insulation ambers, contaminants and voids
AEIC CS5-94, clause C.1.

SUMMARY AND CONCLUSION

The results obtained relate only to the work ordered and to the material tested.
The tests were passed successfully.

Author G.P.T. Roelofs

KEMA Nederland B.V.

E.F. Steennis
KEMA High-Voltage Laboratory

Arnhem, 14 September 1998

This B-report consists of:
14 pages

Utrechtseweg 310, 6812 AR Arnhem , the Netherlands.
Telefoon +31 26 3 56 91 11. Telex 45016 kema nl. Telefax +31 264 43 38 43

Ministry of High Education
King Saud University
College of Engineering

وزارة التعليم العالي
جامعة الملك سعود
كلية الهندسة

Date: ..... التاريخ : No.: ..... الرقم :

King Saud University
College of Engineering
Electrical Engineering Department
Riyadh, Saudi Arabia

Certificate of Type Tests

Test Report No. TR-01419C1

for

8.7/15 kV, Single Core XLPE Insulated Cable

Test carried out at

The High Voltage Laboratory

for

Jeddah Cable Company
Industrial City, 3rd Region
P.O. Box 31248
Jeddah 21497
Saudi Arabia

Dhulqada 1419
March 1999

Total No. of Pages: 8

Contents

Test Report No. TR-01419C1 3

1. Introduction

Jeddah Cable Company, Jeddah, Saudi Arabia requested King Saud University via their fax dated January 30, 1999 to perform 'Electrical Type Testing' of a single core, 95 mm^2, 8.7/15 kV, XLPE insulated cable according to IEC-60502-2/1997. This report contains information about the tested cable, outlines the test requirements and presents the test results.

2. Cable Data

The tested cable was XLPE insulated, single core with stranded copper conductor of 95 mm^2 having a stripple insulation screen, copper tape and wire metallic shield and PVC jacket to operate at a rated frequency of 60 Hz. The rated maximum conductor temperature for XLPE is 90°C. The following information was embossed on the cable sheath:

Jeddah Cable Co.
1x95 mm^2/Cu/XLPE/PVC
8.7/15 kV, 1998

3. Tests Requirements

As per IEC-60502-2/1997, Clause 18, the Type Test, Electrical, include the following tests in the sequence listed here .

a) Partial discharge test (sub. clause 18.1.3).
b) Bending test followed by a partial discharge test (sub-clause 18.1.4).
c) Tanδ measurement (sub-clause 18.1.5).
d) Heating cycle test followed by a partial discharge test (sub-clause 18.1.6).
e) Impulse test followed by an ac voltage test (sub-clause 18.1.7).
f) ac voltage test for four hours (sub-clause 18.1.8).

4. Descriptions of Tests and Results

A sample of the cable having 12 m length was used for all of the tests reported here in the following specified sequence.

4.1 Partial Discharge Test

Requirements:
The magnitude of partial discharges shall be measured at 1.73 U_o, applied between the conductor and the copper screen. This value shall not be higher than 5 pC.

Test Description
The partial discharges (PD) generated in the test object were measured. The measurement was carried out in a direct circuit. For this purpose a PD free coupling capacitor was used. Special precautions were taken to avoid external discharges of the test object. The PD measurements were carried out by means of a Hipotronics, Model DDX, digital discharge detection and analysis system. Measurements were carried out using a 60 Hz test voltage of 15.0 kV_{rms} between the core conductor and the screen. During the test the object was at an ambient temperature of 23°C.

Results:
Background noise level = 2.3 pC
Partial discharge level measured = 2.3 pC

Thus the specified test requirements for PD level were met.

4.2 Bending Test Followed by a Partial Discharge Test

Requirements:
The sample should be bent around a test cylinder of a specific diameter in a manner as described in sub-clause (18.1.4). The sample shall then be subjected to a partial discharge test as per sub-clause (18.1.3). The discharge value shall be less than 5 pC at an applied voltage of 1.73 U_o.

Test Description:
The cable sample was bent around a test cylinder. The diameter of the test cylinder was 0.8 m. The bending test consisted of three cycles of wind, unwind, reversal of the winding direction, wind and unwind. During the test, the temperature of the test object was around 24°C. After the completion of this bending test, the sample was subjected to PD measurements as mentioned in section 4.1 above.

Results:
Background noise level = 2.4 pC
Partial discharge level measured = 2.4 pC

Thus the specific test requirements for PD level after the bending test were met.

4.3 Tan δ Measurement

Requirements:
The sample shall be heated until the conductor reaches a steady temperature which shall be 5^0C to 10^0C above the maximum conductor temperature in normal operation. The Tan δ shall be measured with an ac voltage of at least 2.0 kV at the specified conductor temperature. The measured Tan δ value shall be $\leq 80 \times 10^{-4}$.

Test Description:
The Tan δ of the cable sample was measured by using a Tettex, Type 2801, Schering bridge, and a loss free standard capacitor. The measurement was carried out using a 60 Hz test voltage of 2.08 kV. The tan δ was measured between the copper conductor and the cable metallic screen. During the measurement, the temperature of the cable conductor was kept at 97 ± 2°C. The current was induced in the cable conductor to bring the conductor to an equilibrium at the above mentioned temperature.

Results:
Conductor temperature during measurement was maintained at 97 ± 2 °C. The test voltage was 2.08 kV. The measured Tan δ value = 4×10^{-4}.

Thus the specified test requirements were met for Tan δ value.

4.4 Heating Cycle Test Followed by a Partial Discharge Test

Requirements:

The sample shall be heated until the conductor attains a steady temperature of 5 °C~10 °C above the maximum conductor temperature in normal operation. The heating cycle shall be of 8 hour duration. The conductor temperature shall be maintained within the specified limits for at least 2 hours of each heating period. This shall be followed by at least 3 hours of natural cooling in air. This cycle should be carried out thrice. After the 3rd cycle is completed, the sample shall be subjected to a partial discharge test and should comply with the requirements given in section (4.1) of this report.

Test description:

The cable conductor was heated by induced current to reach a steady temperature of 95~98 °C in 1 hour and 45 minutes. This temperature was then maintained at 95-98°C for a further period of 2 hours and 15 minutes. Then the heating current was switched off and the cable sample went through the natural cooling for 4 hours, before the start of the next 8 hours heating cycle. After the completion of the 3rd heating cycle, the partial discharge test was performed according to the procedure specified in section 4.1 of this report.

Results:

The following results of PD measurements were recorded after the completion of the heat cycling test. The measurements were carried out at an ambient temperature of 24 °C.

Background noise level = 2.5 pC
Partial discharge measured = 2.7 pC

Thus the specified test requirements were met for heating cycle test following by a partial discharge test.

4.5 Impulse Test Followed by an ac Voltage Test

Requirements:

Impulse test should be performed on heated cable at a conductor temperature of 5°C~ 10°C above the maximum conductor temperature in normal operation. The impulse test voltage shall be 95 kV_{peak}. The cable should withstand 10 impulses of each polarity. After the impulse test, the cable shall be subjected to an ac voltage test for 15 minutes with a test voltage of 30.5 kV_{rms}. No breakdown of the insulation shall occur.

Test Description and Results:
The tested cable was heated by passing current in the cable conductor. The impulses applied had waveform with a front time of 1.8 μs and time to half value of ~60μs. Thus, the waveform used complied with the specified requirements. The voltage was measured by using a damped RC voltage divider and digital impulse measurement system. During impulse voltage applications, the conductor temperature was maintained between 95°C ~ 98°C. The cable ends were fitted with a resistive stress controlling sleeve during the impulse test. 10 impulses of each polarity and 95.5 kV_{Peak} value were applied between the conductor and the core screen. No breakdown of the insulation or external flashover took place. Later the cable was allowed to cool down to the ambient temperature. With cable ends in the oil terminations, a 60 Hz test voltage of 30.5 kV_{rms} was applied between the conductor and the screen for 15 minutes and no breakdown or external flashover occurred.

Thus the specified test requirement were met for impulse test followed by an ac voltage test.

4.6 ac Voltage Test for Four Hours

Requirements:
The test shall be performed at the ambient temperature. A test voltage of $4U_o$ shall be applied between the conductor and the screen. The voltage shall be gradually increased to the specified level. No breakdown should occur.

Test Description and Results:
With cable ends in oil terminations, the 60 Hz test voltage was gradually increased to 35.1 kV_{rms} and then the voltage was maintained at this level for four hour. The voltage was applied between the conductor and the core screen. The voltage was measured by a capacitive voltage divider. During the test the ambient temperature was 24 °C. No breakdown or external flashover occurred.

Thus, the specified test requirements for ac voltage test for four hours were met.

5. Conclusion

The tested sample of 8.7/15 kV, 1 x 95 mm^2, Cu/XLPE/PVC cable manufactured by Jeddah Cable Co. Jeddah, Saudi Arabia passed all the electrical type tests as per IEC-60502/2/1997.

6. *Tests Conducted By*

The tests were conducted by the following team from College of Engineering, King Saud University, Riyadh, Saudi Arabia.

1. Abdulrhman A. Al-Arainy (Ph.D.)
   Professor, Electrical Engineering

2. Nazar H. Malik (Ph.D.)
   Professor, Electrical Engineering

3. M. Iqbal Qureshi (Ph.D.)
   Sc. Researcher, Research Center

21/03/99

21/3-99

7. *Tests Witnessed By*

The tests were witnessed by:

Engineer Mustafa Abdel Aal
Quality Control Manager
Jeddah Cable Company
Jeddah, Saudi Arabia.

Kingdom of Saudi Arabia
Ministry of High Education
King Saud University
College of Engineering

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الملك سعود
كلية الهندسة

Date: ..... التاريخ : No.: ..... الرقم :

King Saud University
College of Engineering
Electrical Engineering Department
Riyadh, Saudi Arabia

Certificate of Type Tests

Test Report No. TR-01420C1

for

500 mm^2, 8.7/15 kV, Single Core XLPE Insulated Cable

Test carried out at

The High Voltage Laboratory

for

Jeddah Cable Company
Industrial City, 3rd Region
P.O. Box 31248
Jeddah 21497
Saudi Arabia

Muharram 1420
May 1999

Total No. of Pages: 10

Kingdom of Saudi Arabia
Ministry of High Education
King Saud University
College of Engineering

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الملك سعود
كلية الهندسة

Date: ..... التاريخ : No.: ..... الرقم :

Test Report No. TR-01420C1 2

Contents

P.O. Box 800 & 2461, Riyadh 11421, Cable: UNESCOLL
☎ 4675614 fax:4674254 Telex: 401019 KSU SJ

الرياض ـ ص.ب ٨٠٠، ٢٤٦١ ☎ ٤٦٧٥٦١٤ الرمز البريدي ١١٤٢١
برقيا: ينسكول فاكس: ٤٦٧٤٢٥٤ تلكس: ٤٠١٠١٩

Kingdom of Saudi Arabia
Ministry of High Education
King Saud University
College of Engineering

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الملك سعود
كلية الهندسة

Date: ..... التاريخ : No.: ..... الرقم :

1. Introduction

Jeddah Cable Company, Jeddah, Saudi Arabia requested King Saud University to perform 'Electrical Type Testing' of a single core, 500 mm^2, 8.7/15 kV, XLPE insulated cable according to IEC-60502-2/1997. This report contains information about the tested cable, outlines the test requirements and presents the test results.

2. Cable Data

The tested cable was XLPE insulated, single core with stranded copper conductor of 500 mm^2 having a stripple insulation screen, copper tape and wire metallic shield and PVC jacket to operate at a rated frequency of 60 Hz. The rated maximum conductor temperature for XLPE is 90°C. The following information was embossed on the cable sheath:

Jeddah Cable Co.
1x500 mm^2/Cu/XLPE/PVC
8.7/15 kV, 1999
Property of SCECO East

3. Tests Requirements

As per IEC-60502-2/1997, Clause 18, the Type Test, Electrical, include the following tests in the sequence listed here .

a) Partial discharge test (sub. clause 18.1.3).
b) Bending test followed by a partial discharge test (sub-clause 18.1.4).
c) Tanδ measurement (sub-clause 18.1.5).
d) Heating cycle test followed by a partial discharge test (sub-clause 18.1.6).
e) Impulse test followed by an ac voltage test (sub-clause 18.1.7).
f) ac voltage test for four hours (sub-clause 18.1.8).

Kingdom of Saudi Arabia
Ministry of High Education
King Saud University
College of Engineering

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الملك سعود
كلية الهندسة

Date: ..... التاريخ : No.: ..... الرقم :

4. Descriptions of Tests and Results

A sample of the cable having 12 m length was used for all of the tests reported here in the following specified sequence.

4.1 Partial Discharge Test

Requirements:
The magnitude of partial discharges shall be measured at 1.73 U_o, applied between the conductor and the copper screen. This value shall not be higher than 5 pC.

Test Description
The partial discharges (PD) generated in the test object were measured. The measurement was carried out in a direct circuit. For this purpose a PD free coupling capacitor was used. Special precautions were taken to avoid external discharges of the test object. The PD measurements were carried out by means of a Hipotronics, Model DDX, digital discharge detection and analysis system. Measurements were carried out using a 60 Hz test voltage of 15.0 kV_{rms} between the core conductor and the screen. During the test the object was at an ambient temperature of 22.5°C.

Results:
Background noise level = 2.91 pC
Partial discharge level measured = 2.91 pC

Thus the specified test requirements for PD level were met.

4.2 Bending Test Followed by a Partial Discharge Test

Requirements:
The sample should be bent around a test cylinder of a specific diameter in a manner as described in sub-clause (18.1.4). The sample shall then be subjected to a partial discharge test as per sub-clause (18.1.3). The discharge value shall be less than 5 pC at an applied voltage of 1.73 U_o.

Test Description:
The cable sample was bent around a test cylinder. The diameter of the test cylinder was 1.5 m. The bending test consisted of three cycles of wind, unwind, reversal of the winding direction, wind and unwind. During the test, the temperature of the test object was around 23°C. After the completion of this bending test, the sample was subjected to PD measurements as mentioned in section 4.1 above.

Results:
Background noise level = 2.85 pC
Partial discharge level measured = 2.94 pC

Thus the specific test requirements for PD level after the bending test were met.

4.3 Tan δ Measurement

Requirements:
The sample shall be heated until the conductor reaches a steady temperature which shall be 5^0C to 10^0C above the maximum conductor temperature in normal operation. The Tan δ shall be measured with an ac voltage of at least 2.0 kV at the specified conductor temperature. The measured Tan δ value shall be $\leq 80 \times 10^{-4}$.

Test Description:
The Tan δ of the cable sample was measured by using a Tettex, Type 2801, Schering bridge, and a loss free standard capacitor. The measurement was carried out using a 60 Hz test voltage of 2.11 kV. The tan δ was measured between the copper conductor and the cable metallic screen. During the measurement, the temperature of the cable conductor was kept at 97.5 ± 2°C. The current was induced in the cable conductor to bring the conductor to an equilibrium at the above mentioned temperature.

Results:
Conductor temperature during measurement was maintained at 97.5 ± 2°C. The test voltage was 2.11 kV. The measured Tan δ value = 2×10^{-4}.

Thus the specified test requirements were met for Tan δ value.

4.4 Heating Cycle Test Followed by a Partial Discharge Test

Requirements:

The sample shall be heated until the conductor attains a steady temperature of 5 °C~10 °C above the maximum conductor temperature in normal operation. The heating cycle shall be of 8 hour duration. The conductor temperature shall be maintained within the specified limits for at least 2 hours of each heating period. This shall be followed by at least 3 hours of natural cooling in air. This cycle should be carried out thrice. After the 3rd cycle is completed, the sample shall be subjected to a partial discharge test and should comply with the requirements given in section (4.1) of this report.

Test description:

The cable conductor was heated by induced current to reach a steady temperature of 95~98 °C in 1 hour and 45 minutes. This temperature was then maintained at 95-98°C for a further period of 2 hours and 15 minutes. Then the heating current was switched off and the cable sample went through the natural cooling for about 4 hours, before the start of the next 8 hours heating cycle. After the completion of the 3rd heating cycle, the partial discharge test was performed according to the procedure specified in section 4.1 of this report.

Results:

The following results of PD measurements were recorded after the completion of the heat cycling test. The measurements were carried out at an ambient temperature of 23 °C.

Background noise level	= 3.85 pC
Partial discharge measured	= 3.9 pC

Thus the specified test requirements were met for heating cycle test following by a partial discharge test.

4.5 Impulse Test Followed by an ac Voltage Test

Requirements:

Impulse test should be performed on heated cable at a conductor temperature of 5°C~ 10°C above the maximum conductor temperature in normal operation. The impulse test voltage shall be 95 kV_{peak}. The cable should withstand 10 impulses of each polarity. After the impulse test, the cable shall be subjected to an ac voltage test for 15 minutes with a test voltage of 30.5 kV_{rms}. No breakdown of the insulation shall occur.

Test Description and Results:
The tested cable was heated by passing current in the cable conductor. The impulses applied had waveform with a front time of 2.5 μs and time to half value of ~51μs. Thus, the waveform used complied with the specified requirements. The voltage was measured by using a damped RC voltage divider and digital impulse measurement system. During impulse voltage applications, the conductor temperature was maintained between 96°C ~ 99°C. The cable ends were fitted with a resistive stress controlling sleeve during the impulse test. 10 impulses of each polarity and ~95 kV_{Peak} value were applied between the conductor and the core screen. No breakdown of the insulation or external flashover took place. Later the cable was allowed to cool down to the ambient temperature. With cable ends in the oil terminations, a 60 Hz test voltage of 30.5 kV_{rms} was applied between the conductor and the screen for 15 minutes and no breakdown or external flashover occurred. Impulse waveforms are shown for two of the applied impulses for each polarity.

Thus the specified test requirement were met for impulse test followed by an ac voltage test.

4.6 ac Voltage Test for Four Hours

Requirements:
The test shall be performed at the ambient temperature. A test voltage of $4U_o$ shall be applied between the conductor and the screen. The voltage shall be gradually increased to the specified level. No breakdown should occur.

Test Description and Results:
With cable ends in oil terminations, the 60 Hz test voltage was gradually increased to 35.3 kV_{rms} and then the voltage was maintained at this level for four hour. The voltage was applied between the conductor and the core screen. The voltage was measured by a capacitive voltage divider. During the test the ambient temperature was 25 °C. No breakdown or external flashover occurred.

Thus, the specified test requirements for ac voltage test for four hours were met.

5. Conclusion

The tested sample of 8.7/15 kV, 1 x 500 mm^2, Cu/XLPE/PVC cable manufactured by Jeddah Cable Co. Jeddah, Saudi Arabia passed all the electrical type tests as per IEC-60502/2/1997.

6. *Tests Conducted By*

The tests were conducted by the following team from College of Engineering, King Saud University, Riyadh, Saudi Arabia.

1. Abdulrhman A. Al-Arainy (Ph.D.)
   Professor, Electrical Engineering
2. Nazar H. Malik (Ph.D.)
   Professor, Electrical Engineering
3. M. Iqbal Qureshi (Ph.D.)
   Sc. Researcher, Research Center

7. *Tests Witnessed By*

The tests were witnessed by:

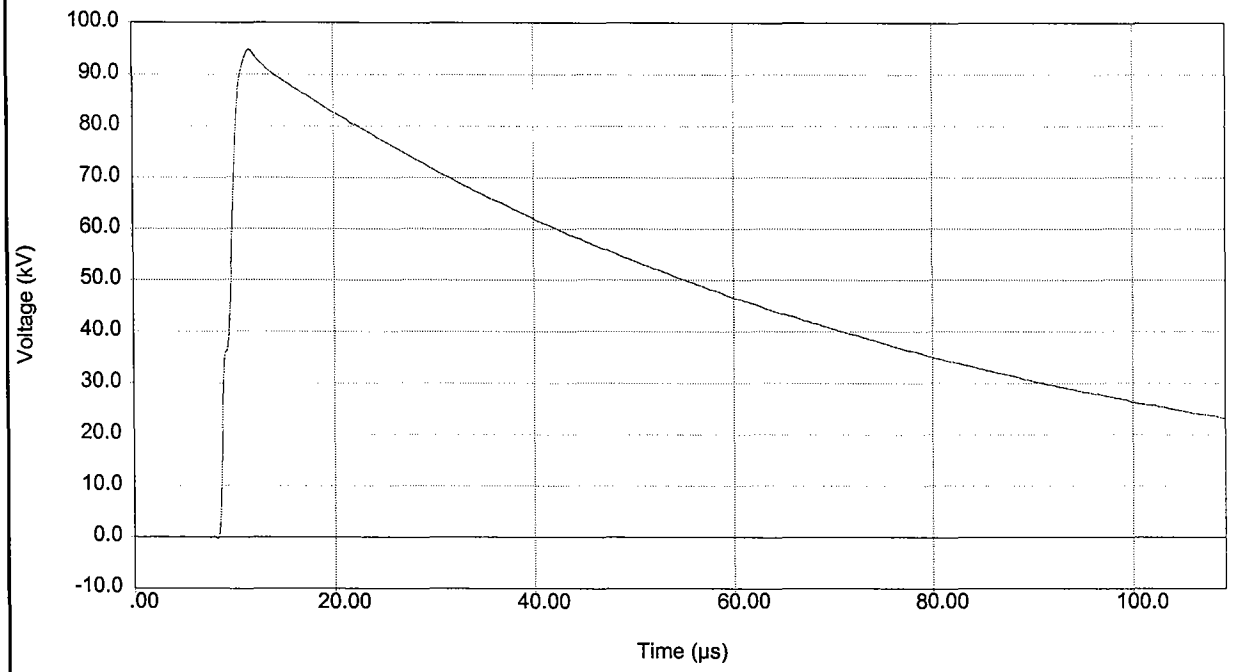
Engineer Mustafa Abdel Aal
Quality Control Manager
Jeddah Cable Company
Jeddah, Saudi Arabia.

Test Report

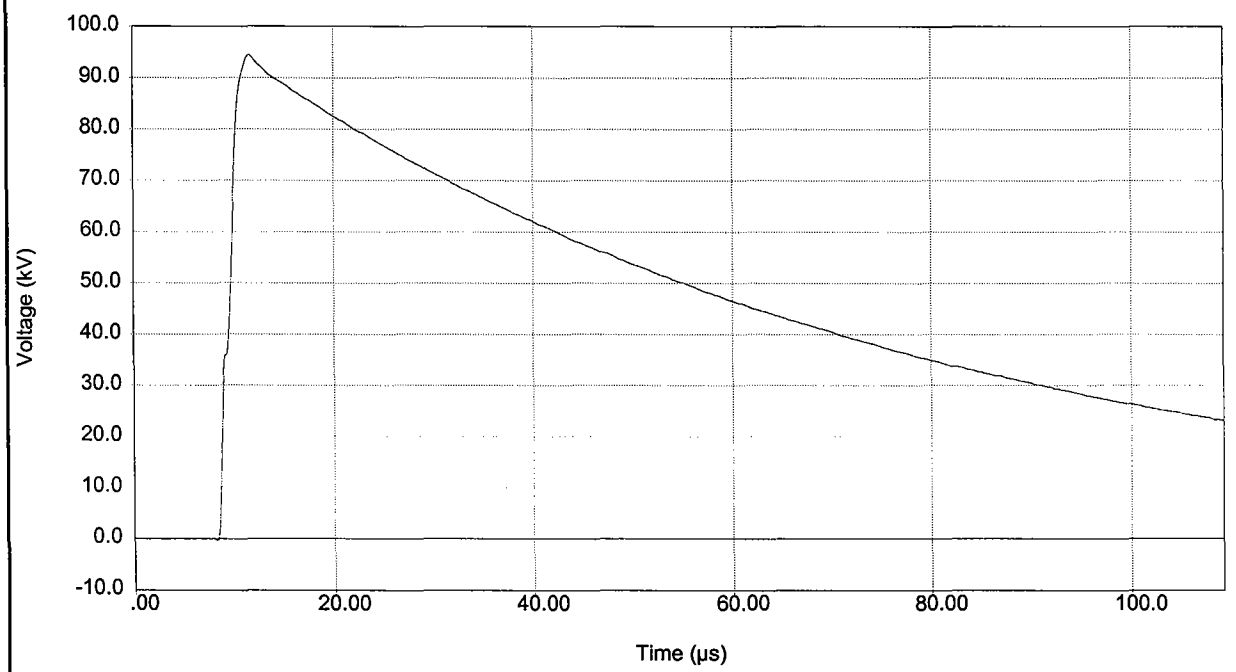
Test Report No. TR-01420C1 9

COMPANY:	
Waveforms	Date :16:02 Wed, May 05, 1999
IMPULSE TESTING	Page 1 of 1

WAVEFORM #: 000140vf 05/05/99 15:58:06
PEAK: 94.80 (kV)
FRONT TIME: 2.51 (µs) TIME TO HALF: 50.67 (µs)



WAVEFORM #: 000141vf 05/05/99 15:58:12
PEAK: 94.53 (kV)
FRONT TIME: 2.50 (µs) TIME TO HALF: 50.80 (µs)



Tested By :	Inspected By :	Approved By :

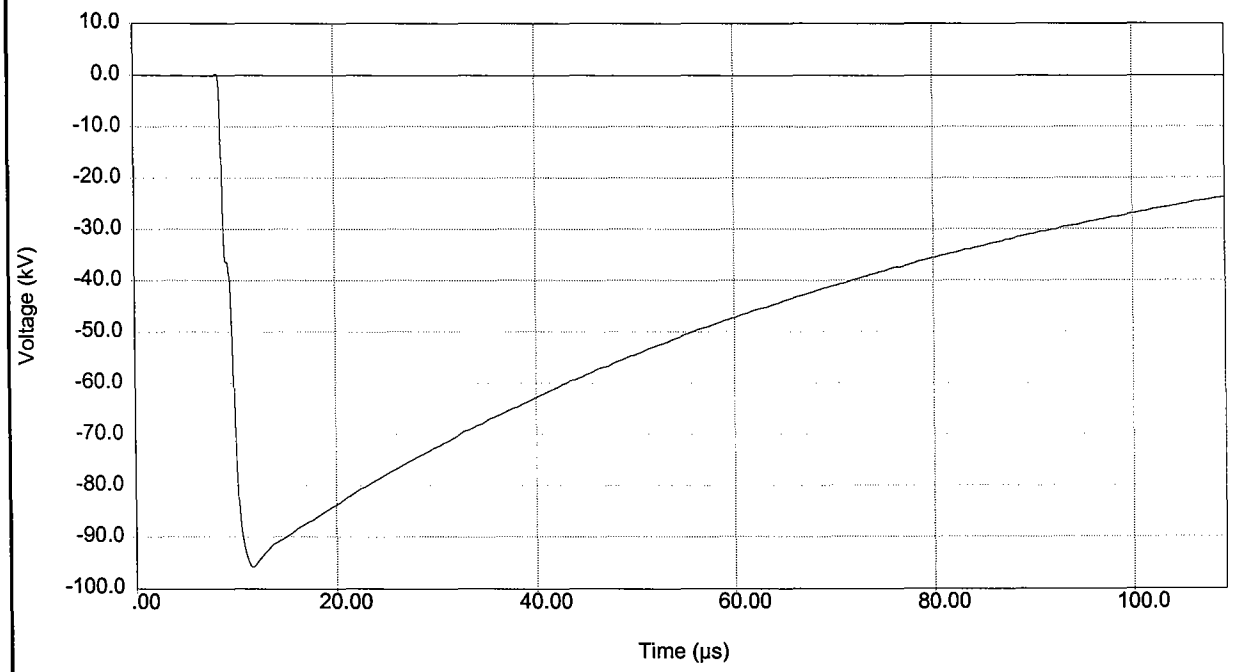
Hipotronics Digital Impulse Measuring System - Version 3.1 Licensed to :HV Lab King Saud University

Test Report

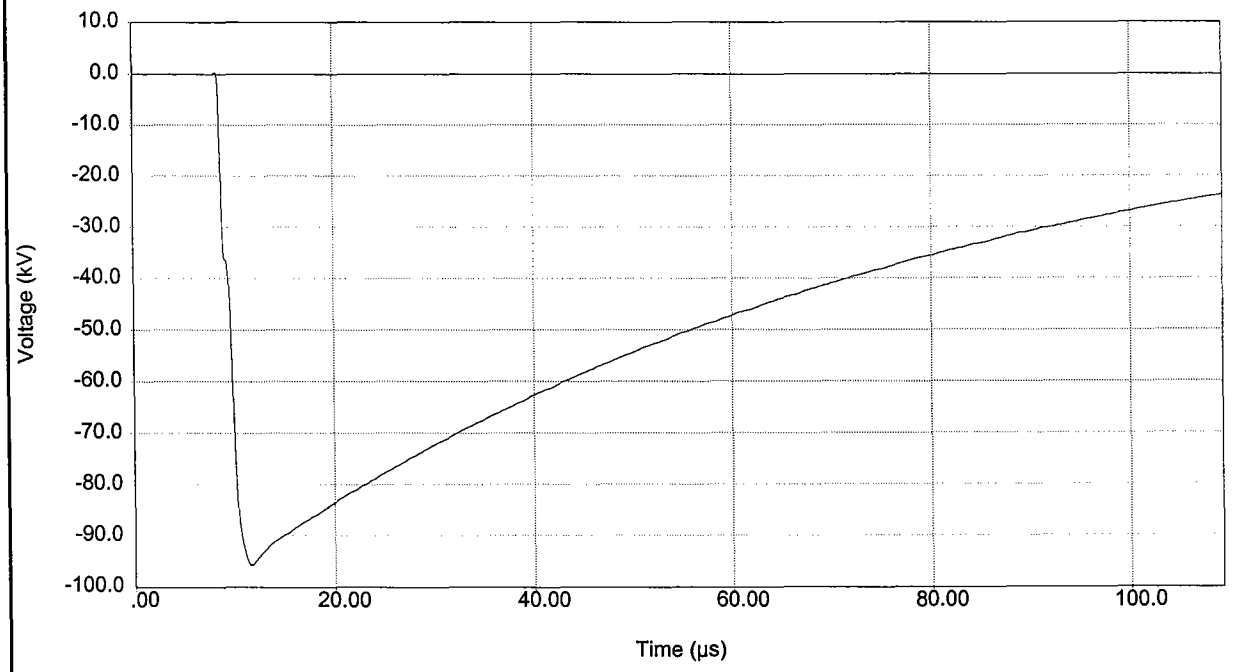
Test Report No. TR-01420C1 10

COMPANY:	
Waveforms	Date :16:07 Wed, May 05, 1999
IMPULSE TESTING	Page 1 of 1

WAVEFORM #: 000146vf 05/05/99 16:04:34
PEAK: -95.80 (kV)
FRONT TIME: 2.52 (µs) TIME TO HALF: 50.62 (µs)



WAVEFORM #: 000147vf 05/05/99 16:04:40
PEAK: -95.75 (kV)
FRONT TIME: 2.52 (µs) TIME TO HALF: 50.64 (µs)



Tested By :	Inspected By :	Approved By :

Hipotronics Digital Impulse Measuring System - Version 3.1 Licensed to :HV Lab King Saud University

Test Description:
The cable sample was bent around a test cylinder. The diameter of the test cylinder was 1.5 m. The bending test consisted of three cycles of wind, unwind, reversal of the winding direction, wind and unwind. During the test, the temperature of the test object was around 23°C. After the completion of this bending test, the sample was subjected to PD measurements as mentioned in section 4.1 above.

Results:
Background noise level = 2.85 pC
Partial discharge level measured = 2.94 pC

Thus the specific test requirements for PD level after the bending test were met.

4.3 Tan δ Measurement

Requirements:
The sample shall be heated until the conductor reaches a steady temperature which shall be 5^0C to 10^0C above the maximum conductor temperature in normal operation. The Tan δ shall be measured with an ac voltage of at least 2.0 kV at the specified conductor temperature. The measured Tan δ value shall be $\leq 80 \times 10^{-4}$.

Test Description:
The Tan δ of the cable sample was measured by using a Tettex, Type 2801, Schering bridge, and a loss free standard capacitor. The measurement was carried out using a 60 Hz test voltage of 2.11 kV. The tan δ was measured between the copper conductor and the cable metallic screen. During the measurement, the temperature of the cable conductor was kept at 97.5 ± 2°C. The current was induced in the cable conductor to bring the conductor to an equilibrium at the above mentioned temperature.

Results:
Conductor temperature during measurement was maintained at 97.5 ± 2 °C. The test voltage was 2.11 kV. The measured Tan δ value = 2×10^{-5}.

Thus the specified test requirements were met for Tan δ value.

KEMA

TEST REPORT

Report no.	98470612.000-HVL 99-1057
Client	Jeddah Cable Company P.O. box 31248 Jeddah 21497 Kingdom of Saudi Arabia
Reference	-
Concerning	test
Date	3 February until 10 August 1999
Place	KEMA High-Voltage Laboratory, Arnhem, the Netherlands
Object	power cable, XLPE insulated, 15 kV
Type	Cu/TR XLPE/PVC
Manufacturer	same as client

REQUIREMENTS
The requirements as specified in the standard AEIC CS5

TEST PROGRAMME
For the test programme we refer to page 2.

SUMMARY AND CONCLUSION
The results obtained relate only to the work ordered and to the material tested.
The tests were passed.

Author H.E. Keizer

KEMA Nederland B.V.
p/o
G.P.T. Roelofs
KEMA High-Voltage Laboratory

This B-report consists of:
24 pages
1 appendix

Arnhem, 20 September 1999

Utrechtseweg 310, 6812 AR Arnhem , the Netherlands.
Telefoon +31 26 3 56 91 11. Telex 45016 kema nl. Telefax +31 26 4 43 38 43

TEST REPORT

Report no.	70670138-HVL 06-1362
Client	Jeddah Cable Company Jeddah, Saudi-Arabia
Concerning	tests
Date	18 October up to and including 6 December 2006
Place	KEMA High-Voltage Laboratory, Arnhem, the Netherlands
Object	0,6/1 kV LV cable
Type	4x300 mm^2, Al/XLPE/PVC
Manufacturer	same as client

REQUIREMENTS
The requirements as specified in the standard IEC 60502-1 (2004).

TEST PROGRAMME
For the test programme we refer to pages 2 and 3.

SUMMARY AND CONCLUSION
The results obtained relate only to the work ordered and to the material tested.
The tests as mentioned in the test programme were passed.

Author P.J. Hülkenberg

KEMA Nederland B.V.

P.G.A. Bus
KEMA T&D Testing Services
Managing Director

This report consists of:
12 pages
1 appendix

Arnhem, 30 January 2007

Utrechtseweg 310, 6812 AR Arnhem. Telephone +31 26 3 56 31 85. Telefax +31 26 4 43 38 43

TEST REPORT

Report no.	70670173-HVL 06-1315
Client	Jeddah Cable Company Jeddah, Saudi Arabia
Reference	-
Concerning	test
Date	16 October 2006 up to and including 12 December 2006
Place	KEMA Nederland B.V., Arnhem, the Netherlands
Object	450/750 V cable
Type	1x16 mm^2 Cu/PVC
Manufacturer	same as client

REQUIREMENTS
The requirements as specified in the standards IEC 60227-3 (1993) and SSA 1320 (1997)

TEST PROGRAMME
The programme was specified by the client and was as follows:
1 Type tests according to IEC 60227-3 (1993) SSA 1320 (1997)

SUMMARY AND CONCLUSION
The results obtained relate only to the work ordered and to the material tested.
The tests were passed.

Author R.J.B. Gruntjes

KEMA Nederland B.V.

This report consists of:
3 pages
2 appendices

P.G.A. Bus
KEMA T&D Testing Services
Managing Director

Arnhem, 18 January 2007

Utrechtseweg 310, 6812 AR Arnhem. Telephone +31 26 3 56 31 85. Telefax +31 26 4 43 38 43

KEMA

04-1218

TYPE TEST CERTIFICATE OF COMPLETE TYPE TEST

OBJECT	three-core power cable
DESIGNATION	19/33 (36) kV, 3x240 mm^2 Cu, XLPE
MANUFACTURER	JEDDAH CABLE COMPANY Industrial City, 3rd Region - Jeddah 21497 – Saudi Arabia
DATE OF TESTS	17 June 2004 up to and including 28 July 2004
TESTED BY	KEMA HIGH-VOLTAGE LABORATORY, Utrechtseweg 310 - 6812 AR Arnhem - the Netherlands

The object, constructed in accordance with the discription, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with

IEC 60502-2

This Type Test Certification has been issued by KEMA following exclusively the STL guides. The results are shown in the record of Proving Tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the above Standard and to justify the ratings assigned by the manufacturer as listed on page 1. The Certificate applies only to the object tested. The responsibility for conformity of any object having the same designations with that tested rests with the manufacturer.

This Certificate comprises 33 sheets in total.

KEMA Nederland B.V.

S.A.M. Verhoeven

Arnhem, 5 August 2004

KEMA

04-1217

TYPE TEST CERTIFICATE OF COMPLETE TYPE TEST

OBJECT	three-core power cable
DESIGNATION	6,35/11(12) kV, 3x240 mm^2 Cu, XLPE
MANUFACTURER	JEDDAH CABLE COMPANY Industrial City - 3rd Region - Jeddah 21497 - Saudi Arabia
DATE OF TESTS	17 June 2004 up to and including 19 July 2004
TESTED BY	KEMA HIGH-VOLTAGE LABORATORY, Utrechtseweg 310 - 6812 AR Arnhem - the Netherlands

The object, constructed in accordance with the discription, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with

IEC 60502-2

This Type Test Certification has been issued by KEMA following exclusively the STL guides. The results are shown in the record of Proving Tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the above Standard and to justify the ratings assigned by the manufacturer as listed on page 1. The Certificate applies only to the object tested. The responsibility for conformity of any object having the same designations with that tested rests with the manufacturer.

This Certificate comprises 34 sheets in total.

KEMA Nederland B.V.

S.A.M. Verhoeven

Arnhem, 29 July 2004

KEMA

03-1066

TYPE TEST CERTIFICATE OF COMPLETE TYPE TEST

OBJECT	4-core, XLPE insulated power cable
DESIGNATION	CU/XLPE/SWA/PVC
Rated voltage $U_0/U/U_m$	0,6/1/1,2 kV Rated frequency 50 Hz
MANUFACTURER	JEDDAH CABLE CO. P.O. Box 31248 - Jeddah 21497 - Saudi Arabia
TESTED FOR	JEDDAH CABLE CO. P.O. Box 31248 - Jeddah 21497 - Saudi Arabia
DATE OF TESTS	24 February 2003 up to and including 26 March 2003
TESTED BY	KEMA HIGH-VOLTAGE LABORATORY Utrechtseweg 310 - 6812 AR Arnhem - the Netherlands

The object, constructed in accordance with the description, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with

IEC 60502-1

This Type Test Certification has been issued by KEMA following exclusively the STL Guides.

The results are shown in the record of Proving Tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the above Standard and to justify the ratings assigned by the manufacturer as listed on page 1.

The Certificate applies only to the object tested. The responsibility for conformity of any object having the same designations with that tested rests with the manufacturer.

This Certificate comprises 28 sheets in total.

KEMA Nederland B.V.

S.A.M. Verhoeven

Arnhem, 2 April 2003

INVESTIGATION REPORT

Report no.	70274009.000-HVL 03-1029
Client	Jeddah Cable Company P.O. Box 31248 Jeddah 21497 Saudi Arabia
Reference	fax of Mr M.A. Itani dated 1 October 2002
Concerning	inspection and investigation
Date	3 up to and including 7 February 2003
Place	KEMA High-Voltage Laboratory, Arnhem the Netherlands
Object	4 samples of power cable
Type	33 kV CU/XLPE/SWA/PVC 3x240 mm^2
Manufacturer	same as client

INVESTIGATION PROGRAMME
For the programme see page 3.

SUMMARY AND CONCLUSION
The results obtained relate only to the work ordered and to the material tested.
For the summary and conclusion see page 4.

Author C.H. Beverwijk

KEMA Nederland B.V.

p/o

S.A.M. Verhoeven
KEMA High-Voltage Laboratory

This B-report consists of:
26 pages

Arnhem, 7 May 2003

Utrechtseweg 310, 6812 AR Arnhem , the Netherlands.
Telefoon +31 26 3 56 91 11. Telefax +31 26 4 43 38 43

KEMA

03-1048

TYPE TEST CERTIFICATE OF COMPLETE TYPE TEST

OBJECT	3-phase, XLPE insulated power cable
DESIGNATION	CU/XLPE/STA/PVC
Rated voltage $U_o/U/U_m$	6,35/11/12 kV Rated frequency 50 Hz
MANUFACTURER	JEDDAH CABLE CO. P.O. Box 31248 - Jeddah 21497 - Saudi Arabia
TESTED FOR	JEDDAH CABLE CO. P.O. Box 31248 - Jeddah 21497 - Saudi Arabia
DATE OF TESTS	25 February 2003 up to and including 25 March 2003
TESTED BY	KEMA HIGH-VOLTAGE LABORATORY Utrechtseweg 310 - 6812 AR Arnhem - the Netherlands

The object, constructed in accordance with the description, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with

IEC 60502-2

This Type Test Certification has been issued by KEMA following exclusively the STL Guides.

The results are shown in the record of Proving Tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the above Standard and to justify the ratings assigned by the manufacturer as listed on page 1.

The Certificate applies only to the object tested. The responsibility for conformity of any object having the same designations with that tested rests with the manufacturer.

This Certificate comprises 40 sheets in total.

KEMA Nederland B.V.

S.A.M. Verhoeven

Arnhem, 2 April 2003

KEMA

TEST REPORT

Report no.	40170114.000-HVL 01-1129
Client	Jeddah Cable Company P.O. Box 31248 Jeddah 21497 Kingdom of Saudi Arabia
Reference	-
Concerning	test
Date	9 July 2001
Place	KEMA High-Voltage Laboratory, Arnhem, the Netherlands
Object	8,7/15 kV power cable
Type	Cu/XLPE/PVC cable 3x185 mm^2
Manufacturer	same as client

REQUIREMENTS
The requirements as specified in the standard AEIC CS5-94 and as per Technical Specification no. EWR/AA/67/Rev. II (14.06.98).

TEST PROGRAMME
The programme was specified by the client and was as follows:
1 Insulation shield stripping test in accordance with clause G.1 of AEIC CS5-94.

SUMMARY AND CONCLUSION
The results obtained relate only to the work ordered and to the material tested.
The tests were passed.

Author R.J.B. Gruntjes

KEMA Nederland B.V.

p/o

S.A.M. Verhoeven
KEMA High-Voltage Laboratory

Arnhem, 24 July 2001

This B-report consists of:
5 pages
1 appendix

Utrechtseweg 310, 6812 AR Arnhem , the Netherlands.
Telefoon +31 26 3 56 91 11. Telex 45016 kema nl. Telefax +31 26 4 43 38 43

EGYPTIAN ELECTRICITY HOLDING COMPANY (E.E.H.C) PEHVRC
Pyramids Extra High Voltage Research Center
Fax : 00202/ 2616512 - 00202/ 5390728

Report No. (84/2001)

Date : Oct., 2001 .

1- CLIENT :

- Jeddah Cable Company .

2- DATE AND PLACE OF TESTS :

- Oct., 2001 in Extra High Voltage Research Center Laboratory Giza, Egypt.

3- MATERIAL DATA :

- Manufacturer : Jeddah Cable Company.
- Type : 35 kV/CU/XLPE/PVC/1×500mm^2
- Year of manufacturer : 2001
- Quantity submitted : One length of approximately 10 m.
- No. of phases : 1 .
- Insulation : XLPE.
- Conductor material : Copper.
- Conductor cross-section : 500 mm^2 .
- Sheath material : PVC.
- Sheath color : Black .
- Rated voltage : 35 kV.

4- REQUIREMENTS :

1- Measurement of dimensions
2- Thermal conditioning.
3- Dissipation factor verification.
4- AC withstand verification.

MINISTRY OF ELECTRICITY & Energy
EGYPTIAN ELECTRICITY COMPANY
PYRAMIDS EXTRA HIGH VOLTAGE
RESEARCH CENTRE

E Farouz

Fatma T. Tahoun

00-1086

KEMA

TYPE TEST CERTIFICATE OF COMPLETE TYPE TEST

OBJECT	power cable 18/30 (36) kV description: 3-core 19/33 kV 240 mm^2 Cu XLPE insulated steel wire armoured PVC sheathed
DESIGNATION	
Rated voltage $U_o/U/U_m$	18/30/36 **kV**
Rated frequency	50 **Hz**
MANUFACTURER	JEDDAH CABLE COMPANY P.O. Box 31248 - Jeddah - Saudi Arabia
TESTED BY	KEMA HIGH-VOLTAGE LABORATORY Utrechtseweg 310 - 6812 AR Arnhem - the Netherlands
DATE OF TESTS	22 May to 23 June 2000

The object, constructed in accordance with the description, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with

IEC 60502-2 (1997)

The results are shown in the record of Proving Tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the above Standard and to justify the ratings assigned by the manufacturer as listed on page 1.

The Certificate applies only to the objects tested. The responsibility for conformity of any object having the same designations with that tested rests with the manufacturer.

This Certificate comprises 40 sheets in total.

KEMA Nederland B.V.

S.A.M. Verhoeven

Arnhem, 3 July 2000

client	JEDDAH CABLE COMPANY - JEDDAH - SAUDI ARABIA
equipment under test	Medium voltage cable 1A4/0 AWG CU/XLPE/PVC
tests performed	Test on electric cable under fire conditions: test on bunched wires or cables
normative documents	IEC 332-3 (1992) Standard - Cat. C
test date	March 14, 2000

n° 0030

n° of pages	11
issue date	March 15, 2000
prepared	P. Scrocco - TEST
approved	E. Bertani - TEST

CENTRO ELETTROTECNICO SPERIMENTALE ITALIANO
Business Unit
Prove ai Componenti
Il Responsabile del Laboratorio

test certificate of	Test on electric cable under fire conditions
apparatus	MV screened power cable, single core, XLPE insulated
designation	Jeddah Cable Company 1x4/0 AWG 12/20 kV CU/XLPE/PVC rated voltage 12/20 kV; rated normal current -- A; rated frequency -- Hz
manufacturer	JEDDAH CABLE COMPANY - Jeddah; Saudi Arabia
tested for	JEDDAH CABLE COMPANY - Jeddah; Saudi Arabia
date(s) of test	March 14, 2000

the apparatus, constructed in accordance with the description, drawing and photographs incorporated in the reference document, identified in this certificate, has been subjected to the series of proving tests in accordance with

IEC Technical Report 60332-3 (1992) Category C

this type test certificate has been issued by CESI in accordance with above mentioned standards.

the results are shown in the record of proving tests and the oscillograms attached in the test report. The values obtained and the general performance are considered to comply with the above standards and to justify the ratings assigned by the manufacturer as listed on page no.2 .

the certificate applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designations with that tested rests with the manufacturer.

only integral reproduction of this certificate, or reproductions of this page accompanied by any page on which are stated the endorsed ratings of the apparatus tested, are permitted without written permission from CESI.

no. of pages 3

issue date April 14, 2000

prepared TEST - E. Bertani

approved TEST - V. Scarioni

CESI
CENTRO ELETTROTECNICO SPERIMENTALE ITALIANO
Business Unit
Prove e Componenti
Il Responsabile del Laboratorio

TEST REPORT

Report no.	98471488.000-HVL99-1215
Client	Jeddah Cable Company P.O. Box 31248 Jeddah Saudi Arabia
Reference	quotation 98471488.000-HVL-1999-21020 Aouw
Concerning	test results
Date	16 till 20 August 1999
Place	KEMA High-Voltage Laboratory, Arnhem, the Netherlands
Object	3x300 mm^2 CU/XLPE/SWA/PVC 15 kV cable
Manufacturer	Jeddah Cable Company, Jeddah, Saudi Arabia

REQUIREMENTS
The requirements as specified in the standard IEC 60502-2 (1997) including amendment 1 (1998-05).

TEST PROGRAMME
The programme was specified by the client and was as follows:
1 partial discharge test in accordance with IEC 60502-2 (1997) clause 18.1.3
2 impulse test followed by a voltage test in accordance with IEC 60502-2 clause 18.1.7
3 voltage test for 4 hours in accordance with IEC 60502-2 clause 18.1.8.

SUMMARY AND CONCLUSION
The results obtained relate only to the work ordered and to the material tested.
The tests were passed.

Author P.H.W. Kuijpers

KEMA Nederland B.V.

G.P.T. Roelofs
KEMA High-Voltage Laboratory

This B-report consists of:
10 pages
1 appendix

Arnhem, 19 August 1999

Utrechtseweg 310, 6812 AR Arnhem, the Netherlands
Telephone (31 26) 356 91 11, Telex 45116 kema nl, Telefax (31 26) 442 39 43

99-1161

KEMA

TYPE TEST CERTIFICATE OF COMPLETE TYPE TEST

OBJECT	power cable 12/20 (24) kV, XLPE-insulated, 3x185 mm^2, Cu, with 70 mm^2 bare ground copper conductor
DESIGNATION	12 kV Cu/XLPE/copper tape/PVC 3x185 mm^2
Rated voltage	12/20/24 **kV**
Rated frequency	50 **Hz**
MANUFACTURER	JEDDAH CABLE COMPANY P.O. Box 31248 - Jeddah 21497 - Kingdom of Saudi Arabia
TESTED BY	KEMA HIGH-VOLTAGE LABORATORY Utrechtseweg 310 - 6812 AR Arnhem - the Netherlands
DATE OF TESTS	18 May to 25 June 1999

The object, constructed in accordance with the description, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with

IEC 60502-2

The results are shown in the record of Proving Tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the above Standard and to justify the ratings assigned by the manufacturer as listed on page 2.

The Certificate applies only to the object tested. The responsibility for conformity of any object having the same designations with that tested rests with the manufacturer.

This Certificate comprises 37 sheets in total.

KEMA Nederland B.V.

G.P.T. Roelofs

Arnhem, 2 August 1999

KEMA

TEST REPORT

Report no.	98471588.000-HVL 99-1272
Client	Jeddah Cable Company P.O. Box 31248 Jeddah 21497 Kingdom of Saudi Arabia
Reference	-
Concerning	test
Date	27 October 1999
Place	KEMA High-Voltage Laboratory, Arnhem, the Netherlands
Object	XLPE-insulated power cable
Type	15 kV, 3 x 185 mm^2, CU/XLPE/PVC
Manufacturer	same as client

REQUIREMENTS
The requirements as specified by the client.

TEST PROGRAMME
The programme was specified by the client and was as follows:
1 short-circuit test on cable screening and one cable core.

SUMMARY AND CONCLUSION
The results obtained relate only to the work ordered and to the material tested.
The maximum temperature of the copper screening after having received a short-circuit current of 5,1 kA (50 Hz) for one second, with pre-heated conductors up to 90°C, was 144 °C.
The results are for information only, since no requirements were specified.

Author W.J.W.M. Sloot

KEMA Nederland B.V.
p/o
G.P.T. Roelofs
KEMA High-Voltage Laboratory

This B-report consists of:
11 pages
1 appendix

Arnhem, 25 November 1999

Utrechtseweg 310, 6812 AR Arnhem , the Netherlands.
Telefoon +31 26 3 56 91 11. Telex 45016 kema nl. Telefax +31 26 4 43 38 43

TEST REPORT

Report no.	98470732.000-HVL 99-1053
Client	Jeddah Cable Company P.O. Box 31248 Jeddah 21497 Kingdom of Saudi Arabia
Reference	-
Concerning	test
Date	18 January until 18 February 1999
Place	KEMA High-Voltage Laboratory, Arnhem, the Netherlands
Object	power cable, XLPE-insulated 35 kV
Type	Cu/TR XLPE/LLDPE, 1x240 mm^2
Manufacturer	same as client

REQUIREMENTS
The requirements as specified in the standard AEIC CS5-94: "Specification for cross-linked polyethylene insulated shielded power cables rated 5 through 46 kV".

TEST PROGRAMME
For the programme we refer to page 2.

SUMMARY AND CONCLUSION
The results obtained relate only to the work ordered and to the material tested.
The tests were passed.

Author H.E. Keizer

KEMA Nederland B.V.

G.P.T. Roelofs
KEMA High-Voltage Laboratory

Arnhem, 12 April 1999

This B-report consists of:
28 pages
1 appendix

Utrechtseweg 310, 6812 AR Arnhem , the Netherlands.
Telefoon +31 26 3 56 91 11. Telex 45016 kema nl. Telefax +31 26 4 43 38 43

27

KEMA

TEST REPORT

Report no.	70670038-HVL 06-1361
Client	Jeddah Cable Company Jeddah, Saudi-Arabia
Concerning	tests
Date	18 October up to and including 28 November 2006
Place	KEMA High-Voltage Laboratory, Arnhem, the Netherlands
Object	0,6/1 kV LV cable
Type	1x630 mm^2, Cu/XLPE/PVC
Manufacturer	same as client

REQUIREMENTS
The requirements as specified in the standard IEC 60502-1 (2004).

TEST PROGRAMME
For the test programme we refer to pages 2 and 3.

SUMMARY AND CONCLUSION
The results obtained relate only to the work ordered and to the material tested.
The tests as mentioned in the test programme were passed.

Author P.J. Hülkenberg

KEMA Nederland B.V.

P.G.A. Bus
KEMA T&D Testing Services
Managing Director

Arnhem, 30 January 2007

This report consists of:
22 pages
1 appendix

Utrechtseweg 310, 6812 AR Arnhem. Telephone +31 26 3 56 31 85. Telefax +31 26 4 43 38 43

59762510-TOS/MEC 07-9071 Confidential

Testing ACSR/AW "Merlin"
1 x 170,5 cable, according to ASTM B549

Arnhem, 4 April 2007

Author S. van der Weiden
KEMA Technical & Operational Services

By order of Jeddah Cable Company

author : S. van der Weiden		07-04-04	reviewed : H.G. van Zuilen		07-04-
B	7 pages - annexes	WSc	approved : C.A.M. van den Ende		07-04-

CONTENTS

Page

SUMMARY

KEMA Technical & Operational Services (TOS) tested the ACSR/AW “Merlin”, 1 x 170.5, according to ASTM B549 according to our quotation ref.: 00375-KPS/I&M 06-4344 Kau/KJ

In the table below you’ll find a summary of the results of the conductor KEMA received.

Table 1 Summary of properties

CONSTRUCTION TESTS		REQUIREMENT	ACTUAL	RESULT (PASS/FAIL)
No. of Al Wires		18	18	Passed
No. of AW Steel Wire		1	1	Passed
Nom. diameter of AL Wire	mm	3.47	3.49	Passed
Nom. diameter of AW Steel Wire	mm	3.47	3.48	Passed
Lay ratio				
- Inner layer		10 - 16	10 - 16	Passed
- Outer layer		10 - 14	10 - 14	Passed
Max. D.C Resistance (at 20°C)	Ohm/km	0.1663	0.1621	Passed
Overall Conductor diameter (approx.)	mm	17.35	17.34	Passed

1 INTRODUCTION

KEMA performed wire tests and electrical tests and some additional tests on a delivered ACSR/AW “Merlin”, 1 x 170.5 from Jeddah Cable.
KEMA tested:

- Al 1350 wire according to ASTM B230 (tensile strength, elongation, wrapping test, dimensions, surface finish)
- AW (aluminium clad steel wire) according to ASTM B502 (tensile strength at 1% elongation, torsion test, measurement of aluminium coating thickness, dimensions).

Besides KEMA tested the resistivity of Al-wire according to ASTM B230, clause 8. Resistance measurements of the Al-clad wire according to ASTM B502. The remaining tests are confined to dimensional checks on the finished conductor and concerns: construction, lay and visual inspections, packaging requirements.

2 ALUMINIUM WIRE ACCORDING TO ASTM B230

Table 2 shows the results of the tests to the ACSR/AW “Merlin”, 1 x 170.5 according to ASTM B230. Because routine tests on wires after stranding are not required (only on request by purchaser and on agreement of manufacturer) KEMA tested the wires after stranding taken from a sample of the deliverd conductor.

Table 2 Results of tensile strength, elongation and dimensions

	Tensile strength (N/mm^2)	**Elongation (%)**	**Dimensions (diameter mm)**
1	172,32	1,73	3,49
2	172,34	1,72	3,49
3	174,21	1,78	3,48
4	168,72	1,78	3,49
5	169,21	1,80	3,49
6	180,12	1,72	3,48
7	165,34	1,76	3,49
8	173,34	1,76	3,48
9	176,49	1,78	3,49
average	172,46	1,76	3,49

The dimensions of the single wires do not vary more than 0.01 mm (i.e. 0.3%).

Visual inspection
The part of the cable that was delivered to KEMA did not show any imperfections.

Wrapping test
Wires are looped around its own diameter and no fracture occurred.

3 ALUMINIUM CLAD STEEL WIRE ACCORDING TO ASTM B502

Tensile test
Tensile test was performed on a calibrated Zwick tensile tester (January 2007). The average tensile strength at 1% elongation was: 124.6 kg/mm^2.

Torsion test
The wire should withstand without fracture not less than 20 twists in a length equivalent of 100 times the nominal diameter of the wire (350 mm). The wires that were tested didn't show any imperfections before testing. The testspeed of the torsion test was 12 twists per minute in the same directions. After an average of 145 cycles fracture occurs (5 measurements).

The measured thickness of the aluminium coating was: 262 g/m^2.

4 ELECTRICAL TEST

Resistivity of aluminium wire was measured according to ASTM B230, clause 8.

- The measured resisivity is 0.02657 Ω·mm^2/mm
- The resistance measurements of the Al-clad wire according to ASTM B502 is 2.803 x 10^{-6} Ω-cm.

5 CONCLUSION

According to these test, the ACSR/AW “Merlin”, 1 x 170.5 passed all tests.

CUSTOMER REFERENCE LIST

Jeddah Cable Company enjoys a lengthy and diverse list of international clients through out its business history. Our customers include large contractors, Oil & Gas corporations, government agencies & utilities, as well as local distributors and this list has been growing steadily as we continuously expand our market segments.

Listing our transaction history with all these companies & institutions would have little purpose, so please find below a list of the major contractual orders (in Saudi Riyal) that have been placed with us during the past decade or so.

The first list is of MV Cables and the second is of LV Cables.

No.	Cable Description	Contract Reference	Customer Name	Qty. in KM	Year of Supply	Contract Value in SR
1	CU/XLPE/SWA/PVC 15 kV 3 x 185 mm^2	94/12/R/PV	SCECO-Central (KSA)	22.000	1992	2,400,000.00
2	CU/XLPE/SWA/PVC 15 kV 3 x 185 mm^2	94/12/R/PC	SCECO-Central (KSA)	67.500	1992	7,730,000.00
3	CU/XLPE/PVC 15 kV 3 x 185 mm^2	3679/S	SCECO-West (KSA)	50.000	1993	3,680,000.00
4	CU/XLPE/PVC 15 kV 3 x 185 mm^2	608/1414	SCECO-West (KSA)	55.000	1993	3,530,000.00
5	CU/XLPE/PVC 15 kV 3 x 185 mm^2	1064/1414	SCECO-West (KSA)	110.000	1994	7,750,000.00
6	CU/XLPE/PVC 15 kV 1 x 630 mm^2	105/14/R/DS	SCECO-Central (KSA)	6.020	1994	425,000.00
7	CU/XLPE/PVC 15 kV 3 x 185 mm^2	01/94	SCECO-West (KSA)	40.000	1995	2,800,000.00
8	CU/XLPE/PVC 15 kV 3 x 185 mm^2	1064/94	SCECO-West (KSA)	40.000	1995	2,800,000.00
9	CU/XLPE/PVC 15 kV 3 x 185 mm^2	CPB1160048	SCECO-West (KSA)	80.000	1995	9,500,000.00
10	CU/XLPE/PVC 33 kV 1 x 500 mm^2	84EM/95	MEW (UAE)	15.000	1995	1,100,000.00
11	AL/XLPE/PVC 11 kV 3 x 185 mm^2	84EM/95	MEW (UAE)	18.000	1995	1,000,000.00
12	CU/XLPE/STA/PVC 15 kV 3 x 300 mm^2	6.NWT.16	Tabuk Elect. Co. (KSA)	25.000	1995	4,500,000.00
13	CU/XLPE/PVC 12/20 kV 1 x 400 mm^2	QBAE-392-15-6600-DA	Saudi ARAMCO (KSA)	4.000	1996	265,000.00
14	CU/XLPE/PVC 12/20 kV 1 x 240 mm^2	QBAE-392-15-6600-DA	Saudi ARAMCO (KSA)	8.500	1996	385,000.00
15	CU/XLPE/PVC 12/20 kV 1 x 95 mm^2	QBAE-392-15-6600-DA	Saudi ARAMCO (KSA)	1.000	1996	25,000.00
16	CU/XLPE/STA/PVC 15 kV 3 x 240 mm^2	DZAD-947-15-2516-ZA	Saudi ARAMCO (KSA)	1.000	1996	145,000.00

17	CU/XLPE/PVC 15 kV 3 x 185 mm^2	CPB11700095	SCECO-West (KSA)	200.000	1996	23,000,000.00
18	CU/XLPE/STA/PVC 15 kV 3 x 300 mm^2	2.NWT.17	Tabuk Elect. Co. (KSA)	48.000	1996	7,000,000.00
19	AL/XLPE/SWA/PVC 11 kV 3 x 300 mm^2	90EM/96	MEW (UAE)	30.000	1996	2,650,000.00
20	AL/XLPE/SWA/PVC 11 kV 3 x 185 mm^2	90EM/96	MEW (UAE)	39.000	1996	2,580,000.00
21	AL/XLPE/SWA/PVC 11 kV 3 x 95 mm^2	90EM/96	MEW (UAE)	7.000	1996	345,000.00
22	AL/XLPE/SWA/PVC 11 kV 3 x 300 mm^2	E03/96	MEW (UAE)	30.000	1996	2,630,000.00
23	AL/XLPE/SWA/PVC 11 kV 3 x 95 mm^2	E03/96	MEW (UAE)	3.000	1996	160,000.00
24	CU/XLPE/PVC 12/20 kV 1 x 400 mm^2	QB-392-15-6602-DA	Saudi ARAMCO (KSA)	4.500	1997	250,000.00
25	CU/XLPE/PVC 12/20 kV 1 x 120 mm^2	QB-392-15-6602-DA	Saudi ARAMCO (KSA)	3.000	1997	75,000.00
26	CU/XLPE/PVC 15 kV 3 x 185 mm^2	CPB11701382	SCECO-West (KSA)	150.000	1997	12,500,000.00
27	CU/XLPE/AWA/PVC 33 kV 1 x 300 mm^2	17S3&5 A3324	SCECO-South (KSA)	2.100	1997	150,000.00
28	CU/XLPE/AWA/PVC 13.8 kV 1 x 300 mm^2	17S3&5 A3324	SCECO-South (KSA)	5.100	1997	315,000.00
29	CU/XLPE/STA/PVC 13.8 kV 3 x 185 mm^2	17S3&5 A3324	SCECO-South (KSA)	2.000	1997	230,000.00
30	AL/XLPE/STA/PVC 15 kV 3 x 300 mm^2	S 9704 07221	SCECO-East (KSA)	10.000	1997	735,000.00
31	CU/XLPE/STA/PVC 15 kV 3 x 300 mm^2	1A.NWT.18/4	Tabuk Elect. Co. (KSA)	33.700	1997	4,500,000.00
32	CU/XLPE/SWA/PVC 33 kV 3 x 1/0 + 25 AWG	YNT-71137	Saudi Yanbu Petrochem. Co. (KSA)	3.000	1997	315,000.00
33	CU/XLPE/SWA/PVC 33 kV 3 x 120 mm^2	6P 3439/EL 6487	PDO (Oman)	3.000	1997	315,000.00
34	CU/XLPE/AWA/PVC 6/10 kV 1 x 630 mm^2	3429/EL6485/ ELP7452	PDO (Oman)	5.000	1997	410,000.00

35	CU/XLPE/AWA/PVC 33 kV 1 x 240 mm^2	6P 3456/ELA 6207	PDO (Oman)	3.500	1997	181,000.00
36	CU/XLPE/SWA/PVC 33 kV 1 x 500 mm^2	94EM/97	MEW (UAE)	71.000	1997	5,500,000.00
37	CU/XLPE/SWA/PVC 33 kV 1 x 240 mm^2	94EM/97	MEW (UAE)	60.000	1997	3,180,000.00
38	CU/XLPE/SWA/PVC 33 kV 3 x 240 mm^2	94EM/97	MEW (UAE)	4.000	1997	550,000.00
39	AL/XLPE/SWA/PVC 11 kV 3 x 300 mm^2	94EM/97	MEW (UAE)	52.000	1997	4,300,000.00
40	AL/XLPE/SWA/PVC 11 kV 3 x 185 mm^2	94EM/97	MEW (UAE)	12.000	1997	760,000.00
41	AL/XLPE/SWA/PVC 11 kV 3 x 95 mm^2	94EM/97	MEW (UAE)	1.000	1997	48,000.00
42	CU/XLPE/SWA/PVC 11 kV 3 x 300 mm^2	94EM/97	MEW (UAE)	5.000	1997	790,000.00
43	AL/XLPE/SWA/PVC 11 kV 1 x 300 mm^2	94EM/97	MEW (UAE)	2.000	1997	66,000.00
44	CU/XLPE/PVC 15 kV 3 x 185 mm^2	CPB11801468	SCECO-West (KSA)	470.000	1998	32,000,000.00
45	CU/XLPE/STA/PVC 18/30 kV 3 x 185 mm^2	CPB11801468	SCECO-West (KSA)	20.000	1998	2,200,000.00
46	CU/XLPE/PVC 15 kV 3 x 185 mm^2	CPB11901076	SCECO-West (KSA)	120.000	1998	8,500,000.00
47	CU/XLPE/PVC 15 kV 1 x 95 mm^2	S 9811 19960	SCECO-East (KSA)	2.000	1998	52,000.00
48	CU/XLPE/PVC 35 kV 3 x 120 mm^2	GOAE-H41-15-0111-DA	Saudi ARAMCO (KSA)	2.195	1998	215,000.00
49	CU/XLPE/SWA/PVC 33 kV 3 x 50 mm^2	6P 3573/EL 6498	Bahwan Engr'g. Co. (Oman)	10.000	1998	650,000.00
50	CU/XLPE/PVC 33 kV 1 x 500 mm^2	104EM/98	MEW (UAE)	94.000	1998	5,400,000.00
51	CU/XLPE/DST/PVC 11 kV 3 x 240 mm^2	HES/240574	ADWEA (UAE)	50.000	1998	5,700,000.00
52	CU/XLPE/SWA/PVC 11 kV 3 x 185 mm^2	Ten. No. 4/97-98	MEW (Qatar)	93.000	1998	8,720,000.00

53	CU/XLPE/SWA/PVC 11 kV 3 x 185 mm^2	Ten. No. 29/97-98	MEW (Qatar)	69.000	1998	6,330,000.00
54	CU/XLPE/SWA/PVC 11 kV 3 x 120 mm^2	Ten. No. 29/97-98	MEW (Qatar)	23.000	1998	1,670,000.00
55	CU/XLPE/PVC 15 kV 3 x 185 mm^2	CPB11901421	SCECO-West (KSA)	265.000	1999	19,000,000.00
56	CU/XLPE/STA/PVC 33 kV 3 x 185 mm^2	CPB11901421	SCECO-West (KSA)	26.000	1999	3,000,000.00
57	CU/XLPE/SWA/PVC 15 kV 3 x 300 mm^2	233/16/R/DS	SCECO-Central (KSA)	118.103	1999	14,000,000.00
58	CU/XLPE/PVC 15 kV 1 x 630 mm^2	359/19/R/DS	SCECO-Central (KSA)	4.700	1999	253,000.00
59	CU/XLPE/SWA/PVC 15 kV 3 x 185 mm^2	083/20/J/PC	SCECO-Central (KSA)	100.000	1999	7,450,000.00
60	CU/XLPE/SWA/PVC 15 kV 3 x 300 mm^2	083/20/J/PC	SCECO-Central (KSA)	78.000	1999	8,280,000.00
61	CU/TR XLPE/LLDPE 35 kV 1 x 240 mm^2	S 9611 03517	SCECO-East (KSA)	3.000	1999	152,000.00
62	CU/XLPE/PVC 15 kV 1 x 500 mm^2	S 9904 24050	SCECO-East (KSA)	10.000	1999	452,000.00
63	CU/XLPE/PVC 15 kV 1 x 500 mm^2	S 9909 29453	SCECO-East (KSA)	5.000	1999	235,000.00
64	AL/XLPE/STA/PVC 15 kV 3 x 300 mm^2	B JC99 00301 003	SCECO-East (KSA)	27.000	1999	1,570,000.00
65	CU/XLPE/PVC 6/10 kV 1 x 240 mm^2	CNAE M98-15-4001 DB	Saudi ARAMCO (KSA)	1.000	1999	27,000.00
66	CU/XLPE/PVC 12/20 kV 1 x 4/0 AWG	DDAD 569-15-0081 DB	Saudi ARAMCO (KSA)	4.573	1999	91,000.00
67	CU/XLPE/STA/PVC 12/20 kV 3 x 2/0 AWG	DDAD 569-15-0071 DB	Saudi ARAMCO (KSA)	2.470	1999	134,000.00
68	CU/XLPE/PVC 12/20 kV 1 x 4/0 AWG	DDAD 569-15-0071 DB	Saudi ARAMCO (KSA)	7.317	1999	145,000.00
69	CU/XLPE/PVC 12/20 kV 1 x 4/0 AWG	DBAD 999-15-8702 DA	Saudi ARAMCO (KSA)	3.050	1999	61,000.00
70	CU/XLPE/PVC 12/20 kV 1 x 4/0 AWG	DUAD 999-15-0869 DA	Saudi ARAMCO (KSA)	5.120	1999	104,000.00

71	CU/XLPE/PVC 12/20 kV 1 x 2/0 AWG	DDAD 569-15-0114 DA	Saudi ARAMCO (KSA)	0.500	1999	45,000.00
72	CU/XLPE/PVC 3.6/6 kV 1 x 35 mm^2	RCO Q-7204-O7M	Royal Comm. for Jubail & Yanbu (KSA)	3.000	1999	25,000.00
73	CU/XLPE/SWA/PVC 15 kV 3 x 300 mm^2	SCECO-Central Tender No. 42/19/3	Mohd. Al-Ojaimi Est. (KSA)	25.000	1999	2,600,000.00
74	CU/XLPE/SWA/PVC 11 kV 3 x 50 mm^2	6P 3847/ELB 6211	MEW (Oman)	3.000	1999	122,000.00
75	CU/XLPE/SWA/PVC 11 kV 3 x 120 mm^2	6P 3847/ELB 6211	MEW (Oman)	1.500	1999	90,000.00
76	CU/XLPE/SWA/PVC 11 kV 3 x 185 mm^2	6P 3847/ELB 6211	MEW (Oman)	4.000	1999	340,000.00
77	CU/XLPE/SWA/PVC 11 kV 3 x 240 mm^2	6P 3847/ELB 6211	MEW (Oman)	3.000	1999	296,000.00
78	CU/XLPE/AWA/PVC 6.35/11 kV 1 x 500 mm^2	6P 3919/ELA 6422	Bahwan Engr'g. Co. (Oman)	2.220	1999	130,000.00
79	CU/XLPE/PVC 15 kV 3 x 185 mm^2	CPB22100702	Saudi Electric Co. Western Region (KSA)	900.000	2000	57,000,000.00
80	CU/XLPE/PVC 15 kV 3 x 185 mm^2	CPB12101205	Saudi Electric Co. Western Region (KSA)	36.000	2000	2,300,000.00
81	CU/XLPE/SWA/PVC 33 kV 3 x 240 mm^2	239/20/R/DS	Saudi Electric Co. Central Region (KSA)	28.000	2000	3,220,000.00
82	CU/XLPE/SWA/PVC 15 kV 3 x 185 mm^2	083/20/J/PC (Additional Order)	Saudi Electric Co. Central Region (KSA)	50.000	2000	3,920,000.00
83	CU/XLPE/SWA/PVC 33 kV 3 x 240 mm^2	468/20/N/PC	Saudi Electric Co. Central Region (KSA)	30.000	2000	3,500,000.00
84	AL/XLPE/STA/PVC 15 kV 3 x 300 mm^2	B JC99 00301 009	Saudi Electric Co. Eastern Region (KSA)	60.000	2000	3,550,000.00
85	CU/XLPE/PVC 15 kV 1 x 70 mm^2	S 0007 38177	Saudi Electric Co. Eastern Region (KSA)	8.000	2000	93,000.00
86	CU/XLPE/LDPE 35 kV 1 x 95 mm^2	S 0007 38177	Saudi Electric Co. Eastern Region (KSA)	3.000	2000	81,000.00

87	CU/XLPE/PVC 15 kV 3 x 185 mm^2	Makkah Project	Najm Al-Jazira Co. (KSA)	20.000	2000	1,310,000.00
88	CU/XLPE/PVC 12/20 kV 1 x 240 mm^2	EDCI-H90-15-D454-DA 3580-E-MR-H90-007(089)	Techint International (ARAMCO Hawiyah IAF)	110.440	2000	3,230,000.00
89	CU/XLPE/PVC 12/20 kV 1 x 400 mm^2	EDCI-H90-15-D454-DA 3580-E-MR-H90-007(089)	Techint International (ARAMCO Hawiyah IAF)	28.296	2000	1,200,000.00
90	CU/XLPE/PVC 6/10 kV 1 x 240 mm^2	EDCI-H90-15-D454-DA 3580-E-MR-H90-007(089)	Techint International (ARAMCO Hawiyah IAF)	0.250	2000	7,000.00
91	CU/XLPE/PVC 6/10 kV 1 x 400 mm^2	EDCI-H90-15-D454-DA 3580-E-MR-H90-007(089)	Techint International (ARAMCO Hawiyah IAF)	3.792	2000	150,000.00
92	CU/XLPE/PVC 33 kV 1 x 500 mm^2	123EM/2000	FEWA (UAE)	100.000	2000	4,922,100.00
93	CU/XLPE/PVC 33 kV 1 x 240 mm^2	123EM/2000	FEWA (UAE)	11.000	2000	316,100.00
94	CU/XLPE/SWA/PVC 6.35/11 kV 3 x 185 mm^2	E-2822/556	Trags Elect. Engr'g. (Qatar)	38.000	2000	3,240,000.00
95	CU/XLPE/SWA/PVC 6.35/11 kV 3 x 185 mm^2	LTC/12/2000	Al-Jaber Trading & Cont. Co. (Qatar)	10.000	2000	910,000.00
96	CU/XLPE/SWA/PVC 6.35/11 kV 3 x 185 mm^2	JTC/00 (Ex-Stock)	Al-Jaber Trading & Cont. Co. (Qatar)	1.160	2000	101,000.00
97	CU/XLPE/AWA/PVC 19/33 kV 1 x 630 mm^2	0106PO4080/ ELA6435	Bahwan Engr'g. Co. (Oman)	2.750	2000	220,000.00
98	CU/XLPE/SWA/PVC 8.7/15 kV 3 x 120 mm^2	UEC/009/2000 (NOSKAB Proj. in U.K.)	United Export Corporation (Egypt)	3.700	2000	206,000.00
99	CU/XLPE/SWA/PVC 8.7/15 kV 3 x 95 mm^2	UEC/009/2000 (NOSKAB Proj. in U.K.)	United Export Corporation (Egypt)	0.900	2000	46,000.00
100	CU/XLPE/PVC 6/10 kV 1 x 35 mm^2	Nova Elect. Cables (Rwanda) Export to Africa	SOFIEX S.A. (Belgium)	5.000	2000	32,000.00
101	CU/XLPE/PVC 6/10 kV 1 x 50 mm^2	Nova Elect. Cables (Rwanda) Export to Africa	SOFIEX S.A. (Belgium)	5.000	2000	38,000.00

102	CU/XLPE/PVC 8.7/15 kV 1 x 25 mm^2	Nova Elect. Cables (Rwanda) Export to Africa	SOFIEX S.A. (Belgium)	10.000	2000	66,000.00
103	CU/XLPE/PVC 8.7/15 kV 1 x 35 mm^2	Nova Elect. Cables (Rwanda) Export to Africa	SOFIEX S.A. (Belgium)	10.000	2000	75,000.00
104	CU/XLPE/PVC 8.7/15 kV 1 x 50 mm^2	Nova Elect. Cables (Rwanda) Export to Africa	SOFIEX S.A. (Belgium)	10.000	2000	86,000.00
105	CU/XLPE/PVC 33 kV 1 x 500 mm^2	131EM/2001	FEWA (UAE)	50.000	2001	2,684,000.00
106	CU/XLPE/PVC 33 kV 1 x 500 mm^2	E10/2001	FEWA (UAE)	130.000	2001	6,217,000.00
107	CU/XLPE/SWA/PVC 6.35/11 kV 3 x 185 mm^2	E-2908/566	Trags Elect. Engr'g. (Qatar)	4.000	2001	326,000.00
108	CU/XLPE/SWA/PVC 6.35/11 kV 3 x 185 mm^2	E-2939/585	Trags Elect. Engr'g. (Qatar)	52.000	2001	3,896,000.00
109	CU/XLPE/LLDPE 35 kV 1 x 95 mm^2	S 0103 45588	Saudi Electric Co. Eastern Region (KSA)	126.000	2001	3,437,000.00
110	CU/XLPE/LLDPE 35 kV 1 x 240 mm^2	S 0103 45588	Saudi Electric Co. Eastern Region (KSA)	53.000	2001	2,426,000.00
111	AL/XLPE/STA/PVC 8.7/15 kV 3 x 300 mm^2	B JC99 00301 014	Saudi Electric Co. Eastern Region (KSA)	100.000	2001	5,728,000.00
112	AL/XLPE/STA/PVC 8.7/15 kV 3 x 300 mm^2	B JC99 00301 033	Saudi Electric Co. Eastern Region (KSA)	160.000	2001	9,114,000.00
113	CU/XLPE/SWA/PVC 19/33 kV 3 x 240 mm^2	Agreement No. 4021/22/2	Saudi Electric Co. Central Region (KSA)	15.000	2002	1,760,000.00
114	CU/XLPE/LLDPE 35 kV 1 x 95 mm^2	S 0210 64476	Saudi Electric Co. Eastern Region (KSA)	17.000	2002	433,000.00
115	CU/XLPE/PVC 8.7/15 kV 1 x 500 mm^2	S 0206 60343	Saudi Electric Co. Eastern Region (KSA)	19.000	2002	865,000.00
116	CU/XLPE/PVC 15 kV 3 x 185 mm^2	CPB10200886	Saudi Electric Co. Western Region (KSA)	60.000	2002	3,832,000.00
117	CU/XLPE/PVC 15 kV 3 x 185 mm^2	CPB10200983	Saudi Electric Co. Western Region (KSA)	32.000	2002	2,024,000.00
118	CU/XLPE/PVC 15 kV 3 x 185 mm^2	CPB10201165	Saudi Electric Co. Western Region (KSA)	208.000	2002	12,492,000.00

119	CU/XLPE/PVC 15 kV 3 x 185 mm^2	CPB30300254	Saudi Electric Co. Western Region (KSA)	327.000	2003	21,390,000.00
120	CU/XLPE/STA/PVC 33 kV 3 x 185 mm^2	CPB30300743	Saudi Electric Co. Western Region (KSA)	23.000	2003	2,059,000.00
121	CU/XLPE/PVC 15 kV 3 x 185 mm^2	CPB30300843	Saudi Electric Co. Western Region (KSA)	345.000	2003	22,932,000.00
122	AL/XLPE/PVC 19/33 kV 1 x 500 mm^2	S 0210 64469	Saudi Electric Co. Eastern Region (KSA)	75.000	2003	2,914,050.00
123	CU/XLPE/LLDPE 35 kV 1 x 500 mm^2	S 0304 69377	Saudi Electric Co. Eastern Region (KSA)	16.000	2003	1,013,804.80
124	CU/XLPE/LLDPE 19/33 kV 1 x 95 mm^2	P.O. 021064476	SEC-ERB	3.000	2003	433,000.00
125	CU/XLPE/LLDPE 19/33KV 1X240mm2	P.O. 021265979	SEC-ERB	6.000	2003	243,000.00
126	CU/XLPE/LLDPE 19/33 kV 1 x 95 mm^2	P.O. 021064476	SEC-ERB	5.889	2003	150,000.00
127	AL/XLPE/SWA/PVC 6.35/11 kV 3 x 185 mm^2	FEWA TENDER	ESE - DUBAI	3.000	2003	160,000.00
128	AL/XLPE/SWA/PVC 6.35/11KV 3CX300mm2	NTC/012/ELE C/2002	NATCO	0.500	2003	37,000.00
129	CU/XLPE/SWA/PVC 6.35/11 kV 3 x 240 mm^2	Site Development Landscape Qatar Foundation	Al-Jaber Engineering CO.	24.000	2003	95,000.00
130	CU/XLPE/SWA/PVC 6.35/11 kV 3 x 240 mm^2	ADWEA CONTRACT NO. 974/1	AL-BARRAK Cont. (U.A.E.)	28.000	2003	81,000.00
131	CU/XLPE/SWA/PVC 6.35/11 kV 3 x 70 mm^2	061-04-2003 (GTC/17/2003)	KAHRA MAA (Qatar)	1.000	2003	45,000.00
132	CU/XLPE/SWA/PVC 6.35/11 kV 3 x 240 mm^2	061-04-2003 (GTC/17/2003)	KAHRA MAA (Qatar)	100.000	2003/200 4	10,060,000.00
133	CU/XLPE/PVC 15 kV 3 x 185 mm^2	CPB30301244	Saudi Electric Co. Western Region (KSA)	278.000	2004	19,720,000.00
134	CU/XLPE/PVC 15 kV 1 x 50 mm^2	CPB30400216	Saudi Electric Co. Western Region (KSA)	25.000	2004	329,000.00

135	CU/XLPE/STA/PVC 19/33 kV 3 x 185 mm^2	CPB30400132	Saudi Electric Co. Western Region (KSA)	12.000	2004	1,247,000.00
136	AL/XLPE/STA/PVC 8.7/15 kV 3 x 300 mm^2	B JC02 00364 025	Saudi Electric Co. Eastern Region (KSA)	160.000	2004	9,640,000.00
137	CU/XLPE/PVC 19/33 kV 1 x 630 mm^2	S 12004210 0045	Saudi Electric Co. Central Region (KSA)	2.500	2004	232,000.00
138	CU/XLPE/SWA/PVC 19/33 kV 3 x 240 mm^2	S 12004210 0047	Saudi Electric Co. Central Region (KSA)	60.000	2004	8,930,000.00
139	AL/XLPE/STA/PVC, 3 x 300 mm^2, 8.7/15 KV	9390/04-O	SAUDI ELECTRIC CO. EAST Region (KSA)	150.2	2005	9756862.08
140	AL/XLPE/STA/PVC, 3 x 300 , 8.7/15 KV	8740/05-O	SAUDI ELECTRIC CO. EAST Region (KSA)	26.37	2005	2427377.43
141	AL/XLPE/STA/PVC, 3 x 300 , 8.7/15 KV	4250/04-O	SAUDI ELECTRIC CO. EAST Region (KSA)	0.41	2005	26252.51
142	AL/XLPE/STA/PVC, 3 x 300 , 8.7/15 KV	8100/04-O	SAUDI ELECTRIC CO. EAST Region (KSA)	144.65	2005	9156326.96
143	AL/XLPE/STA/PVC, 3 x 300 , 8.7/15 KV	9090/00-O	SAUDI ELECTRIC CO. EAST Region (KSA)	0.04	2005	2302.17
144	CU/XLPE/LLDPE, 1 x 500 , 34.5 KV	11320/05-O	SAUDI ELECTRIC CO. EAST Region (KSA)	9.95	2005	1092212.2
145	CU/XLPE/PVC, 1 x 50 , 8.7/15 KV	11060/05-O	SAUDI ELECTRIC CO. EAST Region (KSA)	3.58	2005	64902.66
146	CU/XLPE/PVC, 3 x 185 mm^2, 8.7/15 KV	12840/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	149.84	2005	20224909.08
147	CU/XLPE/PVC, 3 x 185 mm^2, 8.7/15 KV	12820/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	55.34	2005	7469731.11
148	CU/XLPE/PVC, 1 x 50 mm^2, 8.7/15 KV	8730/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	6	2005	108733.26
149	CU/XLPE/PVC, 3 x 185 mm^2, 8.7/15 KV	12340/00-O	SAUDI ELECTRIC CO. WEST Region (KSA)	0.68	2005	43600.55
150	CU/XLPE/PVC, 3 x 185 mm^2, 8.7/15 KV	2560/03-O	SAUDI ELECTRIC CO. WEST Region (KSA)	0.12	2005	7588
151	CU/XLPE/PVC, 3 x 185 mm^2, 8.7/15 KV	5710/03-O	SAUDI ELECTRIC CO. WEST Region (KSA)	0.17	2005	11040.12

152	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	5700/03-O	SAUDI ELECTRIC CO. WEST Region (KSA)	0.22	2005	14504.11
153	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	8670/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	95.87	2005	11680113.33
154	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	9940/00-O	SAUDI ELECTRIC CO. WEST Region (KSA)	1.62	2005	104530.6
155	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	8680/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	120	2005	14619970.17
156	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	9970/00-O	SAUDI ELECTRIC CO. WEST Region (KSA)	0.5	2005	30948.23
157	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	8690/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	120	2005	14619604.66
158	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	8700/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	93.77	2005	11423774.39
159	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	9960/00-O	SAUDI ELECTRIC CO. WEST Region (KSA)	0.36	2005	22733.42
160	CU/XLPE/STA/PVC, 3 x 240 mm², 19/33 KV	11340/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	7.76	2005	1437324
161	CU/XLPE/STA/PVC, 3 x 50 mm², 19/33 KV	2110/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	1.97	2005	148622.71
162	CU/XLPE/STA/PVC, 3 x 240 mm², 19/33 KV	2510/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	1.09	2005	204309.97
163	CU/XLPE/STA/PVC, 3 x 50 mm², 19/33 KV	2500/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	2.01	2005	151489.54
164	CU/XLPE/STA/PVC, 3 x 240 mm², 19/33 KV	2320/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	1.42	2005	265192.1
165	CU/XLPE/STA/PVC, 3 x 50 mm², 19/33 KV	2330/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	1	2005	75141.23
166	CU/XLPE/STA/PVC, 3 x 240 mm², 19/33 KV	2460/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	1.43	2005	266686.14
167	CU/XLPE/STA/PVC, 3 x 50 mm², 19/33 KV	2350/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	2.02	2005	152319.42
168	CU/XLPE/STA/PVC, 3 x 240 mm², 19/33 KV	2360/05-O	SAUDI ELECTRIC CO. SOUTH Region	3.62	2005	676426.61

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169	CU/XLPE/STA/PVC, 3 x 185 mm², 8.7/15 KV	2370/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	5.55	2005	692115.81
170	CU/XLPE/STA/PVC, 3 x 50 mm², 19/33 KV	2450/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	2	2005	150508.79
171	CU/XLPE/STA/PVC, 3 x 50 mm², 19/33 KV	2440/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	2.01	2005	151564.99
172	CU/XLPE/PVC, 1 x 50 mm², 8.7/15 KV	2430/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	2.03	2005	33867.12
173	CU/XLPE/PVC, 1 x 50 mm², 8.7/15 KV	2340/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	2.04	2005	34084.32
174	CU/XLPE/PVC, 1 x 50 mm², 8.7/15 KV	2470/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	2.02	2005	33816.99
175	CU/XLPE/PVC, 1 x 50 mm², 8.7/15 KV	2520/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	4.14	2005	69221.24
176	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	7230/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	70.5	2005	7950320.28
177	CU/XLPE/STA/PVC, 3 x 240 mm², 19/33 KV	10900/05-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	10.26	2005	1904115.63
178	CU/XLPE/PVC, 1 x 50 mm², 8.7/15 KV	2090/05-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	14.84	2005	214083.89
179	CU/XLPE/SWA/PVC, 3 x 185 mm², 8.7/15 KV	1010/04-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	0.18	2005	18473.38
180	CU/XLPE/SWA/PVC, 3 x 185 mm², 8.7/15 KV	9210/04-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	34.44	2005	3986728.04
181	CU/XLPE/SWA/PVC, 3 x 50 mm², 8.7/15 KV	9220/04-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	10.03	2005	534457.98
182	AL/XLPE/STA/PVC, 3 x 300 mm², 8.7/15 KV	8710/05-O	SAUDI ELECTRIC CO. EAST Region (KSA)	130.99	2006	12058730.18
183	AL/XLPE/STA/PVC, 3 x 300 , 8.7/15 KV	8740/05-O	SAUDI ELECTRIC CO. EAST Region (KSA)	155.93	2006	14378400.1
184	CU/XLPE/STA/PVC, 3 x 240 , 19/33 KV	10180/06-O	SAUDI ELECTRIC CO. EAST Region (KSA)	14.16	2006	4477842.06

185	CU/XLPE/PVC, 1 x 70 , 8.7/15 KV	12330/06-O	SAUDI ELECTRIC CO. EAST Region (KSA)	7	2006	214447.52
186	CU/XLPE/LLDPE, 1 x 240 , 19/33 KV	8330/06-O	SAUDI ELECTRIC CO. EAST Region (KSA)	15	2006	1653915
187	CU/XLPE/STA/PVC, 3 x 300 , 8.7/15 KV	21430/06-O	SAUDI ELECTRIC CO. EAST Region (KSA)	18.71	2006	7123764.81
188	AL/XLPE/STA/PVC, 3 x 300 , 8.7/15 KV	11550/06-O	SAUDI ELECTRIC CO. EAST Region (KSA)	89.43	2006	10379237.56
189	AL/XLPE/STA/PVC, 3 x 300 , 8.7/15 KV	10200/06-O	SAUDI ELECTRIC CO. EAST Region (KSA)	88.27	2006	10244789.24
190	AL/XLPE/STA/PVC, 3 x 300 , 8.7/15 KV	5970/06-O	SAUDI ELECTRIC CO. EAST Region (KSA)	24.53	2006	2448491.53
191	CU/XLPE/PVC, 3 x 185 , 8.7/15 KV	12820/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	83.46	2006	11265199.98
192	CU/XLPE/PVC, 3 x 185 , 8.7/15 KV	12830/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	122.12	2006	16482754.94
193	CU/XLPE/PVC, 3 x 185 , 8.7/15 KV	7980/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	74.21	2006	14450514.34
194	CU/XLPE/PVC, 3 x 185 , 8.7/15 KV	7970/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	124.63	2006	24267813.42
195	CU/XLPE/PVC, 3 x 185 , 8.7/15 KV	8040/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	49.2	2006	9284122.19
196	CU/XLPE/PVC, 3 x 185 , 8.7/15 KV	8030/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	99.58	2006	19391195.65
197	CU/XLPE/STA/PVC, 3 x 300 , 8.7/15 KV	21460/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	6.05	2006	2209229.99
198	CU/XLPE/PVC, 3 x 185 , 8.7/15 KV	19490/06-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	58.89	2006	12170977.73
199	CU/XLPE/STA/PVC, 3 x 240 , 19/33 KV	1360/06-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	5.03	2006	1088275.14
200	CU/XLPE/PVC, 1 x 50 , 19/33 KV	21390/06-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	5.65	2006	239226.65
201	CU/XLPE/STA/PVC, 3 x 300 , 8.7/15 KV	19500/06-O	SAUDI ELECTRIC CO. SOUTH Region	31.54	2006	10195083.62

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202	CU/XLPE/STA/PVC, 3 x 300 , 8.7/15 KV	7960/06-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	79.66	2006	23480916.02
203	CU/XLPE/PVC, 3 x 185 , 8.7/15 KV	7950/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	99.92	2006	19002506.8
204	CU/XLPE/PVC, 3 x 185 , 8.7/15 KV	8020/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	29.86	2006	6061487.22
205	CU/XLPE/STA/PVC, 3 x 240 , 19/33 KV	10190/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	60.08	2006	19322761.38
206	CU/XLPE/STA/PVC, 3 x 240 , 19/33 KV	0480/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	44.78	2006	9331099.63
207	CU/XLPE/STA/PVC, 3 x 300 , 8.7/15 KV	21920/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	33.99	2006	12439848.24
208	CU/XLPE/STA/PVC, 3 x 300 , 8.7/15 KV	10320/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	80.93	2006	27444644.84
209	CU/XLPE/STA/PVC, 3 x 300 , 8.7/15 KV	5950/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	87.46	2006	20354959.83
210	CU/XLPE/SWA/LDPE, 3 x 240 , 6.35/11 KV	4880/04-O	DEWA (UAE)	1.81	2006	239666.36
211	AL/XLPE/STA/PVC, 3 x 70 mm², 8.7/15 KV	20130/06-O	SAUDI ELECTRIC CO. EAST Region (KSA)	15.09	2007	855165
212	AL/XLPE/STA/PVC, 3 x 70 mm², 8.7/15 KV	21070/06-O	SAUDI ELECTRIC CO. EAST Region (KSA)	26.06	2007	1472893.94
213	AL/XLPE/STA/PVC, 3 x 300 mm², 8.7/15 KV	20110/06-O	SAUDI ELECTRIC CO. EAST Region (KSA)	99.18	2007	16706543.56
214	AL/XLPE/STA/PVC, 3 x 300 mm², 8.7/15 KV	20120/06-O	SAUDI ELECTRIC CO. EAST Region (KSA)	62.49	2007	10525454.28
215	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	21880/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	89.04	2007	21348442.8
216	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	21900/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	19.74	2007	4733282.69
217	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	21930/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	88.08	2007	21116597.77
218	CU/XLPE/PVC, 3 x	21260/06-O	SAUDI ELECTRIC	68.89	2007	16516380.22

	185 mm², 8.7/15 KV		CO. CENTRAL Region (KSA)			
219	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	21340/06-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	36.49	2007	8749452.21
220	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	21310/06-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	70.83	2007	16981748.55
221	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	21280/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	65.1	2007	15607221.68
222	CU/XLPE/PVC, 3 x 185 mm², 8.7/15 KV	21330/06-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	67.85	2007	16268231.72
223	CU/XLPE/STA/PVC, 3 x 185 mm², 19/33 KV	21270/06-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	2	2007	526590.88
224	CU/XLPE/STA/PVC, 3 x 240 mm², 19/33 KV	21400/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	54.61	2007	21657655.59
225	CU/XLPE/PVC, 1 x 50 mm², 19/33 KV	21390/06-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	12.84	2007	543785.47
226	CU/XLPE/PVC, 1 x 50 mm², 19/33 KV	21360/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	5.93	2007	250955.11
227	CU/XLPE/STA/PVC, 3 x 300 mm², 8.7/15 KV	21460/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	25.84	2007	9430014.1
228	CU/XLPE/STA/PVC, 3 x 300 mm², 8.7/15 KV	21440/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	49.11	2007	17923536.06
229	CU/XLPE/STA/PVC, 3 x 300 mm², 8.7/15 KV	21420/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	49.96	2007	18234500.72
230	CU/XLPE/STA/PVC, 3 x 300 mm², 8.7/15 KV	21450/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	53.31	2007	19458285.36
231	CU/XLPE/STA/PVC, 3 x 300 mm², 8.7/15 KV	21920/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	14.17	2007	5185801.57
232	CU/XLPE/SWA/LDPE, 3 x 240 mm², 6.35/11 KV	23370/06-O	DEWA (UAE)	225.81	2007	57759417.65
233	CU/XLPE/STA/PVC, 3 x 300 mm², 8.7/15 KV	21830/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	39.53	2007	14427008.49
234	CU/XLPE/STA/PVC, 3 x 300 mm², 8.7/15 KV	19500/06-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	3.57	2007	1153763.94

No.	Cable Description	Contract Reference	Customer Name	Qty. in KM	Year of Supply	Contract Value in SR
1	AL/XLPE/PVC 4 x 300 mm^2	331/16/R/PC	SCECO-Central (KSA)	200.000	1996	10,515,000.00
2	AL/XLPE/SWA/PVC 4 x 25 mm^2	CE/69A/96	DEWA (UAE)	10.000	1996	90,000.00
3	AL/XLPE/SWA/PVC 4 x 50 mm^2	CE/69A/96	DEWA (UAE)	30.000	1996	360,000.00
4	AL/XLPE/SWA/PVC 4 x 50 mm^2	E03/96	MEW (UAE)	30.000	1996	420,000.00
5	CU/XLPE/PVC 1 x 630 mm^2	CE/034/97	DEWA (UAE)	70.000	1997	4,020,000.00
6	CU/XLPE/SWA/PVC 4 x 35 mm^2	MEW Tender No. 054/97	Al-Jaber Trading (Qatar)	24.000	1997	620,000.00
7	CU/XLPE/SWA/PVC 4 x 185 mm^2	MEW Tender No. 114/97	Al-Jaber Trading (Qatar)	17.000	1997	1,800,000.00
8	AL/XLPE/SWA/PVC 4 x 50 mm^2	CE/344A/97	DEWA (UAE)	25.000	1998	301,000.00
9	AL/XLPE/SWA/PVC 4 x 25 mm^2	CE/204B/97	DEWA (UAE)	25.000	1998	183,000.00
10	CU/XLPE/PVC 1 x 630 mm^2	104EM/98	MEW (UAE)	15.000	1998	720,000.00
11	AL/XLPE/SWA/PVC 4 x 240 mm^2	MEW Tender No. 058/98	Al-Khajah Est. (Bahrain)	100.000	1998	4,000,000.00
12	CU/XLPE/PVC 3 x 185 + 95 mm^2	CPB11801468	SCECO-West (KSA)	222.000	1998	11,250,000.00
13	AL/XLPE/PVC 4 x 500 mm^2	148/18/R/PC	SCECO-Central (KSA)	210.000	1998-1999	16,000,000.00
14	CU/XLPE/PVC 3 x 70 + 35 mm^2	CPB11901421	SCECO-West (KSA)	50.000	1999	1,005,000.00
15	CU/XLPE/PVC 3 x 120 + 70 mm^2	CPB11901421	SCECO-West (KSA)	70.000	1999	2,500,000.00
16	CU/XLPE/PVC 3 x 185 + 95 mm^2	CPB11901421	SCECO-West (KSA)	270.000	1999	14,005,000.00

17	AL/XLPE/PVC 3 x 120 + 70 mm^2	CPB11901421	SCECO-West (KSA)	100.000	1999	1,700,000.00
18	AL/XLPE/PVC 3 x 185 + 95 mm^2	CPB11901421	SCECO-West (KSA)	370.000	1999	9,150,000.00
19	AL/XLPE/SWA/PVC 3 x 300 + 150 mm^2	123EM/2000	FEWA (UAE)	70.000	2000	2,700,000.00
20	AL/XLPE/SWA/PVC 3 x 185 + 95 mm^2	123EM/2000	FEWA (UAE)	29.000	2000	740,000.00
21	CU/XLPE/PVC 4 x 70 mm^2	Nova Elect. Cables (Rwanda) Export to Africa	SOFIEX S.A. (Belgium)	20.000	2000	515,000.00
22	CU/XLPE/PVC 4 x 95 mm^2	Nova Elect. Cables (Rwanda) Export to Africa	SOFIEX S.A. (Belgium)	5.000	2000	175,000.00
23	CU/XLPE/PVC 1 x 630 mm^2	131EM/2001	FEWA (UAE)	20.000	2001	1,005,000.00
24	AL/XLPE/PVC 4 x 70 mm^2	POA No. B-JC99-00301	Saudi Electric Co. Eastern Region (KSA)	495.000	2001	3,937,000.00
25	AL/XLPE/PVC 4 x 300 mm^2	POA No. B-JC99-00301	Saudi Electric Co. Eastern Region (KSA)	150.000	2001	4,426,000.00
26	CU/XLPE/PVC 1 x 630 mm^2	POA No. B-JC99-00301	Saudi Electric Co. Eastern Region (KSA)	2.000	2001	81,000.00
27	AL/XLPE/PVC 3 x 50 + 25 mm^2	Tender No. PB1/M040102B0277	Saudi Electric Co. Western Region (KSA)	45.000	2001	269,000.00
28	AL/XLPE/PVC 4 x 25 mm^2	Tender No. PB1/M040102B0277	Saudi Electric Co. Western Region (KSA)	60.000	2001	319,000.00
29	AL/XLPE/PVC 3 x 50 + 25 mm^2	Tender No. PB1/M040102B0277	Saudi Electric Co. Western Region (KSA)	45.000	2001-2002	267,000.00
30	AL/XLPE/PVC 4 x 25 mm^2	Tender No. PB1/M040102B0277	Saudi Electric Co. Western Region (KSA)	60.000	2001-2002	317,000.00
31	AL/XLPE/PVC 3 x 300 + 150 mm^2	Tender No. PB1/M040102B0277	Saudi Electric Co. Western Region (KSA)	66.000	2001-2002	1,809,000.00

32	AL/XLPE/PVC 3 x 50 + 25 mm^2	Tender No. PB1/M040102B0277	Saudi Electric Co. Western Region (KSA)	65.000	2002	379,000.00
33	AL/XLPE/PVC 3 x 300 + 150 mm^2	Tender No. PB1/M040102B0277	Saudi Electric Co. Western Region (KSA)	134.000	2002	3,740,000.00
34	AL/XLPE/PVC 4 x 70 mm^2	POA No. B-JC99-00301	Saudi Electric Co. Eastern Region (KSA)	300.000	2002	2,251,000.00
35	AL/XLPE/PVC 4 x 300 mm^2	POA No. B-JC99-00301	Saudi Electric Co. Eastern Region (KSA)	96.000	2002	2,766,000.00
36	CU/XLPE/PVC 1 x 630 mm^2	POA No. B-JC99-00301	Saudi Electric Co. Eastern Region (KSA)	3.000	2002	127,000.00
37	CU/XLPE/PVC 1 x 630 mm^2	Agreement No. 4021/22/2	Saudi Electric Co. Central Region (KSA)	150.000	2002	6,698,000.00
38	AL/XLPE/PVC 4 x 70 mm^2	POA No. B-JC02-00364	Saudi Electric Co. Eastern Region (KSA)	156.000	2002	1,454,000.00
39	AL/XLPE/PVC 4 x 70 mm^2	POA No. B-JC02-00364	Saudi Electric Co. Eastern Region (KSA)	540.000	2002-2003	4,900,000.00
40	CU/XLPE/PVC 1 x 630 mm^2	POA No. B-JC02-00364	Saudi Electric Co. Eastern Region (KSA)	4.500	2003	209,000.00
41	CU/XLPE/SWA/PVC 0.6/1KV 4X240mm2	11811	ESE - DUBAI	5.000	2003	408,000.00
42	CU/XLPE/SWA/PVC 0.6/1KV 4X25mm2	ADWEA CONT. 974/1-3	AL-BARRAK	75.000	2003	782,595.00
43	BARE COPPER 1CX4.9MM2	Conductor Supply	Al-Sharg Cable Factory	1,747.800	2003	567,923.63
44	CU/XLPE/AWA/PVC 0.6/1KV 1Cx800mm2	P.O. COM/PO/018/03	Al-Jaber Engineering	0.800	2003	24,684.45
45	CU/PVC 0.6/1KV 1CX35mm2	SC/070/030	SEC-CRB	100.000	2003	265,060.00
46	CU/PVC 0.6/1KV 1CX50mm2	SC/070/031	SEC-CRB	60.000	2003	214,323.00

47	CU/PVC 0.6/1KV 1CX50mm2	SC/070/032	SEC-CRB	12.000	2003	100,229.40
48	CU/XLPE/PVC 0.6/1KV 1CX70mm2	P.O. # 4500463704	SAUDI ARAMCO	13.000	2003	81,603.86
49	AL/XLPE/PVC 0.6/1KV 4CX25mm2	CPB30300261	SEC-WRB	150.000	2003	605,340.00
50	CU/XLPE/SWA/PVC 0.6/1KV 12CX2.5mm2	Tender No. 283/21/R/PC	SEC-CRB	8.000	2003	54,975.10
51	BARE COPPER 1X70MM2	P.O. 3030222	SEC-WRB	100.00	2003	459,780.00
52	BARE COPPER 1X95MM2	Contract No. 4	ESE - DUBAI	6.000	2003	48,000.00
53	CU/XLPE/SWA/PVC 0.6/1KV 4X150MM2	ADWEA Tender No. 118/2002	ESE - DUBAI	2.970	2003	149,993.00
54	CU/XLPE/SWA/PVC 0.6/1KV 4X120MM2	ADWEA Tender No. 118/2003	ESE - DUBAI	6.000	2003	250,860.00
55	CU/XLPE/SWA/PVC 0.6/1KV 4X95MM2	ADWEA Tender No. 118/2004	ESE - DUBAI	10.000	2003	323,600.00
56	CU/XLPE/SWA/PVC 0.6/1KV 4X70MM2	ADWEA Tender No. 118/2005	ESE - DUBAI	9.410	2003	229,300.68
57	CU/XLPE/SWA/PVC 0.6/1KV 4X50MM2	ADWEA Tender No. 118/2006	ESE - DUBAI	4.000	2003	71,680.00
58	BARE COPPER 1X35MM2	P.O. B-JC02-00364-015	SEC-ERB	350.000	2003	840,700.00
59	CU/PVC 1X35MM2	P.O. B-JC02-00364-021	SEC-ERB	20.000	2003	65,440.00
60	CU/XLPE/PVC 1X1000MM2	Tender No. TC/BN/PT-1371/10/02	BAHRAIN	10.000	2003	727,964.30
61	CU/PVC/PVC 1X185MM2	P.O. 030469240	SEC-ERB	15.000	2003	216,765.00
62	CU/XLPE/PVC 1X630MM2	P.O. S-0304-69361	SEC-ERB	6.000	2003	332,447.40
63	CU/XLPE/SWA/PVC 0.6/1KV 4X16MM2	P.O. 11816	ESE - DUBAI	20.000	2003	157,600.00

64	CU/XLPE/SWA/PVC 0.6/1KV 4X185MM2	P.O. 11816	ESE - DUBAI	5.000	2003	300,150.00
65	CU/XLPE/SWA/PVC 0.6/1KV 4X240MM2	P.O. 11816	ESE - DUBAI	5.000	2003	389,550.00
66	CU/XLPE/SWA/PVC 0.6/1KV 4X300MM2	P.O. 11817	ESE - DUBAI	5.000	2003	479,950.00
67	CU/XLPE/SWA/PVC 0.6/1KV 4X50MM2	P.O. 11818	ESE - DUBAI	8.000	2003	143,040.00
68	CU/XLPE/PVC 0.6/1KV 1X630MM2	P.O. 101/190/2002/1	SEC-CRB	30.000	2003	1,356,767.40
69	CU/XLPE/SWA/PVC 0.6/1 kV 4 x 300 mm²	061-04-2003 (GTC/17/2003)	KAHRA MAA (Qatar)	70.000	2004	8,828,000.00
70	CU/XLPE/SWA/PVC 0.6/1 kV 4 x 35 mm²	061-04-2003 (GTC/17/2003)	KAHRA MAA (Qatar)	15.000	2004	278,000.00
71	CU/XLPE/CWA/PVC 0.6/1 kV 1 x 800 mm²	061-04-2003 (GTC/17/2003)	KAHRA MAA (Qatar)	4.000	2004	363,000.00
72	CU/XLPE/CWA/PVC 0.6/1 kV 1 x 630 mm²	061-04-2003 (GTC/17/2003)	KAHRA MAA (Qatar)	4.000	2004	270,000.00
73	AL/XLPE/PVC, 4 x 185 mm²	11050/05-O	SAUDI ELECTRIC CO. EAST Region (KSA)	0.5	2005	14020.3
74	AL/XLPE/PVC, 4 x 70 mm²	10020/03-O	SAUDI ELECTRIC CO. EAST Region (KSA)	0.1	2005	963.9
75	AL/XLPE/PVC, 4 x 70 mm²	5620/04-O	SAUDI ELECTRIC CO. EAST Region (KSA)	410.08	2005	4327963.21
76	CU/XLPE/PVC, 1 x 35 mm²	9660/05-O	SAUDI ELECTRIC CO. EAST Region (KSA)	33.42	2005	212531.15
77	CU/XLPE/PVC, 1 x 630 mm²	4220/04-O	SAUDI ELECTRIC CO. EAST Region (KSA)	4	2005	309389.33
78	CU/XLPE/PVC, 1 x 630 mm²	8680/01-O	SAUDI ELECTRIC CO. EAST Region (KSA)	0.03	2005	1046.5
79	CU/XLPE/PVC, 1 x 630 mm²	9670/05-O	SAUDI ELECTRIC CO. EAST Region (KSA)	1.19	2005	119862.62
80	CU/PVC/PVC, 12 x 2.5 mm²	6080/04-O	SAUDI ELECTRIC CO. WEST Region (KSA)	2.46	2005	19694.64
81	AL/XLPE/PVC,	11450/03-O	SAUDI ELECTRIC	20.01	2005	415104.71

	3 x 185 + 95 mm²		CO. WEST Region (KSA)			
82	AL/XLPE/PVC, 3 x 185 + 95 mm²	11460/03-O	SAUDI ELECTRIC CO. WEST Region (KSA)	9.97	2005	209270.35
83	AL/XLPE/PVC, 4 x 70 mm²	1150/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	44.89	2005	529318.21
84	AL/XLPE/PVC, 4 x 70 mm²	11640/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	31.36	2005	414161.45
85	AL/XLPE/PVC, 4 x 185 mm²	12490/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	19.76	2005	574636.45
86	AL/XLPE/PVC, 4 x 185 mm²	8720/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	285.61	2005	8008675.77
87	CU/XLPE/PVC, 1 x 630 mm²	11470/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	3.98	2005	400713.51
88	CU/XLPE/PVC, 3 x 185 + 95 mm²	0050/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	20.03	2005	1858353.84
89	AL/XLPE/PVC, 4 x 185 mm²	7480/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	87.58	2005	2455082.83
90	CU/XLPE/PVC, 1 x 185 mm²	2400/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	6.42	2005	177727.58
91	CU/XLPE/PVC, 1 x 185 mm²	2530/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	21.05	2005	583190.25
92	CU/PVC, 1 x 50 mm²	2490/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	24.03	2005	203630.22
93	CU/PVC, 1 x 120 mm²	2480/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	1.05	2005	20010.9
94	CU/PVC, 1 x 120 mm²	2540/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	4.05	2005	77146.78
95	CU/PVC, 1 x 50 mm²	2410/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	33.89	2005	287183.86
96	CU/PVC, 1 x 50 mm²	2380/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	6.01	2005	50886.37
97	CU/PVC, 1 x 50 mm²	2550/05-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	20.04	2005	169844.38

98	CU/XLPE/SWA/PVC, 12 x 2.5 mm²	2050/05-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	15.82	2005	153999.17
99	AL/XLPE/PVC, 4 x 70 mm²	2080/05-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	148.1	2005	1821568.5
100	CU/XLPE/PVC, 1 x 120 mm²	12620/05-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	51.45	2005	1111778.93
101	CU/XLPE/PVC, 1 x 35 mm²	2060/05-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	58.01	2005	321276
102	CU/XLPE/PVC, 1 x 185 mm²	2070/05-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	59.97	2005	1600699.14
103	CU/XLPE/PVC, 1 x 35 mm²	5730/04-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	0.19	2005	882.66
104	CU/XLPE/PVC, 1 x 35 mm²	12610/05-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	25.04	2005	170124.2
105	CU/PVC, 1 x 95 mm²	9200/04-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	118.94	2005	1552851.04
106	CU/XLPE/CWA/PVC, 1 x 630 mm²	0670/05-O	KAHRAMAA (QATAR)	0.99	2005	68792.5
107	CU/XLPE/SWA/PVC, 4 x 300 mm²	0640/05-O	KAHRAMAA (QATAR)	81.56	2005	10552117.5
108	CU/XLPE/SWA/PVC, 4 x 300 mm²	0070/05-O	KAHRAMAA (QATAR)	1.22	2005	240620.06
109	CU/XLPE/SWA/PVC, 4 x 120 mm²	0620/05-O	KAHRAMAA (QATAR)	6.89	2005	371259.16
110	CU/XLPE/SWA/PVC, 4 x 300 mm²	0150/04-O	KAHRAMAA (QATAR)	4.96	2005	641321.79
111	CU/PVC/SWA/PVC, 4 x 4 + 4 x 2 x 1.5 mm²	0610/05-O	KAHRAMAA (QATAR)	38.9	2005	230240.79
112	AL/XLPE/SWA/PVC, 4 x 50 mm²	10930/99-O	DEWA (UAE)	0.2	2005	1624.74
113	AL/XLPE/SWA/PVC, 4 x 185 mm²	7900/04-O	DEWA (UAE)	25.18	2005	833835.82
114	CU/XLPE/PVC, 1 x 630 mm²	7910/04-O	DEWA (UAE)	57.46	2005	4109118.95
115	AL/XLPE/PVC, 4 x 300 mm²	10210/06-O	SAUDI ELECTRIC CO. EAST Region (KSA)	42.84	2006	2470839.52
116	CU/XLPE/PVC, 1 x 35 mm²	8790/05-O	SAUDI ELECTRIC CO. EAST Region	1.2	2006	7523.16

			(KSA)			
117	AL/XLPE/PVC, 4 x 70 mm²	1150/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	0.51	2006	6036.68
118	AL/XLPE/PVC, 4 x 70 mm²	11640/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	29.38	2006	387984.98
119	AL/XLPE/PVC, 4 x 25 mm²	12490/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	48.71	2006	1138707.3
120	AL/XLPE/PVC, 4 x 185 mm²	12490/05-O	SAUDI ELECTRIC CO. WEST Region (KSA)	74.49	2006	2166579.53
121	AL/XLPE/PVC, 4 x 300 mm²	7940/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	216.64	2006	12313065.98
122	AL/XLPE/PVC, 4 x 300 mm²	7930/06-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	49.8	2006	2782159.67
123	AL/XLPE/PVC, 4 x 70 mm²	12810/05-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	295.46	2006	4032284.96
124	AL/XLPE/PVC, 4 x 500 mm²	8520/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	277.56	2006	33410489.15
125	CU/XLPE/PVC, 1 x 35 mm²	0450/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	30.12	2006	226765.65
126	CU/XLPE/PVC, 1 x 120 mm²	12620/05-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	19.66	2006	424879.68
127	CU/XLPE/PVC, 1 x 630 mm²	12580/05-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	75.81	2006	8360003.85
128	CU/XLPE/SWA/PVC, 4 x 35 mm²	0650/05-O	KAHRAMAA (QATAR)	0.89	2006	16848.06
129	CU/XLPE/SWA/PVC, 4 x 300 mm²	0640/05-O	KAHRAMAA (QATAR)	60.43	2006	7818252.11
130	CU/PVC/SWA/PVC, 4 x 4 + 4 x 2 x 1.5 mm²	0610/05-O	KAHRAMAA (QATAR)	328.44	2006	1943798.56
131	CU/XLPE/PVC, 1 x 630 mm²	1400/04-O	FEWA (UAE)	0.47	2006	26284.25
132	AL/XLPE/PVC, 4 x 185 mm²	20630/06-O	SAUDI ELECTRIC CO. EAST Region (KSA)	31.16	2007	1393679.75
133	AL/XLPE/PVC, 4 x 300 mm²	10210/06-O	SAUDI ELECTRIC CO. EAST Region (KSA)	7.43	2007	428397.27

134	AL/XLPE + ACSR/AW, 3 x 120 + 120 mm²	20100/06-O	SAUDI ELECTRIC CO. EAST Region (KSA)	96.77	2007	2746856.44
135	AL/XLPE/PVC, 4 x 70 mm²	21220/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	85.63	2007	1743194.47
136	AL/XLPE/PVC, 4 x 185 mm²	21910/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	233.71	2007	10543826.66
137	AL/XLPE/PVC, 4 x 300 mm²	7940/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	12.38	2007	703365.05
138	AL/XLPE + ACSR/AW, 3 x 50 + 53.5 mm²	21350/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	81.71	2007	1048326.47
139	AL/XLPE + ACSR/AW, 3 x 120 + 120 mm²	21200/06-O	SAUDI ELECTRIC CO. WEST Region (KSA)	84.35	2007	2405211.74
140	AL/XLPE/PVC, 4 x 185 mm²	21240/06-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	65.51	2007	3008225.93
141	AL/XLPE + ACSR/AW, 3 x 50 + 53.5 mm²	21380/06-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	231.84	2007	3036845.96
142	AL/XLPE + ACSR/AW, 3 x 120 + 120 mm²	6110/06-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	119.86	2007	2664498.04
143	AL/XLPE + ACSR/AW, 3 x 120 + 120 mm²	9260/06-O	SAUDI ELECTRIC CO. SOUTH Region (KSA)	14.86	2007	413408.1
144	AL/XLPE/PVC, 4 x 185 mm²	21250/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	64.27	2007	2950966.19
145	AL/XLPE/PVC, 4 x 70 mm²	21230/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	108.23	2007	2244149.06
146	AL/XLPE + ACSR/AW, 3 x 120 + 120 mm²	21180/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	5.98	2007	170377.13
147	AL/XLPE + ACSR/AW, 3 x 120 + 120 mm²	21300/06-O	SAUDI ELECTRIC CO. CENTRAL Region (KSA)	394.2	2007	11240387.4
148	AL/XLPE/SWA/PVC, 2 x 25 mm²	23390/06-O	DEWA (UAE)	2.06	2007	14878.66
149	AL/XLPE/SWA/PVC, 4 x 95 mm²	23410/06-O	DEWA (UAE)	12.04	2007	293396.66
150	AL/XLPE/SWA/PVC,	23420/06-O	DEWA (UAE)	91.17	2007	6090579.69

	4 x 300 mm²					
151	AL/XLPE/SWA/PVC, 4 x 50 mm²	23400/06-O	DEWA (UAE)	16.63	2007	234134.77
152	CU/XLPE/PVC, 1 x 630 mm²	23430/06-O	DEWA (UAE)	103.33	2007	16153768.82

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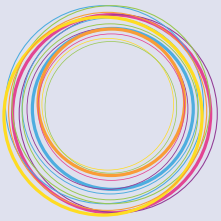

Jeddah cables COMPANY®
A Company of Energya Cables

Medium Voltage Cables

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Introduction

Today, XLPE (Cross- Linked Polyethylene) insulated cables are the most common cables used for power transmission and distribution by the power and energy utilities. XLPE Cables have replaced paper insulated cables since there first development in the 1960s. XLPE insulation is a thermo-set (non-recyclable) material, with an operating temperature of 90°C at normal condition. Similar in properties to regular PE, XLPE is not limited by the temperature of 70°C at normal condition. Cross-linking is the term used to describe the process where individual polymer molecules (in PE) are tied together to form a network structure. This is done using curing techniques, such as Nitrogen curing (Dry-Curing). Nitrogen curing technique is the method used in jeddah Cable Company in our CCV (Continuous Catinary Vulcanization) Lines. The effects of such cross-linking on the properties of polyethylene inculde :

- Excellent electrical properties
- Higher operating temperature, therefore higher current capacity of the insulated conductors
- Chemical properties are enhanced (namely oil resistance at elevated temperatures)
- Certain mechanical properties are also improved.

Nitrogen Curing is a process that utilizes nitrogen as a heating medium instead of pressurized steam. This method avoids saturating the insulation with water, thus reducing the number of voids generated there.

CCV (Continuous Catinary Vulcanization) lines are used in the manufacture of medium and high voltage cables. The CCV line is curved downward from a raised extruder platform, and follows a bowed shape rather than a straight line. This curved shape prevents dragging of the cable along the bottom of the tube, and helps minimize the sagging of the insulation. The State-of-Art CCV Line in jeddah Cable Company is used for triple extrusion of the inner semi-conductor, XLPE insulation, and the outer semiconductor ; the three layers are extruded simultaneously.

Medium Voltage Cables Design and Construction

Single-core or three-core cables consist of the following components:

Conductor

Conductors are made of copper or aluminum. Conductor design is usually circular stranded, and compacted. Our conductor design is in compliance with the requirements of IEC 60228 and BS 6360 Specifications

Insulation

Triple extrusion of inner semi-conductor (conductor screen) , XLPE insulation, and outer semi-conductor (insulation screen) is applied. XLPE insulation is dry cured. XLPE insulation material is as per the requirements of IEC 60502-2 or as per customer's request.

Metallic screen

The metallic screen is usually made of copper wires or copper tape. Radial water sealing such as AL-PE laminate and longitudinal water sealing may be applied upon customer's request.

Assembly

All cable cores are laid-up together with usage of non- hygroscopic filler material. These fillers are temperature compatible with all different cable layers such insulation, bedding, and sheath.

Armoring

Armor material can be either Aluminum for single core cables or Steel for multi-core cables. Armor can be either wires or tapes. Our cable armoring is in compliance with the requirements of IEC 60502-2 and BS 6622.

Outer Sheath/ Jacket

Our cables sheaths are made of an extruded layer of PVC or PE material and are in compliance with the requirements of IEC 60502-2 and BS 7655 Specifications. We are also capable of providing cable sheaths with special requirements to be:

- Termite retardant
- Oil & Gasoline retardant
- Ozone/acid/ alkali retardant
- Flame retardant and in compliance with requirements of IEC 60332-1 and IEC 61034-2
- Low smoke Halogen Free and in compliance with requirements of BS7211 and BS 6724

Testing of medium Voltage Power Cables

We, Jeddah Cable Company, are capable of performing all standard routine tests and sample tests that are normally carried out in accordance to IEC 60502-2 standards. We have all necessary equipment for such tests such as high voltage labs and special ovens.

We are also capable of performing tests in accordance with international or national requirements as agreed upon with our customers.

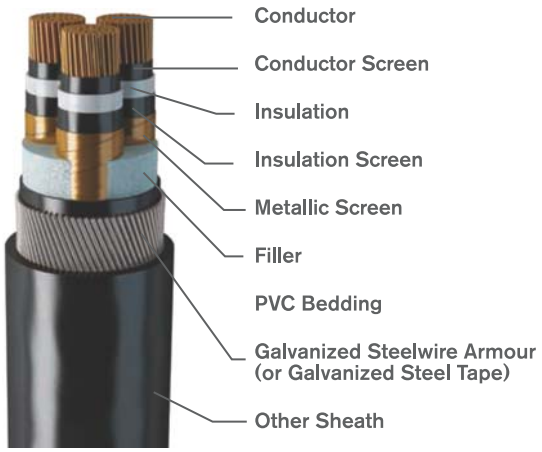
Routine Tests

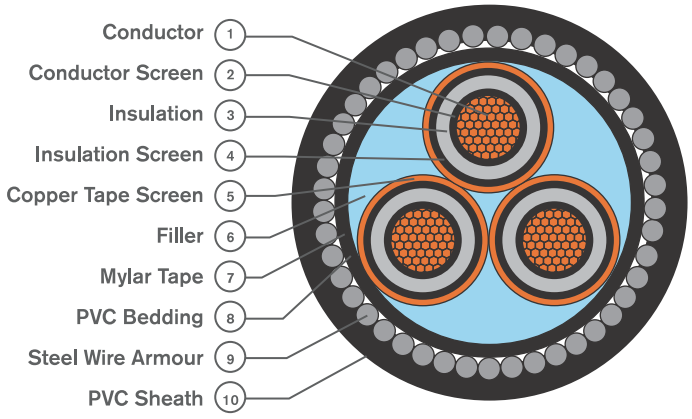
- Measurements of the Electrical Resistance of Conductors
- Partial Discharge Test.
- High Voltage Test

Sample Tests

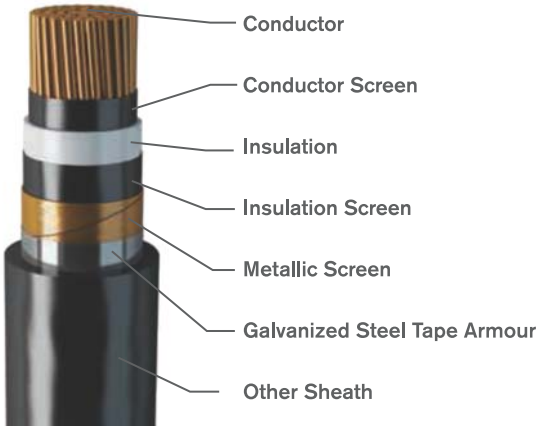
- Conductor Examination
- Check of Dimensions
- Hot Set Test for XLPE Insulations

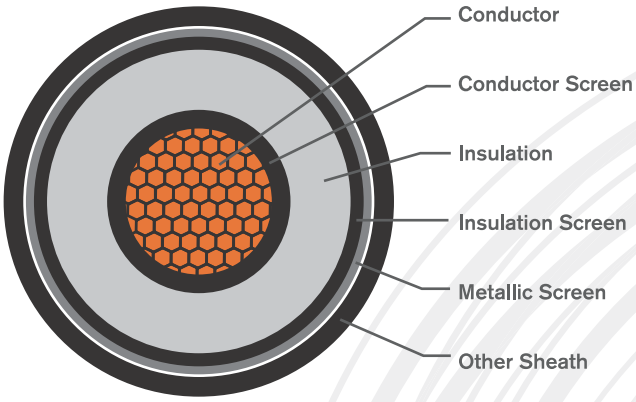
Medium Voltage Cables





3 Cores XLPE Cable





1 Core XLPE Cable

General Information
Selecting A Power Cables

The following factor are important when selecting a suitable cable construction which is required to transport electrical energy from the power station to the consumer:

- Maximum operating voltage
- Insulation level
- Frequency
- Load to be carried
- Magnitude and duration of possible overload
- Magnitude and duration of short-circuit current
- Voltage drop
- Length of line
- Mode of installation underground (direct or in ducts) in air
- Chemical and physical properties of soil
- Max. and min. ambient air temperature and soil temperatures
- Specification and requirements to be met

Voltages

The standard rated voltage of a cable is denoted by $U_o/U(Um)$,
where:
U_o : is the rated power-frequency voltage between conductor and earth or metallic screen.
U : is the rated power-frequency voltage between conductors.
Um : is the maximum continuously permissible operating voltage of a cable at any time or in any part ofthe network.

U_o/U	KV	3.6/6	6/10	8.7/15	12/20	18/30
Um	KV	7.2	12	17.5	24	36

Note:
Cable design for 6/10 and 18/30 kV is applicable for 6.35/11 and 19/33 kV respectively.

Standards

The cable described in this catalogue are all standard types,and their performance has been proved in operation.Construction and test are in accordance with the recommendation of IEC publications where applicable.
Power cables in accordance to other standards (e.g. BS, VDE, NEMA) can be manufactured upon customer's request.

Variation in Production and Delivery options

The provided data is approximate and subject to manufacturing tolerance Delivery length tolerance is ±5%

Jacket Marking

Standard embossed outer jacket marking consisting of:
1 - Name of manufacturer
2 - Type designation,size of conductor, rated voltage and standard.
3 - Continuous length marking every meter.
4 - Year of manufacture.

Laying Information

Minimum Bending Radius During Installation

During laying, the bending radius should not be smaller than values given below.

The radius depends on the outer diameter (D_o) of the cable.

XLPE insulated cables for 6.0 up to 30 kV

Type of Cable	Minimum Radius	
	During Laying	Adjacent to joints or terminations
Single-core		
- Unarmoured	20 D_o	15 D_o
- Armoured	20 D_o	12 D_o
Three-core		
- Unarmoured	15 D_o	12 D_o
- Amoured	12 D_o	10 D_o

Maximum Tensile Forces During Laying

Means of pulling	Type of cable	Formula	Factor
With the pulling head attached to the conductors	All types of cable	$P = \sigma . A$	$\sigma = 50 N/mm^2$ (Copper conductor) $\sigma = 30 N/mm^2$ (Alum. conductor)
With the pulling stocking	Un-armoured cables	$P = \sigma . A$	$\sigma = 50 N/mm^2$ (Copper conductor) $\sigma = 30 N/mm^2$ (Alum. conductor)
	Armoured cables	$P = k . d^2$	$K = 9 N/mm^2$

P = Pull in N

A = Total cross sectional area in mm^2 of all conductors (but not sceen or concentric conductor)

d = Outsode diameter of the cable in mm

σ = Permissible tensile stress of conductor in N/mm^2

k = Empirically derived factor on N/mm^2

Electrical Parameters Of The Cables

DC Resistance of Conductor

The Maximum DC resistance values of conductors at 20°C are as per " IEC 60228" standard.
DC resistances per unit length of the conductor at other conductor temperature are given by:

$$R = R_O [1 + \alpha_{20°C} (t - 20^O)]$$

where:

R = DC resistance at temperature t °C (Ω/km)

Ro = D.C resistance at temperature 20°C (Ω/km) (given in the relative tables for each type of cable)

t = Conductor temperature °C

$\alpha_{20°C}$ = Temperature coefficient at 20°C (1/°C)

For copper conductor $\alpha_{20°C} = 0.00393$

For aluminum conductor $\alpha_{20°C} = 0.00403$

A.C. Resistance of Conductor

The AC Resistance per unit length of the conductor (effective resistance) at its maximum operating temperature is made up of the DC resistance at this temperature and the extra resistance which takes into account additional losses caused by the current displacement in the conductor (Skin effect and Proximity effect). The AC resistance is given in the relative tables for each type of cable.

Inductance

The values of the inductance for both multicores and three single core cables have been calculated based on the following presumption equation.

$$L = K + 0.2 \ln (2S/d) \text{ (mH/km)}$$

where:

K = a constant relating to the conductor formation (mH/km)

D = the conductor diameter (mm)

S = axial spacing between conductors for cables in trefoil formation (mm)

= 1.26 x axial spacing between conductors for cables in flat formation (mm)

The values for inductance of single core cables have been calculated based on one cable diameter between cables in flat formation

Operation Capacitance

The values of operating capacitance for cables have been calculated based on the following presumption:

$$C = \frac{\varepsilon_r}{18 \ln \left(\frac{D}{d}\right)} \text{ µf/km}$$

Where:

ε_r = Relative permativity of insulation

D = External diameter of insulation (mm)

d = Conductor diameter (mm)

Operating temperature for XLPE insulated cables:

90°C for continuous normal operation

105°C for emergency overload conditions

250°C for short circuit conditions

Charging Current

The charging current is the capacitive current which flows when AC voltage is applied to the cable as a result of the capacitance between the conductors and metalic screen. The value can be derived from the equation.

$$I_C = U_O \omega C 10^{-6}$$

where:

U_O = Voltage between phase and earth (V)
$\omega = 2\pi f$ (rad/s)
f = Frequency (Hz)
C = Capacitance to neutral (μF/Km)

Dielectric Losses

The dielectric losses of an AC cable are proportional to the capacitance,the frequency, the phase voltage and dielectric power factor. They are given by:

$$D = (2\pi f C U_o^2 \tan\delta)10^{-6} \text{ (watt/m/phase)}$$

where:

f = Frequency Hz
C = Capacitance to neutral (μF/Km)
U_O = Voltage between phase and earth (V)
$\tan\delta$ = Dielectric power factor

Voltage Drop

When current flows in a cable conductor, there is a voltage drop between the ends of the conductor which is the product of the current and the impedance. The following equations should be used to calculate the voltage drop:

1-Single phase system

$$Vd = 2 (R \cos\phi + X \sin\phi) \text{ (Volt/amp/meter)}$$

2- Three phase system

$$Vd = \sqrt{3} (R\cos\phi + X\sin\phi) \text{ (Volt/amp/meter)}$$

where:

Vd = Voltage drop (V/am/m)
R = AC resistance of conductor at a maximum conductor temperature (Ω/km)
X = Inductive reactance of cable (Ω/km)
$\cos\phi$ = power factor of load

Cable Short Circuit Current Capacity

The permissible short-circuit as presented in tables 11 to 13 are calculated in accordance with IEC 724, 1982. Which are based on the following conditions:

1- Short ciruit starts from the maximum operating temperature.
2- Maximum temperature during short circuit

XLPE=250°C
PVC= 160°C

3- Maximum short circuit current duration is 5 seconds The short circuit current (I) shall be calculated from the formula.

$$I^2 = (K^2 S^2/T) \ln \left[\frac{\theta_1 + \beta}{\theta_2 + \beta}\right] \text{ (A)}$$

where:

I = Short circuit current (A)
T = Duration of short circuit (second)
K = Constant for the material of the conductor
S = Area of conductor (mm^2)
θ_1 = Final temperature (°C)
θ_2 = Initial temperature (°C)
β = Reciprocal of the temperature
coefficient of resistance (α) of the conductor

CURRENT RATINGS

1- RECOMMENDATIONS FOR CURRENT RATINGS

The current rating of power cables is defined by the maximum intensity of current (in amperes), which can flow continuously through the cable, under permanent loading conditions, without any risk of damaging the insulation or deterioration of its electrical properties.

- Current carrying capacities have been calculated in accordance with IEC 60287 (calculation of the continuous current rating of cables).

- The values given in the tables are valid for one circuit in three phase system under conditions specified. For grouping cables rating factors must be used.

- It is to be observed that the current carrying capacities presented in JCC technical data sheets are intended as a guide to assist operating engineers in selecting cables for safety and reliability.

- Basic assumptions and conditions of installation:

* Ambient ground temperature	:	20°C
* Ambient air temperature	:	30°C
* Depth of cable burial	:	1.0m
* Thermal resistivity of soil	:	120°C.Cm/W

- Cables in air are assumed to be protected from direct solar radiation.

- Single core cables are installed as indicated in the technical information tables. Spacing between cables in flat formation is assumed to be one cable diameter.

- For three and four-core cables, it is usual to assume the same current carrying capacity for four cores cables as for three-core cables. Our calculated values are based actually on three core cables. These values are suitable with enough accuracy also for four cores cables in most cases. Only for large four cores cables in air the values may be found to be too conservative, due to the large cable surface and consequent high heat dissipation factor.

- The inner diameter of ducts has been assumed to be at least 1.5 times the diameter of the cables.

- To obtain the maximum current carrying capacity of a cable operating at different conditions from the standards, you have to multiply the values of the current given in the technical information for the corresponding cable by the rating factors mentioned in the tables from 1 to 10, as follows:

$I_a = K_t I_s$ in amperes

where:

I_a : Current rating at actual operating conditions (amperes)

I_s : Current rating at standard operating conditions (amperes)

K_t : Rating factor given the in the tables 1 to 10.

It has to be noted that Kt is the total rating factor: $K_t = K_1 .... K_2 ..... K_n$

You may have a multiplication of so many partial rating factors, as many as the differences of laying and operating conditions from standard conditions.

Table 1

RATING FACTORS K FOR VARIATION IN GROUND TEMPERATURE

GROUND TEMPERATURE °C		20	25	30	35	40	45	50	55
PVC cables rated	70°C	1.00	0.95	0.90	0.84	0.78	0.71	0.63	0.54
PVC cables rated	85°C	1.00	0.96	0.92	0.87	0.83	0.78	0.73	0.67
XLPE cables rated	90°C	1.00	0.96	0.92	0.88	0.84	0.79	0.75	0.70

Table 2

RATING FACTORS K FOR VARIATION IN AIR TEMPERATURE

AIR TEMPERATURE °C		25	30	35	40	45	50	55
PVC cables rated	70°C	1.07	1.00	0.93	0.87	0.79	0.70	0.61
PVC cables rated	85°C	1.04	1.00	0.95	0.90	0.85	0.80	0.74
XLPE cables rated	90°C	1.04	1.00	0.96	0.91	0.87	0.82	0.76

Table 3

RATING FACTORS K FOR VARIATION IN GROUND DEPTH

DEPTH OF LAYING (m)	0.6	0.7	0.8	0.9	1.0	1.1	1.2
k	1.05	1.03	1.02	1.01	1.0	0.99	0.98

Table 4

RATING FACTORS K FOR VARIATION IN SOIL RESISTIVITY

SOIL RESISTIVITY (°C. cm/W)	80	90	100	120	150	200	250
k	1.17	1.12	1.07	1.0	0.91	0.80	0.73

Table 5

TREFOIL OR FLAT FORMATION DERATING FACTORS FOR THREE SINGLE CORE CABLES LAID DIRECT IN GROUND

NUMBER OF CIRCUITS	 TREFOIL FORMATION				 FLAT FORMATION	
	TOUCHING		SPACING = 0.15 M		SPACING = 0.30 M	
NR	TREFOIL	FLAT	TREFOIL	FLAT	TREFOIL	FLAT
2	0.77	0.80	0.82	0.85	0.88	0.91
3	0.66	0.69	0.73	0.76	0.80	0.83
4	0.60	0.63	0.68	0.71	0.74	0.77
5	0.56	0.59	0.64	0.67	0.72	0.75
6	0.53	0.57	0.61	0.64	0.70	0.73

Table 6

TREFOIL OR FLAT FORMATION DERATING FACTORS FOR MULTI-CORE CABLES LAID DIRECT IN GROUND

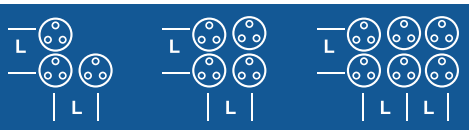
NUMBER OF CABLES	 TREFOIL FORMATION				 FLAT FORMATION	
	TOUCHING		SPACING = 0.15 M		SPACING = 0.30 M	
NR	TREFOIL	FLAT	TREFOIL	FLAT	TREFOIL	FLAT
2	0.81	0.81	0.87	0.87	0.91	0.91
3	0.69	0.70	0.76	0.78	0.82	0.84
4	0.62	0.63	0.72	0.74	0.77	0.81
5	0.58	0.60	0.66	0.70	0.73	0.78
6	0.54	0.56	0.63	0.67	0.70	0.76

Table 7

FLAT FORMATION DERATING FACTORS FOR THREE SINGLE CORE CABLES LAID IN FREE AIR

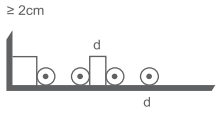
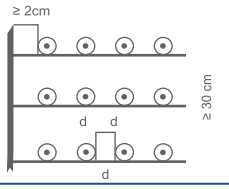
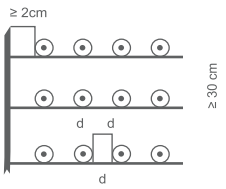
Clearance = Cable diameter (d) Clearance from the wall 2 Cm		Number of circuits 1	2	3	
Laid on the Floor		0.92	0.89	0.88	
	Number of troughs				
Laid cables	1	0.92	0.89	0.88	
troughs	2	0.87	0.84	0.83	
(circulation of air	3	0.84	0.82	0.81	
is restricted)	6	0.82	0.80	0.79	
	Number of racks				
	1	1.00	0.97	0.96	
	2	0.97	0.94	0.93	
Laid	3	0.96	0.93	0.92	
on cable racks	6	0.94	0.91	0.90	
Arranged near the wall		0.94	0.91	0.89	
Arranged on the wall		0.89	0.86	0.84	

Table 8

TREFOIL TOUCHING FORMATION DERATING FACTORS FOR THREE SINGLE CORE CABLES LAID IN FREE AIR

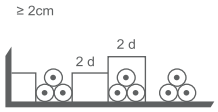
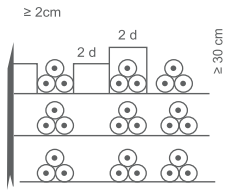
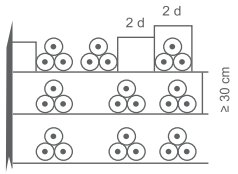
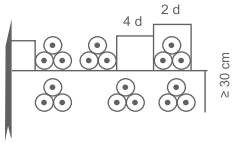
Clearance = 2 (d) Clearance from the wall 2 cm		Number of circuits 1	2	3	
Laid on the Floor		0.95	0.90	0.88	
	Number of troughs				
Laid cables	1	0.95	0.90	0.88	
troughs	2	0.90	0.85	0.83	
(circulation of air	3	0.88	0.83	0.81	
is restricted)	6	0.86	0.81	0.79	
	Number of racks				
	1	1.00	0.98	0.96	
Laid	2	1.00	0.95	0.93	
on cable racks	3	1.00	0.94	0.92	
	6	1.00	0.93	0.90	
Arrangements for which reduction of the current is not necessary					

Table 9

HORIZONTAL OR VERTICAL FORMATION DERATING FACTORS FOR MULTI-CORE CABLES LAID IN FREE AIR

Clearance = Cable diameter (d) Clearance from the wall 2 cm		Number of Cables 1	2	3	4	5	6	9
Laid on the Floor		0.95	0.90		0.88		0.85	0.84
	Number of troughs							
Laid cables troughs (circulation of air is restricted)	1	0.95	0.90		0.88		0.85	0.84
	2	0.90	0.85		0.83		0.81	0.80
	3	0.88	0.83		0.81		0.79	0.78
	6	0.86	0.81		0.79		0.77	0.76
	Number of racks							
Laid on cable racks	1	1.00	0.98		0.96		0.93	0.92
	2	1.00	0.95		0.93		0.90	0.89
	3	1.00	0.94		0.92		0.89	0.88
	6	1.00	0.93		0.90		0.87	0.86
Arranaged near the wall		1.00	0.93		0.90		0.87	0.86

Arrangements for which reduction of the current is not necessary	Clearance from the wall	Clearance between cables
	≥ 2cm	≥ 2 d

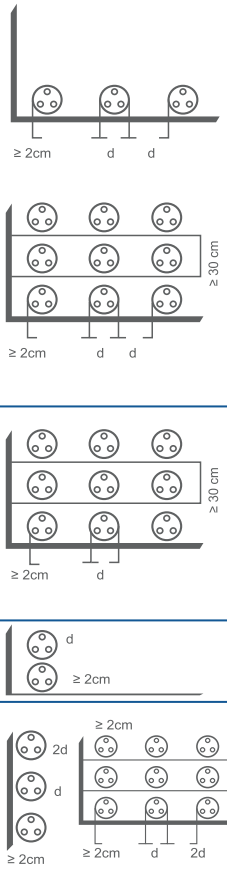


Table 10

DERATING FACTORS FOR MULTI-CORE CABLES TOUCHING AND IN CONTACT WITH THE WALL IN FREE AIR

Clearance touching troughs and contact with wall		Number of Cables 1	2	3	4	5	6	9
Laid on the Floor		0.90	0.84		0.80		0.75	0.73
	Number of troughs							
Laid cables troughs (circulation of air is restricted)	1	0.95	0.84		0.80		0.75	0.73
	2	0.95	0.80		0.76		0.71	0.69
	3	0.95	0.78		0.74		0.70	0.68
	6	0.95	0.76		0.72		0.68	0.66
	Number of racks							
Laid on cable racks	1	0.95	0.84		0.80		0.75	0.73
	2	0.95	0.80		0.76		0.71	0.69
	3	0.95	0.78		0.74		0.70	0.68
	6	0.95	0.76		0.72		0.68	0.66
Arranged on the wall		0.95	0.78		0.73		0.68	0.66

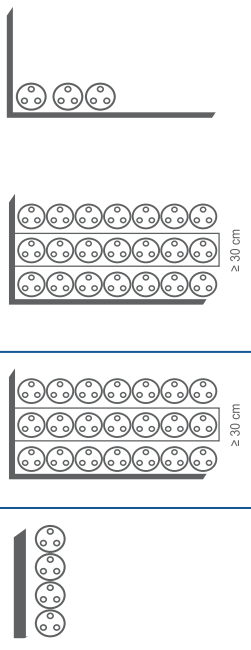


Table 11 (90/250 °C)

SHORT CIRCUIT CURRENT FOR COPPER CONDUCTORS - XLPE INSULATED (KA)										
Area (mm^2)	TIME (S)									
	0.1	0.2	0.3	0.4	0.5	1	2	3	4	5
16	7.24	5.12	4.18	3.62	3.24	2.29	1.62	1.32	1.14	1.02
25	11.31	8.00	6.53	5.66	5.06	3.58	2.53	2.07	1.79	1.60
35	15.84	11.20	9.14	7.92	7.08	5.01	3.54	2.89	2.50	2.24
50	22.62	16.00	13.06	11.31	10.11	7.15	5.06	4.13	3.58	3.20
70	31.67	22.40	18.29	15.84	14.16	10.02	7.08	5.78	5.01	4.48
95	42.98	30.39	24.82	21.49	19.22	13.59	9.61	7.85	6.80	6.08
120	54.30	38.39	31.34	27.15	24.28	17.17	12.14	9.91	8.59	7.68
150	67.87	47.99	39.19	33.94	30.35	21.46	15.18	12.39	10.73	9.60
185	83.71	59.19	48.33	41.85	37.43	26.47	18.72	15.28	13.24	11.94
240	108.59	76.79	62.70	54.30	48.56	34.34	24.28	19.83	17.17	15.36
300	135.74	95.98	78.37	67.87	60.71	42.93	30.35	24.78	21.46	19.20

Table 12 (90/250 °C)

SHORT CIRCUIT CURRENT FOR ALUMINUM CONDUCTORS - XLPE INSULATED (KA)										
Area (mm^2)	TIME (S)									
	0.1	0.2	0.3	0.4	0.5	1	2	3	4	5
16	4.78	3.38	2.76	2.39	2.14	1.51	1.07	0.87	0.76	0.68
25	7.47	5.28	4.31	3.73	3.34	2.36	1.67	1.36	1.18	1.06
35	10.46	7.40	6.04	5.23	4.68	3.31	2.34	1.91	1.65	1.48
50	14.94	10.56	8.63	7.47	6.68	4.72	3.34	2.73	2.36	2.11
70	20.91	14.79	12.08	10.46	9.35	6.61	4.68	3.82	3.31	2.96
95	28.38	20.07	16.39	14.19	12.69	8.98	6.35	5.18	4.49	4.01
120	35.85	25.35	20.70	17.93	16.03	11.34	8.02	6.55	5.67	5.07
150	44.82	31.69	25.88	22.41	20.04	14.17	10.02	8.18	7.09	6.34
185	55.28	39.09	31.91	27.64	24.72	17.48	12.36	10.09	8.74	7.82
240	71.71	50.71	41.40	35.85	32.07	22.68	16.03	13.09	11.34	10.14
300	89.64	63.38	51.75	44.82	40.09	28.35	20.04	16.37	14.17	12.68

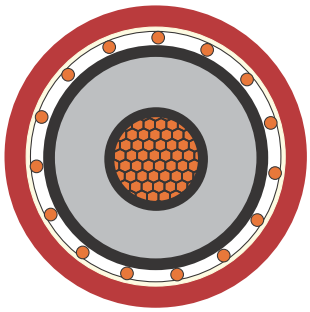
Table 13 (90/250 °C)

SHORT CIRCUIT CURRENT FOR COPPER SCREEN (KA)										
Area (mm^2)	TIME (S)									
	0.1	0.2	0.3	0.4	0.5	1	2	3	4	5
16	7.24	5.12	4.18	3.62	3.24	2.29	1.62	1.32	1.14	1.02
25	11.31	8.00	6.53	5.66	5.06	3.58	2.53	2.07	1.79	1.60
35	15.84	11.20	9.14	7.92	7.08	5.01	3.54	2.89	2.50	2.24

Single Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 3.6/6 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper(or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Annealed copper wires or (copper tape)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
1x25	2.5	1.5	19.8	640
1x35	2.5	1.6	21.0	765
1x50	2.5	1.6	22.4	905
1x70	2.5	1.6	24.0	1135
1x95	2.5	1.7	25.9	1405
1x120	2.5	1.8	27.6	1660
1x150	2.5	1.8	29.2	2035
1x185	2.5	1.9	31.4	2395
1x240	2.6	1.9	34.1	2980
1x300	2.8	2.0	36.3	3610
1x400	3.0	2.2	40.2	4500
1x500	3.2	2.3	44	5500
1x630	3.2	2.4	47.5	7110

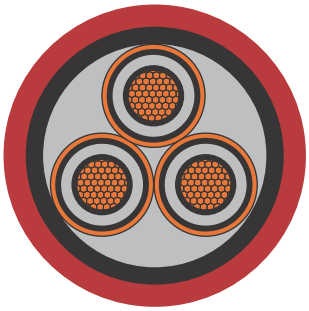
2. Electrical Data

Cross section Area	mm^2	25	35	50	70	95	120	150	185	240	300	400	500	630
Screen Area	mm^2	16	16	16	16	16	16	25	25	25	25	35	35	35
DC Resist at 20 ^{O}C	Ω/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.028
Ac Resist at 90 ^{O}C	Ω/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1290	0.099	0.0812	0.0657	0.538	0.045
Inductance														
Flat Formation	mh/km	0.495	0.467	0.440	0.417	0.400	0.384	0.380	0.368	0.355	0.349	0.345	0.338	0.328
Trefoil Formation	mh/km	0.449	0.421	0.394	0.371	0.353	0.338	0.331	0.322	0.420	0.303	0.299	0.292	0.283
Capacitance	μF/km	0.269	0.306	0.337	0.385	0.430	0.472	0.514	0.558	0.606	0.617	0.646	0.672	0.751
Charging current	A/km	0.365	0.415	0.457	0.522	0.583	0.640	0.697	0.758	0.823	0.838	0.876	0.912	1.019
Dielectic losses	W/m	0.011	0.012	0.013	0.015	0.017	0.018	0.020	0.022	0.024	0.024	0.025	0.026	0.029
Current Ampacity														
Cable in ground	A	170	195	235	265	305	345	395	455	500	560	635	710	790
Cable in free air	A	180	210	245	285	355	410	470	540	630	720	840	960	1100
Short circuit current														
Conductor S.C (1 Sec)	KA	5.01	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2	71.5	90.0
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	: CU/XLPE/PVC, 3.6/6 KV
Standard	: IEC 60502-2
Conductor	: Circular stranded Compacted copper (or Aluminum)
Conductor Screen	: Bonded semiconducting material
Insulation	: XLPE material
Insulation Screen	: Strippable semiconducting material (or Bonded)
Metallic Screen	: Copper tape (or copper wires)
Bedding	: PVC compound (or LSHF or PE)
Jacketing	: PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
3x25	2.5	2.1	39.2	1955
3x35	2.5	2.2	42.2	2365
3x50	2.5	2.3	45.0	2891
3x70	2.5	2.4	48.9	3655
3x95	2.5	2.5	52.5	4590
3x120	2.5	2.6	56.4	5490
3x150	2.5	2.7	60.0	6466
3x185	2.5	2.8	64.0	7646
3x240	2.6	3.0	69.7	9645
3x300	2.8	3.2	75.7	11810
3x500	3.0	3.5	83.5	14665
	3.2	3.7	90.5	17900

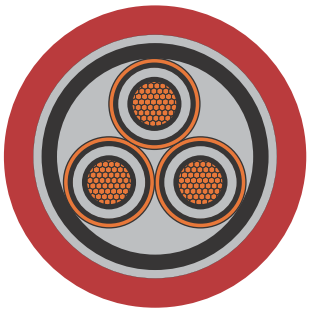
2. Electrical Data

Cross section Area	mm^2	16	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm^2	16	16	16	16	16	16	16	25	25	25	25	35	35
DC Resist at 20 ^{O}C	Ω/km	1.150	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 ^{O}C	Ω/km	1.466	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1290	0.099	0.0812	0.0657	0.538
Inductance	mh/km	0.422	0.902	0.379	0.422	0.330	0.310	0.300	0.290	0.280	0.270	0.266	0.261	0.256
Capacitance	µF/km	0.241	0.269	0.306	0.337	0.385	0.430	0.472	0.514	0.558	0.606	0.617	0.646	0.672
Charging current	A/km	0.314	0.365	0.415	0.457	0.522	0.583	0.640	0.697	0.758	0.823	0.838	0.876	0.912
Dielectic losses	W/m	0.010	0.011	0.012	0.013	0.015	0.017	0.018	0.020	0.022	0.024	0.024	0.025	0.026
Current Ampacity Cable in ground Cable in free air	 A A	 115 120	 160 172	 191 203	 224 235	 255 275	 300 335	 340 390	 385 445	 435 510	 495 580	 555 665	 625 760	 700 890
Short circuit current Conductor S.C (1 Sec) Screen S.C (1 Sec)	 KA KA	 2.3 2.29	 3.57 2.29	 5.0 2.29	 7.15 2.29	 10.0 2.29	 13.5 2.29	 17.17 2.29	 21.4 3.58	 26.4 3.58	 34.4 3.58	 42.9 3.58	 57.2 5.07	 71.5 5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/STA/PVC, 3.6/6 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or copper wires)
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized steel tape
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x16	2.5	0.5	2.1	39.4	2100
3x25	2.5	0.5	2.2	41.2	2585
3x35	2.5	0.5	2.2	44.0	3025
3x50	2.5	0.5	2.3	47.0	4460
3x70	2.5	0.5	2.5	51.1	5455
3x95	2.5	0.5	2.6	54.7	6420
3x120	2.5	0.5	2.7	58.6	7455
3x150	2.5	0.5	2.8	62.0	8695
3x185	2.5	0.5	2.9	66.0	9426
3x240	2.6	0.5	3.1	71.7	10805
3x300	2.8	0.5	3.3	77.9	13075
3x400	3.0	0.8	3.6	87.3	16570
3x500	3.2	0.8	3.8	95.1	19900

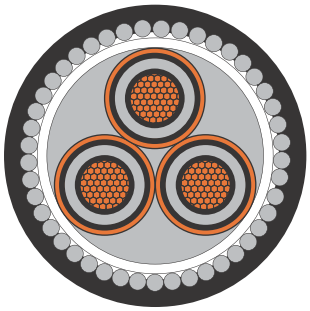
2. Electrical Data

Cross section Area	mm^2	16	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm^2	16	16	16	16	16	16	16	25	25	25	25	35	35
DC Resist at 20 ^{o}C	Ω/km	1.150	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 ^{o}C	Ω/km	1.466	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1290	0.099	0.0812	0.0657	0.538
Inductance	mh/km	0.422	0.400	0.366	0.342	0.323	0.310	0.300	0.290	0.280	0.270	0.266	0.261	0.256
Capacitance	µF/km	0.241	0.269	0.306	0.337	0.385	0.430	0.472	0.514	0.558	0.606	0.617	0.646	0.672
Charging current	A/km	0.314	0.365	0.415	0.457	0.522	0.583	0.640	0.697	0.758	0.823	0.838	0.876	0.912
Dielectic losses	W/m	0.010	0.011	0.012	0.013	0.015	0.017	0.018	0.020	0.022	0.024	0.024	0.025	0.026
Current Ampacity														
Cable in ground	A	114	157	187	219	248	297	336	379	425	485	540	612	680
Cable in free air	A	120	170	198	230	281	335	390	445	495	575	650	745	860
Short circuit current														
Conductor S.C (1 Sec)	KA	2.3	3.57	5.0	7.15	10.0	13.5	17.17	21.4	26.4	34.4	42.9	57.2	71.5
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/SWA/PVC, 3.6/6 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or copper wire)
Armoring	:	Galvanized Steel Wire
Bedding	:	PVC compound (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x16	2.5	2.00	2.2	41.0	2960
3x25	2.5	2.00	2.3	43.5	3410
3x35	2.5	2.50	2.3	46.5	3935
3x50	2.5	2.50	2.5	50.5	5045
3x70	2.5	2.50	2.6	54.5	5985
3x95	2.5	2.50	2.8	57.9	7090
3x120	2.5	2.50	2.8	65	8170
3x150	2.5	2.50	2.9	65.5	9280
3x185	2.5	2.50	3.1	70	10365
3x240	2.6	3.15	3.2	75.5	12945
3x300	2.8	3.15	3.5	83.5	16500
3x400	3.0	3.15	3.7	90.5	19865
3x500	3.2	3.15	4.0	98.5	23200

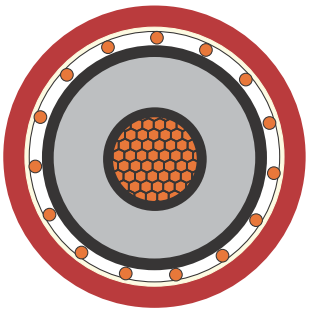
2. Electrical Data

Cross section Area	mm^2	16	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm^2	16	16	16	16	16	16	16	25	25	25	25	35	35
DC Resist at 20 ^{o}C	Ω/km	1.150	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 ^{o}C	Ω/km	1.466	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1290	0.099	0.0812	0.0657	0.538
Inductance	mh/km	0.422	0.400	0.366	0.342	0.323	0.309	0.296	0.288	0.280	0.270	0.266	0.261	0.256
Capacitance	µF/km	0.241	0.269	0.306	0.337	0.385	0.430	0.472	0.514	0.558	0.606	0.617	0.646	0.672
Charging current	A/km	0.314	0.365	0.415	0.457	0.522	0.583	0.640	0.697	0.758	0.823	0.838	0.876	0.912
Dielectic losses	W/m	0.010	0.011	0.012	0.013	0.015	0.017	0.018	0.020	0.022	0.024	0.024	0.025	0.026
Current Ampacity														
Cable in ground	A	114	158	188	220	249	298	337	380	426	485	541	613	681
Cable in free air	A	120	172	199	230	282	336	392	447	495	576	650	746	862
Short circuit current														
Conductor S.C (1 Sec)	KA	2.3	3.57	5.0	7.15	10.0	13.5	17.17	21.4	26.4	34.4	42.9	57.2	71.5
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07

Single Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 6/10 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Annealed Copper Wire (or Copper Tape)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
1x25	3.4	1.6	21.8	710
1x35	3.4	1.6	23.1	825
1x50	3.4	1.7	24.4	980
1x70	3.4	1.7	26.1	1200
1x95	3.4	1.8	27.9	1495
1x120	3.4	1.8	29.4	1740
1x150	3.4	1.9	31.6	2134
1x185	3.4	1.9	33.2	2485
1x240	3.4	2.0	35.9	3080
1x300	3.4	2.1	38.3	3695
1x400	3.4	2.2	41.5	4620
1x500	3.4	2.3	44.6	5595
1x630	3.4	2.4	49.3	7145

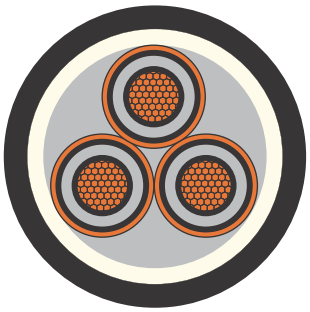
2. Electrical Data

Cross section Area	mm^2	25	35	50	70	95	120	150	185	240	300	400	500	630
Screen Area	mm^2	16	10	16	16	16	16	25	25	25	25	35	35	35
DC Resist at 20 ^{O}C	Ω/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283
Ac Resist at 90 ^{O}C	Ω/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1290	0.099	0.0812	0.0657	0.0538	0.0452
Inductance														
Flat Formation	mh/km	0.512	0.483	0.474	0.433	0.417	0.400	0.363	0.382	0.367	0.352	0.347	00.341	0.330
Trefoil Formation	mh/km	0.466	0.437	0.410	0.385	0.368	0.352	0.344	0.334	0.319	0.310	0.302	0.294	0.282
Capacitance	µF/km	0.213	0.240	0.264	0.299	0.332	0.363	0.394	0.427	0.479	0.520	0.577	0.636	0.711
Charging current	A/km	0.482	0.544	0.596	0.676	0.751	0.822	0.892	0.966	1.083	1.176	1.306	1.439	1.607
Dielectic losses	W/m	0.023	0.026	0.029	0.032	0.036	0.039	0.043	0.046	0.052	0.056	0.063	0.069	0.077
Current Ampacity														
Cable in ground	A	170	195	235	265	305	345	395	455	500	560	635	710	790
Cable in free air	A	180	210	245	285	355	410	470	540	630	720	840	960	1100
Short circuit current														
Conductor S.C (1 Sec)	KA	3.57	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2	71.5	90.0
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	3.58	2.29	3.58	3.58	5.07	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC,6/10 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or copper wires)
Bedding	:	PVC compound (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm²	mm	mm	mm	kg/km
3x16	3.4	2.2	41.0	1815
3x25	3.4	2.2	43.1	2220
3x35	3.4	2.3	46.5	2695
3x50	3.4	2.4	49.1	3195
3x70	3.4	2.5	53.0	3980
3x95	3.4	2.7	57.2	5020
3x120	3.4	2.8	60.7	5885
3x150	3.4	2.9	64.1	6885
3x185	3.4	3.0	67.8	8080
3x240	3.4	3.1	73.8	10120
3x300	3.4	3.3	78.5	12135
3x400	3.4	3.5	85.0	14875
3x500	3.4	3.7	91.6	18020

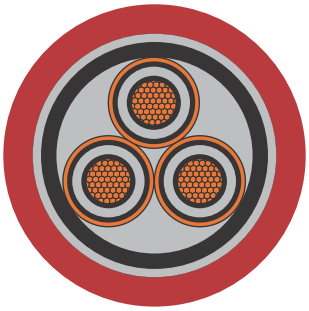
2. Electrical Data

Cross section Area	mm²	16	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm²	16	16	16	16	16	16	16	25	25	25	25	35	35
DC Resist at 20 °C	Ω/km	1.150	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 °C	Ω/km	1.466	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1291	0.099	0.0814	0.0659	0.543
Inductance	mh/km	0.447	0.413	0.387	0.362	0.341	0.325	0.312	0.302	0.300	0.280	0.274	0.265	0.259
Capacitance	µF/km	0.192	0.213	0.240	0.264	0.299	0.332	0.363	0.394	0.427	0.479	0.520	0.577	0.636
Charging current	A/km	0.314	0.482	0.544	0.596	0.676	0.751	0.822	0.892	0.966	1.083	1.176	1.306	1.439
Dielectic losses	W/m	0.019	0.023	0.026	0.029	0.032	0.036	0.039	0.043	0.046	0.052	0.056	0.063	0.069
Current Ampacity														
Cable in ground	A	115	161	180	210	253	302	340	387	430	493	555	628	700
Cable in free air	A	120	173	199	230	275	335	390	447	505	578	665	758	890
Short circuit current														
Conductor S.C (1 Sec)	KA	2.3	3.57	5.0	7.15	10.0	13.5	17.17	21.4	26.4	34.4	42.9	57.2	71.5
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/STA/PVC, 6/10 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape(or copper wire)
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized steel tape
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x16	3.4	0.5	2.3	43	2430
3x25	3.4	0.5	2.4	45.3	2920
3x35	3.4	0.5	2.4	48.7	3456
3x50	3.4	0.5	2.5	51.3	4000
3x70	3.4	0.5	2.6	55.2	4850
3x95	3.4	0.5	2.7	59.2	5935
3x120	3.4	0.5	2.8	62.7	6860
3x150	3.4	0.5	2.9	66	7910
3x185	3.4	0.5	3.1	69.8	9170
3x240	3.4	0.5	3.2	76	11350
3x300	3.4	0.5	3.4	80.7	13450
3x400	3.4	0.5	3.6	88.3	17090
3x500	3.4	0.5	3.8	95	20415

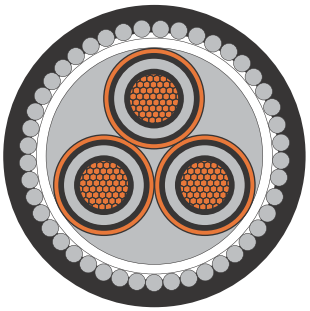
2. Electrical Data

Cross section Area	mm^2	16	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm^2	16	16	16	16	16	16	16	25	25	25	25	358	35
DC Resist at 20 ^{O}C	Ω/km	1.150	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 ^{O}C	Ω/km	1.466	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1291	0.099	0.0814	0.0659	0.543
Inductance	mh/km	0.447	0.413	0.387	0.362	0.341	0.326	0.312	0.302	0.300	0.281	0.274	0.265	0.259
Capacitance	µF/km	0.192	0.213	0.240	0.264	0.299	0.332	0.363	0.394	0.427	0.479	0.520	0.577	0.636
Charging current	A/km	0.569	0.482	0.544	0.596	0.676	0.751	0.822	0.892	0.966	1.038	1.176	1.306	1.439
Dielectic losses	W/m	0.019	0.023	0.026	0.029	0.032	0.036	0.039	0.043	0.046	0.054	0.056	0.063	0.069
Current Ampacity														
Cable in ground	A	115	159	175	205	250	295	335	380	420	482	540	612	682
Cable in free air	A	125	172	195	232	232	340	390	446	495	570	650	745	863
Short circuit current														
Conductor S.C (1 Sec)	KA	2.3	3.57	5.0	7.15	10.0	13.5	17.11	21.4	26.4	34.3	42.9	57.2	71.5
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07

Three Core Cable

For Installations outdoor in ground and ducts, and indoor on trays, in walls, and in ducts.

Type	:	CU/XLPE/SWA/PVC, 6/10 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper*(or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material(or Bonded)
Metallic Screen	:	Copper tape (or copper wire)
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized steel wires
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x16	3.4	2.00	2.4	45.0	3400
3x25	3.4	2.00	2.4	48.5	4280
3x35	3.4	2.50	2.6	51.9	4890
3x50	3.4	2.50	2.7	54.5	5520
3x70	3.4	2.50	2.8	58.4	6480
3x95	3.4	2.50	2.8	62.4	7670
3x120	3.4	2.50	2.9	65.9	8715
3x150	3.4	2.50	3.0	70.0	9880
3x185	3.4	2.50	3.2	73.2	11295
3x240	3.4	3.15	3.4	81.7	14825
3x300	3.4	3.15	3.6	86.4	17080
3x400	3.4	3.15	3.8	92.8	20255
3x500	3.4	3.15	4.0	99.1	23779

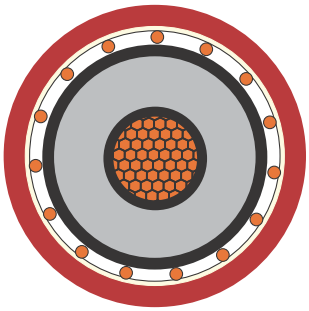
2. Electrical Data

Cross section Area	mm^2	16	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm^2	16	16	16	16	16	16	16	25	25	25	25	358	35
DC Resist at 20 ^{O}C	Ω/km	1.150	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 ^{O}C	Ω/km	1.466	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1290	0.0999	0.0814	0.0659	0.0543
Inductance	mh/km	0.447	0.413	0.387	0.362	0.341	0.326	0.312	0.302	0.294	0.281	0.274	0.265	0.259
Capacitance	µF/km	0.192	0.213	0.240	0.264	0.299	0.332	0.363	0.394	0.427	0.479	0.520	0.577	0.636
Charging current	A/km	0.314	0.482	0.544	0.596	0.676	0.751	0.822	0.892	0.966	1.083	1.176	1.306	1.439
Dielectic losses	W/m	0.019	0.023	0.026	0.029	0.032	0.036	0.039	0.043	0.046	0.052	0.056	0.063	0.069
Current Ampacity														
Cable in ground	A	115	160	175	205	245	295	330	375	418	470	525	590	640
Cable in free air	A	125	172	199	230	285	336	392	445	487	568	635	735	820
Short circuit current														
Conductor S.C (1 Sec)	KA	2.3	3.57	5.0	7.15	10.0	13.5	17.11	21.4	26.4	34.3	42.9	57.2	71.5
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07

Single Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 8.7/15 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper(or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Annealed Copper Wires (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
1x25	4.5	1.7	24.2	800
1x35	4.5	1.7	25.5	920
1x50	4.5	1.7	26.6	1065
1x70	4.5	1.8	28.5	1305
1x95	4.5	1.8	30.1	1590
1x120	4.5	1.9	31.8	1860
1x150	4.5	2	34	2260
1x185	4.5	2.0	35.0	2540
1x240	4.5	2.1	38.3	3225
1x300	4.5	2.2	40.5	3850
1x400	4.5	2.3	43.9	4785
1x500	4.5	2.4	47	5770
1x630	4.5	2.5	51.7	7335

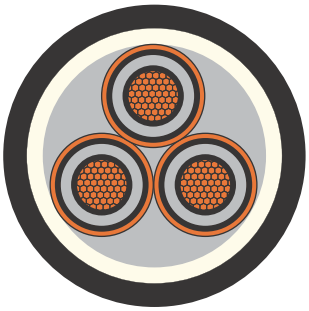
2. Electrical Data

Cross section Area	mm^2	25	35	50	70	95	120	150	185	240	300	400	500	630
Screen Area	mm^2	16	16	16	16	16	16	25	25	25	25	35	35	35
DC Resist at 20 ^{O}C	Ω/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283
Ac Resist at 90 ^{O}C	Ω/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1286	0.0992	0.0806	0.0651	0.532	0.0455
Inductance	mh/km	0.534	0.504	0.475	0.451	0.432	0.416	0.407	0.396	0.380	0.371	0.361	0.352	0.339
Flat Formation Trefoil Formation	mh/km	0.486	0.457	0.427	0.402	0.384	0.386	0.358	0.348	0.332	0.322	0.314	0.304	0.291
Capacitance	µF/km	0.175	0.196	0.213	0.240	0.266	0.289	0.313	0.338	0.377	0.408	0.452	0.496	0.553
Charging current	A/km	0.572	0.641	0.699	0.788	0.871	0.949	1.026	1.108	1.236	1.339	1.481	1.628	1.813
Dielectic losses	W/m	0.040	0.045	0.049	0.055	0.061	0.066	0.071	0.077	0.086	0.093	0.103	0.113	0.126
Current Ampacity														
Cable in ground	A	150	180	210	255	305	345	390	430	500	560	630	710	790
Cable in free air	A	165	200	240	300	360	415	475	540	635	730	840	960	1100
Short circuit current														
Conductor S.C (1 Sec)	KA	3.57	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2	71.5	90.0
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 8.7/15 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper Tape (or Copper Tape)
Bedding	:	PVC compound (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
3x25	4.5	2.4	48.7	2640
3x35	4.5	2.5	51.7	3095
3x50	4.5	2.6	54.2	3610
3x70	4.5	2.7	58.5	4480
3x95	4.5	2.8	62.2	5470
3x120	4.5	2.9	65.6	6350
3x150	4.5	3.0	69	7375
3x185	4.5	3.1	73.1	8670
3x240	4.5	3.3	78.9	10710
3x300	4.5	3.5	83.6	12760
3x400	4.5	3.7	90.1	15555
3x500	4.5	3.9	97.1	18835

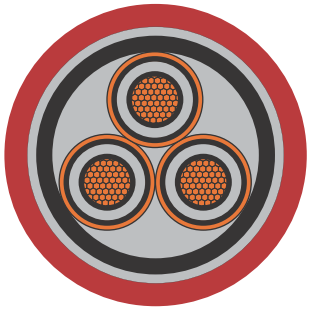
2. Electrical Data

Cross section Area	mm^2	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm^2	16	16	16	16	16	16	25	25	25	25	35	35
DC Resist at 20 ^{o}C	Ω/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 ^{o}C	Ω/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1288	0.0995	0.0810	0.0655	0.0538
Inductance	mh/km	0.438	0.411	0.384	0.360	0.345	0.330	0.319	0.309	0.296	0.287	0.278	0.270
Capacitance	µF/km	0.175	0.196	0.213	0.240	0.266	0.289	0.313	0.338	0.377	0.408	0.452	0.496
Charging current	A/km	0.572	0.641	0.699	0.788	0.871	0.949	1.026	1.108	1.236	1.339	1.481	1.628
Dielectic losses	W/m	0.040	0.045	0.049	0.055	0.061	0.066	0.071	0.077	0.086	0.093	0.103	0.113
Current Ampacity Cable in ground	A	148	175	205	250	300	340	380	425	493	555	630	695
Cable in free air	A	160	195	230	280	340	390	440	505	585	665	765	885
Short circuit current Conductor S.C (1 Sec)	KA	3.57	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2	71.5
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/STA/PVC, 8.7/15 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper Tape
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized Steel Tape
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x25	4.5	0.5	2.5	50.9	3440
3x35	4.5	0.5	2.6	53.19	3945
3x50	4.5	0.5	2.7	56.4	4500
3x70	4.5	0.5	2.8	60.7	5450
3x95	4.5	0.5	2.9	64.4	6500
3x120	4.5	0.5	3.0	67.8	7440
3x150	4.5	0.5	3.1	71.2	8525
3x185	4.5	0.5	3.2	75.3	9890
3x240	4.5	0.5	3.4	81.1	12030
3x300	4.5	0.8	3.6	87	14945
3x400	4.5	0.8	3.8	93.5	17910
3x500	4.5	0.8	4.0	100.5	21385

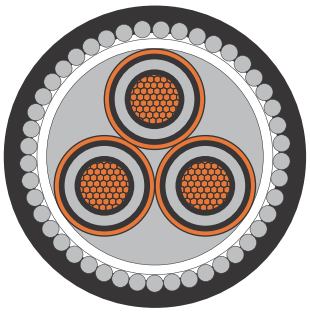
2. Electrical Data

Cross section Area	mm^2	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm^2	16	16	16	16	16	16	25	25	25	25	35	35
DC Resist at 20 ^{o}C	Ω/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 ^{o}C	Ω/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1288	0.0995	0.0810	0.0655	0.0538
Inductance	mh/km	0.438	0.411	0.384	0.360	0.345	0.330	0.319	0.309	0.296	0.287	0.278	0.270
Capacitance	µF/km	0.175	0.196	0.213	0.240	0.266	0.289	0.313	0.338	0.377	0.408	0.452	0.496
Charging current	A/km	0.572	0.641	0.699	0.788	0.871	0.949	1.026	1.108	1.236	1.339	1.481	1.628
Dielectic losses	W/m	0.040	0.045	0.049	0.055	0.061	0.066	0.071	0.077	0.086	0.093	0.103	0.113
Current Ampacity Cable in ground	A	146	175	205	245	295	330	370	415	482	540	610	675
Cable in free air	A	160	195	232	285	345	395	450	500	590	660	750	860
Short circuit current Conductor S.C (1 Sec)	KA	3.57	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2	71.5
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/SWA/PVC, 8.7/15 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper Tape
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized Steel Wires (or Steel Tape)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x25	4.5	2.50	2.6	54.1	4930
3x35	4.5	2.50	2.7	57.1	5555
3x50	4.5	2.50	2.8	59.6	6160
3x70	4.5	2.50	2.9	63.9	7250
3x95	4.5	2.50	3	67.6	8415
3x120	4.5	2.50	3.1	71.	9435
3x150	4.5	3.15	3.2	74.4	10635
3x185	4.5	3.15	3.4	81	13310
3x240	4.5	3.15	3.6	86.8	15720
3x300	4.5	3.15	3.7	91.3	18025
3x400	4.5	3.15	4.0	98.0	21245
3x500	4.5	3.15	4.1	104.8	24915

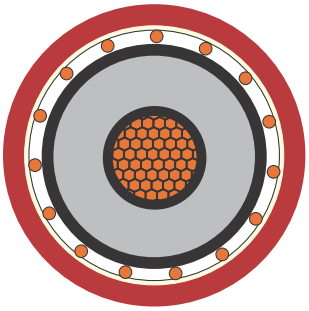
2. Electrical Data

Cross section Area	mm^2	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm^2	16	16	16	16	16	16	25	25	25	25	35	35
DC Resist at 20 ^{O}C	Ω/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 ^{O}C	Ω/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1288	0.0995	0.0810	0.0655	0.0538
Inductance	mh/km	0.438	0.411	0.384	0.360	0.345	0.330	0.319	0.309	0.296	0.287	0.278	0.270
Capacitance	µF/km	0.175	0.196	0.213	0.240	0.266	0.289	0.313	0.338	0.377	0.408	0.452	0.496
Charging current	A/km	0.572	0.641	0.699	0.788	0.871	0.949	1.026	1.108	1.236	1.339	1.481	1.628
Dielectic losses	W/m	0.040	0.045	0.049	0.055	0.061	0.066	0.071	0.077	0.086	0.093	0.103	0.113
Current Ampacity Cable in ground Cable in free air	 A A	 160 172	 175 199	 205 235	 245 285	 295 345	 333 395	 370 445	 415 505	 470 570	 525 635	 690 735	 640 820
Short circuit current Conductor S.C (1 Sec) Screen S.C (1 Sec)	 KA KA	 5 2.29	 5.0 2.29	 7.15 2.29	 10.0 2.29	 13.5 2.29	 17.1 2.29	 21.4 3.58	 26.47 3.58	 34.4 3.58	 42.9 3.58	 57.2 5.07	 71.5 5.07

Single Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 12/20 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Annealed Copper wires (or Copper Tape)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
1x35	5.5	1.8	27.7	1015
1x50	5.5	1.8	28.8	1160
1x70	5.5	1.9	30.7	1415
1x95	5.5	1.9	32.3	1700
1x120	5.5	2.0	34	1975
1x150	5.5	2.0	36	2365
1x185	5.5	2.1	37.8	2710
1x240	5.5	2.2	40.5	3360
1x300	5.5	2.2	42.5	3970
1x400	5.5	2.3	45.9	4920
1x500	5.5	2.4	48.6	5900
1x630	5.5	2.5	53.7	7495

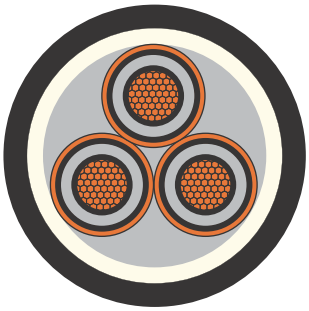
2. Electrical Data

Cross section Area	mm^2	35	50	70	95	120	150	185	240	300	400	500	630
Screen Area	mm^2	16	16	16	16	16	25	25	25	25	35	35	35
DC Resist at 20 ^{O}C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.366	0.0283
Ac Resist at 90 ^{O}C	Ω/km	0.668	0.494	0.342	0.247	0.196	0.160	0.1286	0.0990	0.0806	0.0641	0.0530	0.0440
Inductance Flat Formation Trefoil Formation	mh/km mh/km	0.521 0.472	0.491 0.443	0.466 0.417	0.446 0.398	0.429 0.381	0.419 0.371	0.4080 0.359	0.391 0.343	0.380 0.333	0.370 0.323	0.358 0.310	0.347 0.300
Capacitance	µF/km	0.170	0.185	0.207	0.228	0.247	0.267	0.287	0.319	0.345	0.381	0.417	0.464
Charging current	A/km	0.769	0.835	0.936	1.031	1.119	1.207	1.300	1.445	1.561	1.723	1.889	2.089
Dielectic losses	W/m	0.074	0.080	0.090	0.099	0.107	0.116	0.125	0.139	0.150	0.165	0.181	0.201
Current Ampacity Cable in ground Cable in free air	 A A	 175 200	 210 240	 255 300	 305 360	 345 415	 385 475	 430 540	 500 640	 560 730	 630 840	 710 960	 795 1105
Short circuit current Conductor S.C (1 Sec) Screen S.C (1 Sec)	KA KA	 5.0 2.29	 7.15 2.29	 10.0 2.29	 13.5 2.29	 17.1 2.29	 21.4 3.58	 26.4 3.58	 34.4 3.58	 42.9 3.58	 57.2 5.07	 71.5 5.07	 90.0 5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 12/20 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or Copper Wire)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
3x35	5.5	2.6	56.6	3525
3x50	5.5	2.7	59.2	4060
3x70	5.5	2.8	63	4895
3x95	5.5	3.0	66.49	5940
3x120	5.5	3.1	70.3	6845
3x150	5.5	3.2	74.2	7970
3x185	5.5	3.3	77.8	9215
3x240	5.5	3.5	83.6	11290
3x300	5.5	3.6	88.1	13330
3x400	5.5	3.9	95	16260

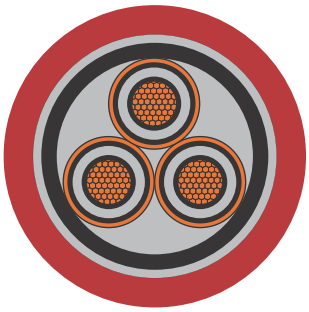
2. Electrical Data

Cross section Area	mm^2	35	50	70	95	120	150	185	240	300	400
Screen Area	mm^2	16	16	16	16	16	25	25	25	25	35
DC Resist at 20 ^{o}C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470
Ac Resist at 90 ^{o}C	Ω/km	0.668	0.402	0.342	0.247	0.196	0.160	0.1286	0.0993	0.0806	0.0652
Inductance	mh/km	0.429	0.410	0.378	0.361	0.344	0.323	0.323	0.308	0.299	0.289
Capacitance	µF/km	0.170	0.185	0.207	0.228	0.247	0.267	0.287	0.319	0.345	0.381
Charging current	A/km	0.769	0.835	0.936	1.031	1.119	1.207	1.300	1.445	1.561	1.723
Dielectic losses	W/m	0.074	0.080	0.090	0.099	0.107	0.116	0.125	0.139	0.150	0.165
Current Ampacity											
Cable in ground	A	175	205	250	300	340	380	425	490	555	625
Cable in free air	A	195	240	285	350	395	450	510	600	680	775
Short circuit current											
Conductor S.C (1 Sec)	KA	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/STA/PVC, 12/20 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or Copper Wires)
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized steel tape
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x35	5.5	0.5	2.7	58.8	4460
3x50	5.5	0.5	2.8	61.4	5040
3x70	5.5	0.5	2.9	65.2	5940
3x95	5.5	0.5	3.0	68.9	7020
3x120	5.5	0.5	3.1	72.3	7980
3x150	5.5	0.5	3.3	76.4	9210
3x185	5.5	0.5	3.4	80	10515
3x240	5.5	0.5	3.6	87	13470
3x300	5.5	0.5	3.7	91.5	15640
3x400	5.5	0.5	4.0	98.6	18805

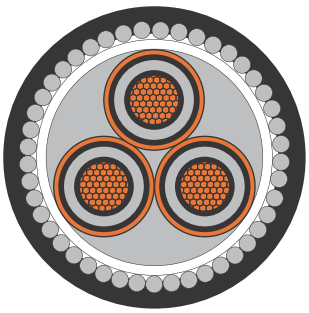
2. Electrical Data

Cross section Area	mm^2	35	50	70	95	120	150	185	240	300	400
Screen Area	mm^2	16	16	16	16	16	25	25	25	25	35
DC Resist at 20 ^{O}C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470
Ac Resist at 90 ^{O}C	Ω/km	0.668	0.494	0.342	0.247	0.196	0.160	0.1286	0.0992	0.0806	0.0652
Inductance	mh/km	0.429	0.402	0.378	0.361	0.350	0.333	0.323	0.308	0.300	0.289
Capacitance	µF/km	0.170	0.185	0.207	0.228	0.247	0.267	0.287	0.319	0.345	0.381
Charging current	A/km	0.769	0.835	0.936	1.031	1.119	1.207	1.300	1.445	1.561	1.723
Dielectic losses	W/m	0.074	0.080	0.090	0.099	0.107	0.116	0.125	0.139	0.150	0.165
Current Ampacity											
Cable in ground	A	175	205	245	295	330	370	415	485	540	610
Cable in free air	A	195	240	285	350	395	450	500	590	685	750
Short circuit current											
Conductor S.C (1 Sec)	KA	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/SWA/PVC, 12/20 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or Copper Wires)
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized steel wires
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x35	5.5	2.50	2.8	62.0	6205
3x50	5.5	2.50	3.0	64.6	6875
3x70	5.5	2.50	3.0	68.4	7885
3x95	5.5	2.50	3.1	72.1	9075
3x120	5.5	2.50	3.3	75.7	10150
3x150	5.5	3.15	3.4	81.9	12640
3x185	5.5	3.15	3.6	85.7	14150
3x240	5.5	3.15	3.7	91.3	16550
3x300	5.5	3.15	3.8	96.9	18875
3x400	5.5	3.15	4.1	102.9	22250

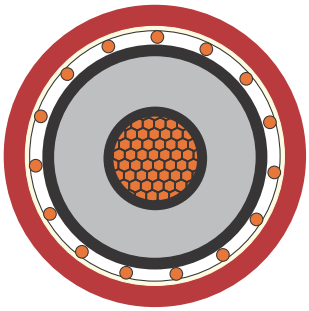
2. Electrical Data

Cross section Area	mm^2	35	50	70	95	120	150	185	240	300	400
Screen Area	mm^2	16	16	16	16	16	25	25	25	25	35
DC Resist at 20 ^{o}C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470
Ac Resist at 90 ^{o}C	Ω/km	0.668	0.494	0.342	0.247	0.196	0.159	0.1286	0.0992	0.0806	0.0652
Inductance	mh/km	0.430	0.402	0.378	0.361	0.350	0.333	0.323	0.308	0.300	0.289
Capacitance	µF/km	0.170	0.185	0.207	0.228	0.247	0.267	0.287	0.319	0.345	0.381
Charging current	A/km	0.769	0.835	0.936	1.031	1.119	1.207	1.300	1.445	1.561	1.723
Dielectic losses	W/m	0.074	0.080	0.090	0.099	0.107	0.116	0.125	0.139	0.150	0.165
Current Ampacity											
Cable in ground	Amp.	175	205	245	295	330	370	410	470	520	585
Cable in free air	Amp.	200	235	290	350	400	450	500	590	660	725
Short circuit current											
Conductor S.C (1 Sec)	KA	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07

SIngle Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 18/30 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper Wires (or Copper Tape)
Bedding	:	PVC compound (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
1x35	8.0	1.9	32.9	1265
1x50	8.0	2.0	34.2	1436
1x70	8.0	2.0	35.9	1685
1x95	8.0	2.1	37.7	2005
1x120	8.0	2.1	39.2	2275
1x150	8.0	2.2	41.4	2695
1x185	8.0	2.2	43	3070
1x240	8.0	2.3	45.7	3710
1x300	8.0	2.4	47.9	4360
1x400	8.0	2.5	51.3	5330
1x500	8.0	2.6	54.3	6355
1x630	8.0	2.7	59.1	7975

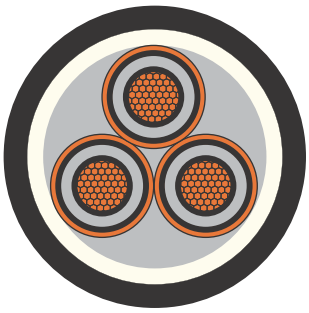
2. Electrical Data

Cross section Area	mm^2	35	50	70	95	120	150	185	240	300	400	500	630
Screen Area	mm^2	16	16	16	16	16	25	25	25	25	35	35	35
DC Resist at 20 ^{O}C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.366	0.0283
Ac Resist at 90 ^{O}C	Ω/km	0.668	0.494	0.342	0.247	0.196	0.160	0.1286	0.0990	0.0806	0.0648	0.0530	0.0440
Inductance	mh/km	0.555	0.525	0.497	0.477	0.458	0.447	0.433	0.414	0.404	0.393	0.381	366
Flat Formation Trefoil Formation	μF/km	0.509	0.477	0.450	0.429	0.411	0.399	0.386	0.368	0.356	0.343	0.332	0.320
Capacitance	A/km	0.133	0.143	0.159	0.174	0.192	0.201	0.216	0.238	0.256	0.281	0.306	0.34
Charging current	W/m	0.903	0.974	1.081	0.181	1.274	1.366	1.464	1.161	1.737	1.906	2.6	2.30
Dielectic losses		0.130	0.140	0.156	0.170	0.183	0.197	0.221	0.233	0.250	0.270	0.300	0.330
Current Ampacity													
Cable in ground	A	176	210	257	305	346	387	432	500	563	630	712	795
Cable in free air	A	205	243	305	368	419	479	545	645	732	845	965	1105
Short circuit current													
Conductor S.C (1 Sec)	KA	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2	71.5	90.0
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 18/30 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or Copper Wire)
Bedding	:	PVC compound (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
3x35	8.0	3.0	68.2	4635
3x50	8.0	3.1	70.8	5215
3x70	8.0	3.2	75	6185
3x95	8.0	3.3	78.7	7260
3x120	8.0	3.5	82.3	8260
3x150	8.0	3.6	85.8	9370
3x185	8.0	3.7	89.4	10670
3x240	8.0	3.8	95	12790
3x300	8.0	4.0	100.1	15055

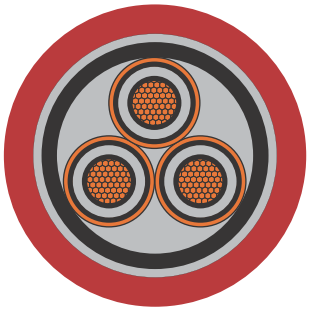
2. Electrical Data

Cross section Area	mm^2	35	50	70	95	120	150	185	240	300
Screen Area	mm^2	16	16	16	16	16	25	25	25	25
DC Resist at 20 ^{o}C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601
Ac Resist at 90 ^{o}C	Ω/km	0.668	0.494	0.342	0.247	0.196	0.159	0.1286	0.0993	0.0806
Inductance	mh/km	0.470	0.441	0.423	0.404	0.389	0.376	0.364	0.348	0.338
Capacitance	µF/km	0.133	0.143	0.159	0.174	0.188	0.201	0.216	0.238	0.256
Charging current	A/km	0.903	0.974	1.081	1.181	1.274	1.366	1.464	1.616	1.737
Dielectic losses	W/m	0.130	0.140	0.156	0.170	0.183	0.197	0.211	0.233	0.250
Current Ampacity										
Cable in ground	Amp.	177	205	252	302	340	380	429	494	555
Cable in free air	Amp.	200	240	290	360	405	455	520	610	690
Short circuit current										
Conductor S.C (1 Sec)	KA	5.0	7.15	10.0	13.5	17.1	21.4	26.4	3.44	42.9
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/STA/PVC, 18/30 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material
Metallic Screen	:	Copper tape (or Copper Wire)
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized steel tapes (or Steel Wire)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm²	mm	mm	mm	mm	kg/km
3x35	8.0	0.5	3.1	70.4	5770
3x50	8.0	0.5	3.2	73	6395
3x70	8.0	0.5	3.3	77.2	7440
3x95	8.0	0.5	3.4	80.1	8580
3x120	8.0	0.8	3.6	85.7	10405
3x150	8.0	0.8	3.7	89.2	11610
3x185	8.0	0.8	3.8	92.8	13005
3x240	8.0	0.8	4.0	98.6	15335
3x300	8.0	0.8	4.1	103.5	17685

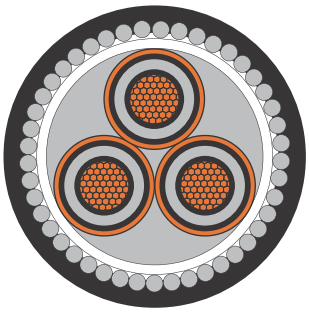
2. Electrical Data

Cross section Area	mm²	35	50	70	95	120	150	185	240	300
Screen Area	mm²	16	16	16	16	16	25	25	25	25
DC Resist at 20 °C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601
Ac Resist at 90 °C	Ω/km	0.668	0.494	0.342	0.247	0.196	0.159	0.1286	0.0993	0.0806
Inductance	mh/km	0.470	0.449	0.423	0.404	0.389	0.376	0.364	0.348	0.338
Capacitance	µF/km	0.133	0.143	0.159	0.174	0.188	0.201	0.216	0.238	0.256
Charging current	A/km	0.903	0.974	1.081	1.181	1.274	1.366	1.464	1.616	1.737
Dielectic losses	W/m	0.130	0.140	0.156	0.170	0.183	0.197	0.211	0.233	0.250
Current Ampacity										
Cable in ground	A	174	204	245	295	335	370	420	483	540
Cable in free air	A	199	235	287	350	400	450	505	590	655
Short circuit current										
Conductor S.C (1 Sec)	KA	5.0	7.15	10.0	13.5	17.1	21.4	26.4	3.44	42.9
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/SWA/PVC, 18/30 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or Copper Wire)
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized steel wires
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm2	mm	mm	mm	mm	kg/km
3x35	8.0	2.50	3.2	73.6	7852
3x50	8.0	3.15	3.4	78.7	9710
3x70	8.0	3.15	3.5	82.9	10905
3x95	8.0	3.15	3.6	86.6	12270
3x120	8.0	3.15	3.7	90	13385
3x150	8.0	3.15	3.8	93.5	14715
3x185	8.0	3.15	3.9	97.1	16235
3x240	8.0	3.15	4.1	102.9	18780
3x300	8.0	3.15	4.2	107.8	21290

2. Electrical Data

Cross section Area	mm2	35	50	70	95	120	150	185	240	300
Screen Area	mm2	16	16	16	16	16	25	25	25	25
DC Resist at 20 ^{O}C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601
Ac Resist at 90 ^{O}C	Ω/km	0.668	0.494	0.342	0.247	0.196	0.159	0.1286	0.0993	0.0806
Inductance	mh/km	0.470	0.449	0.423	0.404	0.389	0.376	0.364	0.348	0.338
Capacitance	µF/km	0.133	0.143	0.159	0.174	0.188	0.201	0.216	0.238	0.256
Charging current	A/km	0.903	0.974	1.081	1.181	1.274	1.366	1.464	1.616	1.737
Dielectic losses	W/m	0.130	0.140	0.156	0.170	0.183	0.197	0.211	0.233	0.250
Current Ampacity										
Cable in ground	A	174	204	245	295	330	370	420	470	520
Cable in free air	A	200	235	290	350	400	488	500	585	655
Short circuit current										
Conductor S.C (1 Sec)	KA	5.0	7.15	10.0	13.5	17.1	21.4	26.4	3.4	42.9
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58

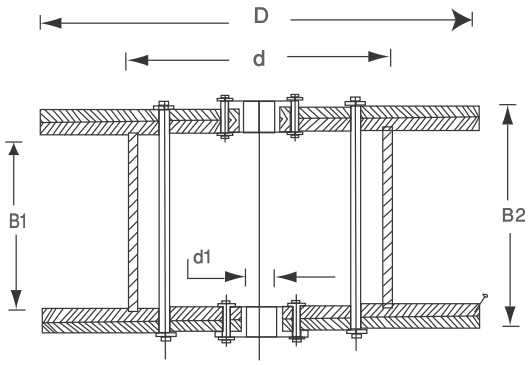
Conversion Table

Multiply	by	to obtain
WEIGHT - Imperial		
Ounces	28.3495	grams
Pounds (Av)	453.59	grams
Pounds (Av)	0.45359	kilograms
Tons (short)	907.19	kilograms
Tons (long)	1016.05	kilograms
WEIGHT - Metric		
Grams	0.03527	ounces
Grams	0.002205	pounds
Kilograms	35.274	ounces
Kilograms	2.2046	pounds
Kilograms	0.001102	tons (short)
Kilograms	0.0009842	tons (long)
MISCELLANEOUS - Imperial		
Pounds per 1000 feet	1.48816	kilograms per kilometer
Pounds per mile	0.28185	kilograms per kilometer
Pounds per square inch	0.0007031	kilograms per square millimeter
Pounds per square inch	0.07031	kilograms per square centimeter
Feet per second	18.288	meters per minute
Feet per second	1.09728	kilometers per hour
Mils per hour	1.60935	kilometers per hour
Ohms per 1000 feet	3.28083	ohms per kilometer
Ohms per mile	0.62137	ohms per kilometer
Decibels per 1000 feet	3.28083	decibels per kilometer
Decibels per mile	0.62137	decibels per kilometer
Decibles	0.1153	nepers
MISCELLANEOUS - Metric		
Kilograms per kilometer	0.67197	pounds per 1000 feet
Kilograms per kilometer	3.54795	pounds per mile
Kilograms per square millimeter	1422.34	pounds per square inch
Kilograms per square centimeter	14.2234	pounds per square inch
Grams per cubic cm	0.03613	pounds per cubic inch
Meters per minute	0.05468	feet per second
Kilometer per hour	0.91134	feet per second
Kilometer per hour	0.62137	miles per hour
Ohms per kilometer	0.3048	ohms per 1000 feet
Ohms per kilometer	1.6093	ohms per mile
Decibels per kilometer	0.3048	decibels per 1000 feet
Decibels per kilometer	1.6093	decibles per mile
TEMPERATURE		
°Fahrenheit	5/9 (°F)-32	°Celsius
°Celsius	9/5 (°C) + 32	°Fahrenheit

Multiply	by	to obtain
LENGTH - Imperial		
Mils	0.001	inches
Mils	0.0254	millimeters
Inches	1000	mils
Inches	25.40	millimeters
Inches	2.54	centimeters
Feet	30.48	centimeters
Feet	0.3048	meters
Feet (thousands of)	0.3048	kilometers
Yards	0.9144	meters
Mils	1.6093	kilometers
LENGTH - Imperial		
Millimeters	39.37	mils
Millimeters	0.03937	inches
Centimeters	0.3937	inches
Centimeters	0.032808	feet
Meters	39.37	inches
Meters	3.2808	feet
Meters	1.0936	yards
Kilometers	3280.83	feet
Kilometers	0.62137	mils
AREA - Imperial		
Square mils	1.2732	circular mills
Square mils	0.000001	square inches
Circular mils	0.7854	square mils
Circular mils	0.0000007854	square inches
Circular mils	0.00050657	square millimeters
Square inches	1000000	square mils
Square inches	1273240	circular mils
Square inches	645.16	square millimeters
Square inches	6.4516	square centimeters
Square inches	0.09290	square meters
Square inches	0.8361	square meters
AREA - Metric		
Square millimeters	1973.52	circular mills
Square millimeters	0.00155	square inches
Square centimeters	0.155	square inches
Square meters	10.7638	square feet
Square meters	1.19599	square yards
VOLUME - Imperial		
Cubic inches	16.38716	cubic centimeters
Cubic feet	0.028317	cubic meters
VOLUME - U.S.		
Quarts (liquid)	0.9463	cubic centimeters
Gallaons	3.7854	cubic meters
VOLUME - Metric		
Cubic centimeters	0.06102	cubic inches
Cubic meters	35.3145	cubic feet
Litres	1.05668	quarts (Liquid U.S.)
Litres	0.26417	gallons (U.S.)

Packing

International practice is to supply cables on wooden drums or as appropriate plastic spools. At the customers request we will also supply steel drums for improved on-site performance & handling.
The finished drums may be - when requested by our customer - closed with a continuous lagging with a wood having approximate thickness 2.00 mm.



Drum Dimensions:

D	d	d1	B1	B2
600	300	85	450	580
700	350	85	530	660
800	400	85	530	660
900	450	85	630	760
1000	500	85	630	772
1100	550	85	630	772
1200	600	85	850	992
1300	650	85	850	992
1400	700	85	850	992
1500	750	110	850	1020
1600	800	110	850	1020
1700	850	110	850	1020
1800	900	110	850	1032
1900	950	110	850	1032
2000	1000	110	980	1174
2100	1050	110	980	1174
2200	1100	110	1230	1274
2300	1150	110	1280	1432
2400	1200	110	1280	1482
2500	1250	110	1280	1482
2600	1300	110	1280	1432
2700	1350	110	1280	1482
2800	1400	110	1280	1482
2900	1450	110	1280	1482
3000	1500	110	1280	1482

Legend

D	=	Flange Diameter (mm)
d	=	Barrel Diameter (mm)
d1	=	Benz hole diameter (mm)
B1	=	Distance between flanges (mm)
B2	=	Overall Width (mm)

Selection Form: Medium Voltage Cables

This form needs to be filled in order to help Jeddah Cables Company prepare the right quotation:

Standard & Specification

- ☐ IEC
- ☐ BS
- ☐ Others: _____

Conductor:

Type:

- ☐ Copper
- ☐ Aluminum

Size (mm^2) _____

Number of Cores:

- ☐ Single Core
- ☐ Three Cores

Voltage Rating (Uo/U): _____

Metallic Shield Type:

- ☐ Copper Wire
- ☐ Copper Tape

Total Screen Area(mm^2): _____

Armoring Type (If Any):

Single Core Cables:

- ☐ Al Wire Armor (AWA)
- ☐ Double Al Tape Armor (ATA)

Three Core Cables:

- ☐ Steel Wire Armor (SWA)
- ☐ Double Steel Tape Armor (STA)

Jacket Type:

- ☐ PVC
- ☐ PE
- ☐ Low Smoke Halogen Free (LSHF)

Special Requirements: _____

_____

_____

P.O.Box 31248 Jeddah 21497, KSA **Tel.:** +966 2 636 0770 **Fax:** +966 2 636 4695
e-mail: info@cables.energya.com www.cables.energya.com

Jeddah cables COMPANY

P.O.Box 31248 Jeddah 21497, KSA
Tel.: +966 2 636 0770
Fax: +966 2 636 4695
e-mail: info@cables.energya.com
www.cables.energya.com

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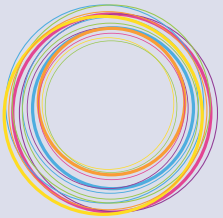


Jeddah cables COMPANY®
A Company of Energya Cables

Overhead Lines

elsewedy HELAL®

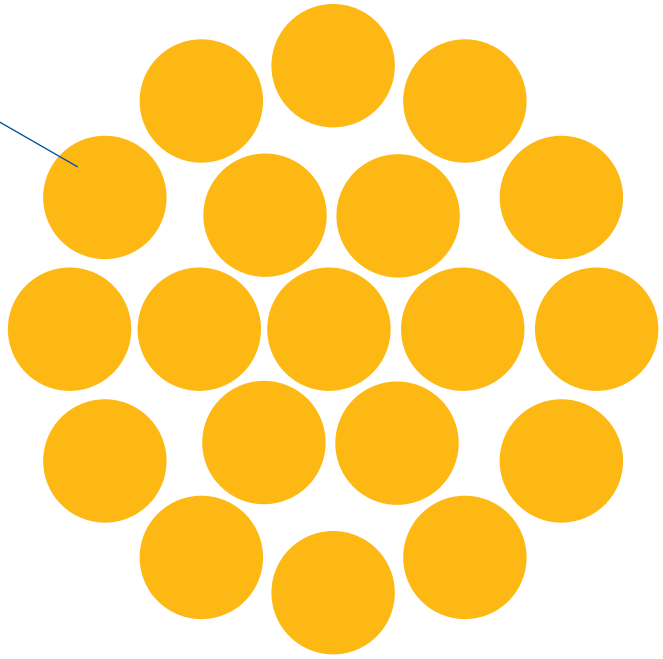
Introduction

Overhead lines are bare conductors that are used for earthing electrical systems (when soft drawn copper is used) and in transmission/distribution of high voltage electricity (when hard drawn copper and aluminum is used). Examples include:

- AAC (All Aluminum Conductors) used in short spans
- AAAC (All -Aluminum -Alloy Conductors)
- ACSR (Aluminium Conductor Steel Reinforced) used in large spans
- ACAR (Aluminium Conductor , Alloy Reinforced)

In this catalogue, we cover all technical aspects of Jeddah Cables Company Overhead Lines. We included Design Considerations such as conductor size, number of wires, and wire diameter. Cables Electrical Parameters such as Conductor DC Resistance are included as well.

Copper Wire (or Aluminum)



General Information

Standards

- The overhead lines described in this catalogue are all standard types, and their performance has been proved in operation.
- Construction and tests are all in accordance with recommendations of IEC, ASTM, DIN, and BS publications where applicable.
- Overhead lines in accordance to customer requirements and needs can be manufactured upon request.

Variation in Production and Delivery Options

- The provided data is approximate and subject to manufacturing tolerance
- Delivery length tolerance is ± 5%
- Other overhead line sizes are available upon customer request

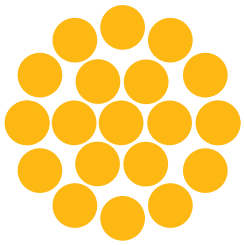
Electrical Parameters of Overhead Lines

DC Resistance

- The DC resistance of soft annealed copper conductors is based on 100% conductivity at 20°C with a corresponding resistivity of 0.017241 ohm.mm^2/m and a constant mass temperature coefficient at 20°C per Kelvin of 0.00393
- The DC resistance of hard drawn copper conductors is based on 97% conductivity at 20°C with a corresponding resistivity of 0.01771 ohm.mm^2/m and a constant mass temperature coefficient at 20°C per Kelvin of 0.00381
- The DC resistance of hard drawn aluminum conductors is based on volume resistivity of 0.028264 ohm.mm^2/m and a constant mass temperature coefficient at 20°C per Kelvin of 0.00403°C

Bare Copper Conductors

For grounding electrical systems and equipment

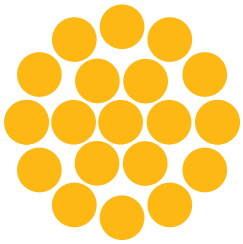


Standard : IEC 60228
Conductor : Soft annealed stranded copper wires
Packing : Coils or Non returnable wooden drums as per customer requirements

TECHNICAL INFORMATION

Nominal Cross Section	Number & nominal wire diameter	Approx. Overall diameter	Approx. Conductor weight	Max DC Resistance at 20°C
mm^2	NR x mm	mm	Kg/km	ohm/km
4	7x0.84	2.5	35	4.610
6	7x1.03	3.1	50	3.080
10	7x1.33	4.0	90	1.830
16	7x1.617	5.0	140	1.150
25	7x2.11	6.3	220	0.727
35	7x2.48	7.44	300	0.524
50	19x1.76	8.8	415	0.387
70	19x2.12	10.55	595	0.268
95	19x2.48	12.4	820	0.193
120	37x2.00	14.14	1060	0.153
150	37x2.22	15.6	1290	0.124
185	37x2.48	17.36	1600	0.0991
240	61x2.22	20.0	2130	0.0754
300	61x2.48	22.32	2645	0.0601
400	61x2.82	25.4	3455	0.0470
500	61x3.17	28.6	4365	0.0366

Bare Copper Conductors



For transmission and distribution in electrical networks

Standard : DIN 48201-Part 1
Conductor : Hard drawn stranded copper wires
Packing : Non returnable wooden drums as per customer requirements

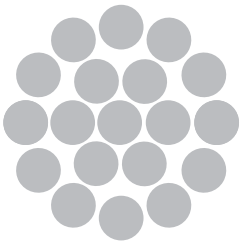
TECHNICAL INFORMATION

Nominal Cross Section	Number & nominal wire diameter	Approx. Overall diameter	Approx. Conductor weight	Max DC Resistance at 20°C	Calculated Breaking Load
mm^2	NR x mm	mm	Kg/km	ohm/km	KN
10	7x1.35	4.05	90	1.8060	4.1
16	7x1.70	5.1	145	1.1385	6.5
25	7x2.10	6.3	220	0.7461	9.9
35	7x2.50	7.5	310	0.5264	14.0
50	19x1.80	9.0	435	0.3759	19.8
70	19x2.10	10.5	595	0.2762	26.9
95	19x2.50	12.5	845	0.1949	38.1
120	19x2.80	14.0	1065	0.1554	47.8
150	37x2.25	15.7	1335	0.1238	60.1
185	37x2.50	17.5	1650	0.1003	74.2
240	61x2.25	20.2	2210	0.0753	99.0
300	61x2.50	22.5	2725	0.0610	122.3
400	61x2.89	26.0	3640	0.0456	163.4
500	61x3.23	29.1	4545	0.0365	204.2

All Aluminum Conductors (AAC)

For transmission and distribution in electrical networks with relatively short spans

Standard : DIN 48201- Part 5, BS 215
Conductor : Hard drawn stranded aluminum wires
Packing : Non returnable wooden drums as per customer requirements



TECHNICAL INFORMATION

A-According To DIN 48201

Nominal Cross Section	Number & nominal wire diameter	Approx. Overall diameter	Approx. Conductor weight	Max DC Resistance at 20°C	Calculated Breaking Load
mm²	NR x mm	mm	Kg/km	ohm/km	KN
16	7x1.70	5.1	45	1.8017	2.84
25	7x2.10	6.3	65	1.1807	4.17
35	7x2.50	7.5	95	0.8331	5.78
50	7x3.00	9.0	135	0.5786	7.94
50	19x1.80	9.0	135	0.5949	8.45
70	19x2.10	10.5	180	0.4371	11.32
95	19x2.50	12.5	255	0.3084	15.68
120	19x2.80	14.0	320	0.2459	18.78
150	37x2.25	15.7	405	0.1960	25.30
185	37x2.50	17.5	500	0.1587	30.54
240	61x2.25	20.2	670	0.1191	39.51
300	61x2.50	22.5	825	0.09649	47.70
400	61x2.89	26.0	1105	0.07220	60.86
500	61x3.23	29.1	1380	0.05781	74.67
630	91x2.96	32.6	1730	0.04625	95.25

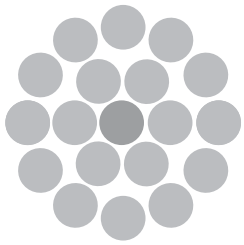
B-According To BS 215

Code Name	Nominal Cross Section	Number & nominal wire diameter	Approx. Overall diameter	Approx. Conductor weight	Max DC Resistance at 20°C	Calculated Breaking Load
Name	mm²	NR x mm	mm	Kg/km	ohm/km	KN
MIDGE	22	7X2.06	6.18	64	1.227	3.99
ANT	50	7X3.10	9.30	145	0.5419	8.28
FLY	60	7X3.40	10.2	174	0.4505	9.90
WASP	100	7X4.39	13.17	290	0.2702	16.0
HORNET	150	19X3.25	16.25	434	0.1825	25.7
CHAFER	200	19X3.78	18.9	587	0.1349	32.4
COCKROACH	250	19X4.22	21.1	731	0.1083	40.0
BUTTERFLY	300	19X4.65	23.25	888	0.08916	48.75
CENTIPEDE	400	19X3.78	26.46	1145	0.06944	56.10

Aluminum Conductors Steel Reinforced (ACSR)

For transmission and distribution in electrical networks over long spans

Standard : ASTM B 232
Conductor : A center galvanized steel wire(s) and Hard drawn stranded aluminum wires*
Packing : Non returnable wooden drums as per customer requirements



TECHNICAL INFORMATION

Code Name	Nominal Cross Section	Number & nominal wire diameter N*d (mm)		Approx. Overall diameter	Approx. Conductor weight Kg/km		Max DC Resistance at 20°C	Calculated Breaking Load
Name	mm^2	Al	Steel	mm	Al	Steel	ohm/km	KN
GROUSE	40.5	8*2.54	1*4.24	9.3	110	110	0.7112	23.1
PETREL	51.6	12*2.34	7*2.34	11.7	140	235	0.5614	46.2
MINORCA	56.1	12*2.44	7*2.44	12.2	155	255	0.5163	50.2
LEGHORN	68.2	12*2.69	7*2.69	13.45	190	310	0.4248	60.5
GUINEA	80.4	12*2.92	7*2.92	14.6	225	370	0.3605	71.1
DOTTEREL	89.4	12*3.08	7*3.08	15.4	250	410	0.3240	76.9
DORKING	96.5	12*3.20	7*3.20	16	265	445	0.3002	83.1
BRAHMA	102.8	16*2.86	19*2.48	18.1	285	720	0.2819	126.3
COCHIN	107.1	12*3.37	7*3.37	16.9	300	490	0.2707	92.0
TURKEY	13.3	6*1.70	1*1.70	5.0	35	15	2.157	5.3
SWAN	21.2	6*2.12	1*2.12	6.36	60	25	1.3545	8.3
SWANATE	21.1	7*1.96	1*2.61	6.5	60	45	1.3583	10.5
SPARROW	33.6	6*2.67	1*2.67	8.0	90	45	0.8540	12.7
SPARATE	33.5	7*2.47	1*3.30	8.3	90	70	0.8553	16.1
ROBIN	42.4	6*3.00	1*3.00	9.0	115	55	0.6764	15.8
RAVEN	53.5	6*3.37	1*3.37	10.1	150	70	0.5360	19.4
QUAIL	67.4	6*3.78	1*3.78	11.4	190	90	0.4261	23.6
PIGEON	85.1	6*4.25	1*4.25	12.7	235	110	0.337	29.4
PENGUIN	107.2	6*4.77	1*4.77	14.3	295	140	0.2676	37.1
WAXWING	135.0	18*3.09	1*3.09	15.5	375	60	0.2136	30.3
PARTIRIDGE	134.9	26*2.57	7*2.0	16.3	374	175	0.2148	50.2
OSTRICH	152.2	26*2.73	7*2.12	17.3	420	195	0.1904	56.6
MERLIN	170.2	18*3.47	1*3.47	17.4	470	75	0.1694	38.2
LINNET	170.6	26*2.89	7*2.25	18.3	475	215	0.1699	62.8
ORIOLE	170.5	30*2.69	7*2.69	18.8	475	315	0.1703	77.4
CHICKADDEE	200.9	18*3.77	1*3.77	18.9	545	85	0.1435	44.3
BRANT	201.6	24*3.27	7*2.18	19.6	560	205	0.1437	64.7
IBIS	201.3	26*3.14	7*2.44	19.8	560	255	0.1439	72.1
LARK	200.9	30*2.92	7*2.92	20.5	560	370	0.1446	90.3
PELICAN	241.70	18*4.14	1*4.14	20.7	657	105	0.1190	52.3
FLICKLER	241.6	24*3.58	7*2.39	21.5	670	245	0.1199	76.8
HAWK	241.7	26*3.44	7*2.67	21.8	670	310	0.1199	86.4
HEN	241.3	30*3.20	7*3.20	22.4	670	440	0.1204	105.2
OSPREY	282.5	18*4.47	1*4.47	22.3	780	125	0.1021	61.0
PARAKEET	282.3	24*3.87	7*2.58	23.2	785	285	0.1026	88.3
DOVE	282.6	26*3.72	7*2.89	23.5	780	360	0.1025	101.1

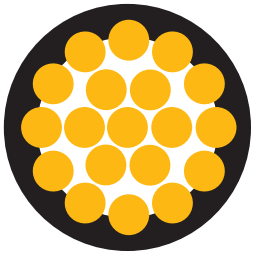
* Grease may be applied for anti-corrosive purposes if required.

Aluminum Conductors Steel Reinforced (ACSR)

TECHNICAL INFORMATION

Code Name	Nominal Cross Section	Number & nominal wire diameter N*d (mm)		Approx. Overall diameter	Approx. Conductor weight Kg/km		Max DC Resistance at 20°C	Calculated Breaking Load
Name	mm^2	Al	Steel	mm	Al	Steel	ohm/km	KN
EAGLE	282.6	30*3.45	7*3.45	24.15	775	511	0.1030	1229
PEACOCK	306.1	24*4.03	7*2.69	24.2	850	310	0.0946	95.9
SWAB	305.8	26*3.87	7*3.01	24.5	850	390	0.0947	108.1
WOODDUCK	307.1	30*3.61	7*3.61	25.3	850	660	0.0946	129.0
TEAL	307.1	30*3.61	19*2.16	25.21	850	550	0.0946	133.4
SWIFT	323.0	36*3.38	1*3.38	23.7	890	70	0.0893	60.7
KINGBIRD	323.0	18*4.78	1*4.78	23.9	890	140	0.0893	69.7
ROOK	323.1	24*4.14	7*2.76	24.8	895	325	0.0897	101.0
GROSSBEAK	322.7	26*3.97	7*3.09	25.12	895	410	0.0900	111.9
SCOTER	322.7	30*3.70	7*3.70	25.9	895	600	0.0900	135.5
EGRET	322.6	30*3.70	19*2.22	25.9	895	575	0.0900	140.6
FLAMINGO	337.3	24*4.23	7*2.82	25.4	935	345	0.859	105.5
GANNET	338.3	26*4.07	7*3.16	25.8	935	430	0.0857	117.3
STILT	363.3	24*4.39	7*2.92	26.3	1005	370	0.0798	113.3
STARLING	361.9	26*4.21	7*3.28	26.68	1005	460	0.0800	126.0
REDWING	362.1	30*3.92	19*2.35	27.5	1005	645	0.0802	153.7
CUCKOO	402.8	24*4.62	7*3.08	27.72	1115	440	0.0720	123.8
DRAKE	402.6	26*4.44	7*3.45	28.11	1115	510	0.0720	139.7
TERN	402.8	45*3.38	7*2.25	27.03	1120	220	0.0718	97.5
COOT	401.9	36*3.77	1*3.77	26.4	1110	90	0.0717	74.7
CONDOR	402.8	54*3.08	7*3.08	27.72	1116	410	0.0720	124.3
MALLARD	403.8	30*4.14	19*2.48	29.0	1120	720	0.0719	171.2
RUDDY	455.5	45*3.59	7*2.40	28.7	1265	245	0.0636	109.4
CANARY	456.4	54*3.28	7*3.28	29.52	1265	460	0.0635	141.0
RAIL	483.4	45*3.70	7*2.47	29.61	1340	260	0.0599	116.1
CATIBIRD	484.6	36*4.14	1*4.14	29.0	1335	105	0.0595	87.9
CARDINAL	484.5	54*3.38	7*3.38	30.4	1340	490	0.0598	149.7
ORTOLAN	523.9	45*3.85	7*2.57	30.8	1450	285	0.0553	123.3
TANAGER	522.8	36*4.30	1*4.30	30.1	1445	115	0.0551	94.8
CURLEW	522.5	54*3.51	7*3.51	31.59	1440	530	0.0554	161.5
BLUEJAY	564.0	45*4.00	7*2.66	32.0	1565	305	0.0512	132.7
FINCH	565.0	54*3.65	19*2.19	32.8	1570	560	0.0515	174.6
BUNTING	605.8	45*4.14	7*2.76	33.1	1675	325	0.0478	142.4
GRAKCLE	602.8	54*3.77	19*2.27	34.0	1680	600	0.0483	186.9
BITTERN	644.4	45*4.27	7*2.85	43.2	1785	350	0.0450	151.6
PHEASANT	645.1	54*3.90	19*2.34	35.1	1785	640	0.0451	194.1
SKYLARK	643.3	36*4.77	1*4.77	33.4	1775	140	0.0448	116.7
DIPPER	684.2	45*4.40	7*2.93	35.2	1895	370	0.0423	160.7
MARTIN	685.4	54*4.02	19*2.41	36.2	1905	680	0.0425	206.1
BOBOLINK	725.2	45*4.53	7*3.02	36.3	2010	390	0.0399	170.5
PLOVER	726.9	54*4.14	19*2.48	37.2	2020	720	0.0401	218.4
NUTHATCH	746.2	45*4.65	7*3.10	37.2	2120	415	0.0379	177.6
PARROT	766.1	54*4.25	19*2.55	38.2	2130	760	0.0380	230.5
LAPWING	807.5	45*4.78	7*3.18	38.2	2230	435	0.0359	187.4
FALCON	806.2	54*4.36	19*2.62	39.2	2240	800	0.0361	243.0

PVC Insulated Hard Drawn Copper Conductors



For overhead power lines when crossing telecommunication Lines

Type : Type 8 (or Type 16)*
Standard : BS 6485
Conductor : Hard drawn standed copper wires
Insulation : PVC compound**
Packing : Non returnable wooden drums as per customer requirements

TECHNICAL INFORMATION

Type 8

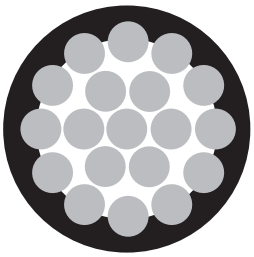
Nominal Cross Section	Number & nominal wire diameter	Minimum insulation Thickness	Approx. Overall diameter	Approx. Conductor weight	Max DC Resistance at 20°C
mm^2	NR x mm	mm	mm	Kg/km	ohm/km
10	7x1.35	0.8	6.05	115	1.890
16	7x1.70	0.8	7.1	180	1.190
25	7x2.14	0.8	8.42	265	0.749
35	7x2.50	0.8	9.5	355	0.540
50	7x3.0	0.8	11	515	0.399
50	19x1.80	0.8	11.0	505	0.399
70	19x2.10	0.8	12.5	565	0.276
95	19x2.50	0.8	14.5	950	0.199
120	19x2.50	0.8	16.0	1180	0.158
150	37x2.25	0.8	17.8	1460	0.128
185	37x2.50	0.8	19.5	1790	0.102

*Insulation color is black for Type 8, green for Type 16, or other colors as per customer requirements

**Type 16 (increased insulation thickness) overhead lines are available.

PVC Insulated Hard Drawn Aluminum Conductors

For overhead power lines when crossing telecommunication Lines



Type : Type 8 (or Type 16)*
Standard : BS 6485
Conductor : Hard drawn standed copper wires
Insulation : PVC compound**
Packing : Non returnable wooden drums as per customer requirements

TECHNICAL INFORMATION

Nominal Cross Section	Number & nominal wire diameter	Minimum insulation Thickness	Approx Overall diameter	Approx Conductor weight	Max DC Resistance at 20°C
mm^2	NR x mm	mm	mm	Kg/km	ohm/km
16	7x1.70	0.8	7.1	80	1.8017
25	7x2.10	0.8	8.3	115	1.1807
35	7x2.50	0.8	9.5	145	1.8331
50	7x3.10	0.8	11.3	195	0.5786
50	19x1.80	0.8	11.0	200	0.5949
70	19x2.10	0.8	12.5	250	0.4371
95	19x2.50	0.8	14.5	335	0.3084
120	19x2.80	0.8	16.0	415	0.2459
150	37x2.25	0.8	17.75	512	0.1960
185	37x2.50	0.8	19.5	605	0.1587

*Insulation color is black for Type 8, green for Type 16, or other colors as per customer requirements

**Type 16 (increased insulation thickness) overhead lines are available.

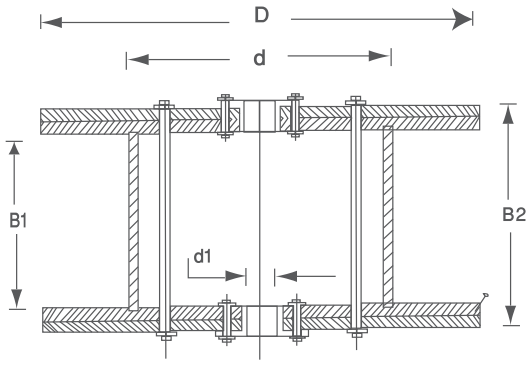
Conversion Table

Multiply	by	to obtain
WEIGHT - Imperial		
Ounces	28.3495	grams
Pounds (Av)	453.59	grams
Pounds (Av)	0.45359	kilograms
Tons (short)	907.19	kilograms
Tons (long)	1016.05	kilograms
WEIGHT - Metric		
Grams	0.03527	ounces
Grams	0.002205	pounds
Kilograms	35.274	ounces
Kilograms	2.2046	pounds
Kilograms	0.001102	tons (short)
Kilograms	0.0009842	tons (long)
MISCELLANEOUS - Imperial		
Pounds per 1000 feet	1.48816	kilograms per kilometer
Pounds per mile	0.28185	kilograms per kilometer
Pounds per square inch	0.0007031	kilograms per square millimeter
Pounds per square inch	0.07031	kilograms per square centimeter
Feet per second	18.288	meters per minute
Feet per second	1.09728	kilometers per hour
Mils per hour	1.60935	kilometers per hour
Ohms per 1000 feet	3.28083	ohms per kilometer
Ohms per mile	0.62137	ohms per kilometer
Decibels per 1000 feet	3.28083	decibels per kilometer
Decibels per mile	0.62137	decibels per kilometer
Decibles	0.1153	nepers
MISCELLANEOUS - Metric		
Kilograms per kilometer	0.67197	pounds per 1000 feet
Kilograms per kilometer	3.54795	pounds per mile
Kilograms per square millimeter	1422.34	pounds per square inch
Kilograms per square centimeter	14.2234	pounds per square inch
Grams per cubic cm	0.03613	pounds per cubic inch
Meters per minute	0.05468	feet per second
Kilometer per hour	0.91134	feet per second
Kilometer per hour	0.62137	miles per hour
Ohms per kilometer	0.3048	ohms per 1000 feet
Ohms per kilometer	1.6093	ohms per mile
Decibels per kilometer	0.3048	decibels per 1000 feet
Decibels per kilometer	1.6093	decibles per mile
TEMPERATURE		
°Fahrenheit	5/9 (°F)-32	°Celsius
°Celsius	9/5 (°C) + 32	°Fahrenheit

Multiply	by	to obtain
LENGTH - Imperial		
Mils	0.001	inches
Mils	0.0254	millimeters
Inches	1000	mils
Inches	25.40	millimeters
Inches	2.54	centimeters
Feet	30.48	centimeters
Feet	0.3048	meters
Feet (thousands of)	0.3048	kilometers
Yards	0.9144	meters
Mils	1.6093	kilometers
LENGTH - Imperial		
Millimeters	39.37	mils
Millimeters	0.03937	inches
Centimeters	0.3937	inches
Centimeters	0.032808	feet
Meters	39.37	inches
Meters	3.2808	feet
Meters	1.0936	yards
Kilometers	3280.83	feet
Kilometers	0.62137	mils
AREA - Imperial		
Square mils	1.2732	circular mills
Square mils	0.000001	square inches
Circular mils	0.7854	square mils
Circular mils	0.0000007854	square inches
Circular mils	0.00050657	square millimeters
Square inches	1000000	square mils
Square inches	1273240	circular mils
Square inches	645.16	square millimeters
Square inches	6.4516	square centimeters
Square inches	0.09290	square meters
Square inches	0.8361	square meters
AREA - Metric		
Square millimeters	1973.52	circular mills
Square millimeters	0.00155	square inches
Square centimeters	0.155	square inches
Square meters	10.7638	square feet
Square meters	1.19599	square yards
VOLUME - Imperial		
Cubic inches	16.38716	cubic centimeters
Cubic feet	0.028317	cubic meters
VOLUME - U.S.		
Quarts (liquid)	0.9463	cubic centimeters
Gallaons	3.7854	cubic meters
VOLUME - Metric		
Cubic centimeters	0.06102	cubic inches
Cubic meters	35.3145	cubic feet
Litres	1.05668	quarts (Liquid U.S.)
Litres	0.26417	gallons

Packing

International practice is to supply cables on wooden drums or as appropriate plastic spools. At the customers request we will also supply steel drums for improved on-site performance & handling.
The finished drums may be - when requested by our customer - closed with a continuous lagging with a wood having approximate thickness 2.00 mm.



Drum Dimensions:

D	d	d1	B1	B2
600	300	85	450	580
700	350	85	530	660
800	400	85	530	660
900	450	85	630	760
1000	500	85	630	772
1100	550	85	630	772
1200	600	85	850	992
1300	650	85	850	992
1400	700	85	850	992
1500	750	110	850	1020
1600	800	110	850	1020
1700	850	110	850	1020
1800	900	110	850	1032
1900	950	110	850	1032
2000	1000	110	980	1174
2100	1050	110	980	1174
2200	1100	110	1230	1274
2300	1150	110	1280	1432
2400	1200	110	1280	1482
2500	1250	110	1280	1482
2600	1300	110	1280	1432
2700	1350	110	1280	1482
2800	1400	110	1280	1482
2900	1450	110	1280	1482
3000	1500	110	1280	1482

LEGEND

D	=	Flange Diameter	(mm)
d	=	Barrel Diameter	(mm)
d1	=	Benz hole diameter	(mm)
B1	=	Distance between flanges	(mm)
B2	=	Overall Width	(mm)

Selection form: Overhead Lines

This form needs to be filled in order to help Jeddah Cables Company prepare the night quitation

Standard & Specification

- ☐ IEC
- ☐ BS
- ☐ ASTM
- ☐ Others _____

Cu Conductor

- Size (mm^2 , AWG or kcmil) _____
- Code name _____
- Conductor Type

- ☐ Bare Soft Copper
- ☐ Bare Hard Copper
- ☐ AAC (All Aluminum Conductor)
- ☐ ACSR (All Aluminum Conductor Steel Reinforced)
- ☐ ACSR / AW (All Aluminum Conductor Aluminum Clad Steel Reinforced)
- ☐ PVC Insulated Hard Drawn Copper
  - ☐ Type 8
  - ☐ Type 16
- ☐ PVC Insulated Hard Drawn Aluminum
  - ☐ Type 8
  - ☐ Type 16

Special Requirements _____

_____

_____

P.O.Box 31248 Jeddah 21497, KSA **Tel.:** +966 2 636 0770 **Fax:** +966 2 636 4695
e-mail: info@cables.energya.com www.cables.energya.com

Jeddah cables COMPANY

P.O.Box 31248 Jeddah 21497, KSA
Tel.: +966 2 636 0770
Fax: +966 2 636 4695
e-mail: info@cables.energya.com
www.cables.energya.com

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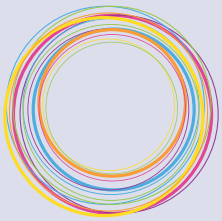

Jeddah cables COMPANY®
A Company of Energya Cables

Low Voltage Cables

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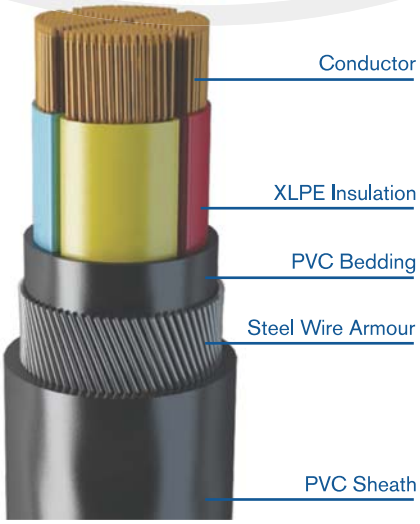
Introduction

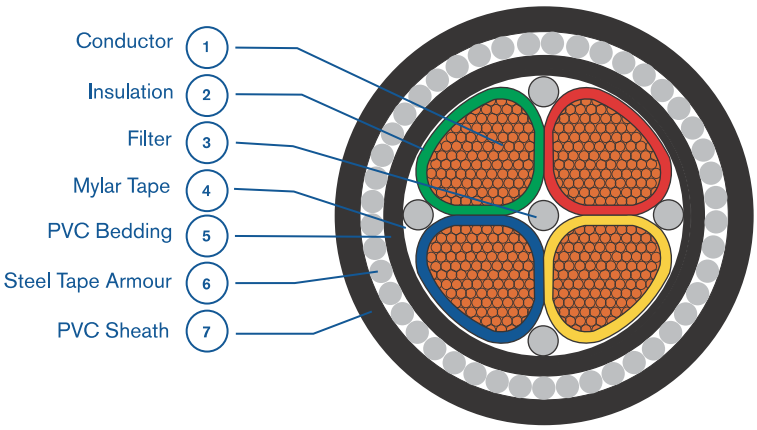
Low Voltage Power Cables are used to transmit electrical energy from one location to another. Low Voltage Power Cables are usually employed in the distribution process of electricity to various loads such as house holds.

In this catalogue, we cover all technical aspects of Jeddah Cable Company Low Voltage Power Cables. We included design considerations such as type of insulation material (i.e. PVC and XLPE), insulation thickness, type of armour ,armour diamensions, sheath material and sheath thickness. Cables Electrical Parameters such as Conductor DC Resistance and current ratings are included as well.

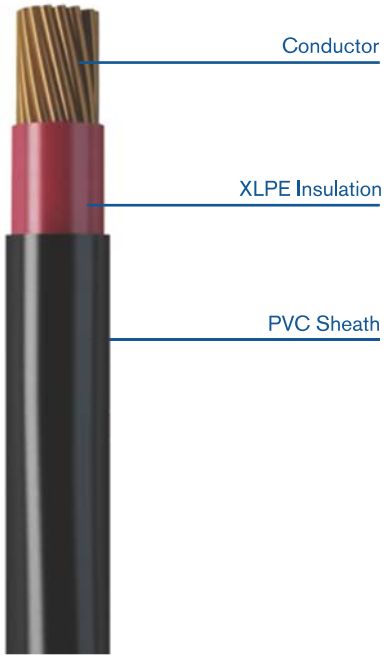
Jeddah Cable Company Low Voltage Power Cables are manufactured based on international standards such as IEC 60502-1, BS 5467and BS 6346. We are also capable of manufacturing according to client requirements and needs.

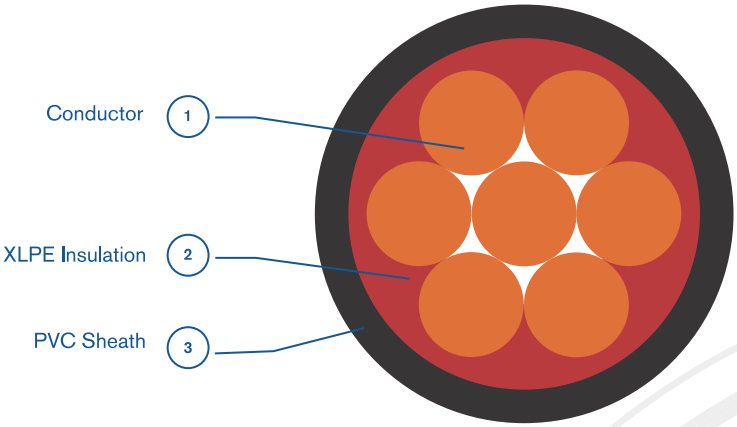
Low Voltage Cables





Sector Shape 4 Cores





Round Shape 1 Core

Low Voltage Power Cables - Design and Testing

Low voltage power cables are normally either single core or multi-core (i.e three-core or four-core).

- Conductor Design

  Conductors are made of copper or aluminum . They are circular stranded, compacted or non-compacted, or shaped (i.e. sectors). Our conductor design is in compliance with the requirements of IEC 60228 and BS 6360 specifications.

- Insulation

  - XLPE material, and complies with the requirements of IEC 60502-1 and BS 5467 Specifications.
  - PVC material, and complies with the requirements of IEC 60500-1, BS 6346, and SASO 1694 specifications.

Assembly

All cable cores are laid-up together with usage of non-hygroscopic filler material and are temperature compatible with all different cable layers such as insulation, bedding, and sheath.

Armoring

Armoring material can be either Aluminum for single core cables or Steel for multi-core cables. Armor can be either wires or tape .Our cable armoring is in compliance with the requirements of IEC 60502-1, BS 5467, and BS 6346 Specifications.

Ourter Sheath / Jacket

Our cables sheathes are made of extruded layers of PVC or PE material and is in compliance with the requirements of IEC 60502-1 and BS 7655 Specifications . We are also capable of providing cable sheaths with special requirements to be:

- Termite retardant
- Oil & Gasoline retardant
- Ozone / acid / alkali retardant
- Flame retardant and in compliance with requirements of IEC 60332-1 and IEC 61034-2
- Low Smoke Halogen Free and in compliance with requirements of BS 7211 and BS 6724.

Testing of Low Voltage Power Cables

We Jeddah Cable Company are capable of performing all standard routine tests and sample tests that are normally carried out in accordance to IEC 60502 standards. We have all necessary equipment for such tests such as high voltage labs and special oven. We are also capable of performing tests in accordance with international or national requirements as agreed upon with our customers.

- Routine Tests
  - Voltage Test
  - Measurement of the electrical resistance of conductors
- Sample Tests
  - Conductor examination
  - Check of dimensions
  - Hot set test for XLPE insulations

General Information

Selecting A Power Cables

The following factors are important when selecting a suitable cable construction which is required to transport electrical energy from the power station to the consumer:

- Maximum operating voltage
- Insulation level
- Frequency
- Load to be carried
- Magnitude and duration of possible overload
- Magnitude and duration of short-circuit current
- Voltage drop
- Length of line
- Mode of installation
  * underground (direct or in ducts)
  * in air
- Chemical and physical properties of soil
- Max. and min. ambient air temperature and soil temperatures
- Specification and requirements to be met

Voltage

The standard rated voltage of a cable is denoted by U_O/U (Um), i.e. "0.6/1 (1.2)" where:
U_O: is the rated power-frequency voltage between conductor and earth
U: is the rated power-frequency voltage between conductors.
Um: is the maximum continuously permissible operating voltage of a cable at any time or in any part of the network.

Standards

The cables described in this catalogue are all standard types, and their performance has been proved in operation. Construction and tests are in accordance with the recommendation of IEC publications where applicable.
Power cables in accrdance to other standards (e.g. BS, VDE, NEMA) can be manufactured upon customer's request.

Variation in Production and Delivery Options

- The provided data are approximate
- Delivery length tolerance is ± 5% and subject to manufacturing tolerance
- Other sizes are available upon request.

Jacket Marking

Standard embossed outer jacket marking consisting of:
1 - Name of manufacturer
2 - Type designation, size of conductor, rated voltage and standard.
3 - Continuous length marking every meter.
4 - Year of manufacture.

Laying Information

Minimum Bending Radius During Installation

During laying, the bending radius should not be smaller than values given below.
The radius depends on the outer diameter (Do) of the cable.

PVC and XLPE insulated Cables up to 3.6 kV

Conductor	Construction	Outer diameter (mm)	Min. Radius
Stranded aluminum or copper	Armoured or Unarmoured	Any	8 Do

Maximum Tensile Forces During laying

Means of Pulling	Type of Cable	Formula	Factor
With pulling head attached to the conductors	All types of cables	$P = \sigma . A$	$\sigma = 50\ N/mm^2$ (Copper conductor) $\sigma = 30\ N/mm^2$ (Al conductor)
with pulling stocking	Un-armoured cables	$P = \sigma . A$	$\sigma = 50\ N/mm^2$ (Copper conductor) $\sigma = 30\ N/mm^2$ (Al conductor)
	Armoured cables	$P = k . d^2$	$k = 9N/mm$

P = Pull in N
A = Total cross sectional area in mm^2 of all conductors
d = Outside diameter of the cable in mm
σ = Permissible tensile stress of conductor in N/mm^2
k = Emperically derived factor in N/mm^2

Electrical Parameters Of The Cables

DC Resistance of Conductor

The Maximum DC resistance values of conductors at 20°C are as per "IEC 60228" standard.

DC resistance per unit length of the conductor at other conductor temperature is given by:

$$R = R_o [1 + \alpha_{20°C} (t - 20°C)]$$

Where :

R = DC resistance at temperature t °CΩ/km

Ro = D.C resistance at temperature 20°C

Ω/km (given in the relative tables for each type of cable)

t = Conductor temperature °C

$\alpha_{20°C}$ = Temperature coefficient at 20°C 1/°C

For copper conductor $\alpha_{20°C} = 0.00393$

For aluminum conductor $\alpha_{20°C} = 0.00403$

A.C. Resistance of Conductor

The AC Resistance per unit length of the conductor (effective resistance) at its maximum operating temperature is made up of the DC resistance at this temperature and the extra resistance which takes into account additional losses caused by the current displacement in the conductor (skin effect, proximity effect). The AC resistance is given in the relative tables for each type of cable.

Inductance

The values of the inductance for both multi cores and three single core cables have been calculated based on the following equation

L = K+0.2 In (2S /d) (mH/km)

Where:

K = a constant relating to the conductor formation (mH/km).

d = the conductor diameter (mm)

S = axial spacing between conductors for cables in trefoil formation (mm)

= 1.26 x axial spacing between conductors for cables in flat formation (mm)

The values for inductance of single core cables has been calculated based on one cable diameter between cables in flat formation.

Operation Capacitance

The values of operating capacitance for cables has been calculated based on the following presump-

$$C = \frac{\varepsilon r}{18 \text{ In } (D / d)} (\mu f/km)$$

Where :

εr = Relative permativity of insulation

D = External diameter of insulation (mm)

d = Conductor diameter (mm)

Operation Temperature for XLPE Insulated Cables

90°C for continuous normal operation

105°C for emergency overload conditions.

250°C for short circuit conditions .

Voltage Drop

When current flows in a cable conductor, there is a voltage drop between the ends of the conductor which is the product of the current and the impedance . The following equations should be used to calculate the voltage drop:

1- Single phase system

$V_d = 2(R \cos\phi + X \sin\phi)$ (Volt/amp/meter)

2-Three phase system

$V_d = \sqrt{3}(R \cos\phi + X \sin\phi)$ (Volt/amp/meter)

Where:

V_d = Voltage drop (V/A.m)

R = AC resistance of conductor at a maximum conductor temperature (Ω/km)

X = Inductive reactance of cable (Ω/km)

$\cos\phi$ = power factor of load

* Voltage drop data for L.V cables are tabulated in tables 16 to 23.

Cable Short Circuit Capacity

The permissible short-circuit as presented in tables 12 to 15 are calculated in accordance with IEC 724, which are based on the following conditions:

1- Short circuit starts from the maximum operating temperature.

2- Maximum temperature during short circuit XLPE = 250 °C, PVC =160°C

3- Maximum short circuit current duration is 5 seconds.

The short - circuit current (I) shall be calculated from the formula.

$$I_2 = \frac{K^2 \times S^2}{T} \times \ln\left[\frac{\theta_1 + ß}{\theta_2 + ß}\right]$$

Where:

I = Short circuit current (A)

T = Duration of short circuit (Second)

K = Constant for the material of the conductor

S = Area of conductor (mm^2)

θ_1 = Final temperature (°C)

θ_2 = Initial temperature (°C)

ß = Reciprocal of the temperature coefficient of resistance ( ) of the conductor.

Current Ratings

Recommendations For Currnet Ratings

The current rating of power cables is defined by the maximum intensity of current (in amperes), which can flow continuously through the cable, under permanent loading conditions without any risk of damaging the insulation or deterioration of its electrical properties.

- Current carrying capacities have been calculated in accordance with IEC 60287 (calculation of the continous current rating of cables)
- The values given in the tables are valid for one circuit in three phase system under conditions specified. For grouping cables rating factors must be used.

- It is to be observed that the current carrying capacities presented in JCC technical data sheets are intended as a guide to assist operating engineers in selecting cables for safety and reliability.

- Basic assumptions and conditions of installation:
* Ambient ground temperature: 20°C
* Ambient air temperature : 30°C
* Depth of cable burial : 1.0 m
* Thermal resistivity of soil : 120°C. cm/ W
- Cables in air are assumed to be proteced from direct solar radiation.

- Single core cables are installed as indicated in the technical information tables . Spacing between cables in flat fromation is assumed to be one cable diameter.
- For three and four core cables, it is usual to assume the same current carrying capacity for four cores cables as for three core cables. Our calculated values are based actually on three core cables. These values are suitable with enough accuracy also for four cores cables in most cases.

- The inner diameter of ducts has been assumed to be at least 1.5 times the diamter of the cables.

To obtain the maximum current carrying capacity of a cable operating at different conditions from the standards, you have to mulitply the values of the current given in the technical information for the corresponding cable by the rating factors mentioned in the tables from 1 to 11, as follows:

Ia = Kt. Is in amperes
where:
Ia : Current rating at actual operating conditions (amperes)
Is : Current rating at standard operating condtions (amperes).
Kt : Rating factor given in the tables 1 to 11. it has to be noted that Kt is the total rating factor : Kt = K1 K2 ...Kn
You may have a multiplication of so many partial rating factors, as many as the difference of laying and operating conditions from standard conditions.

Table 1
RATING FACTORS K FOR VARIATION IN GROUND TEMPERATURE

GROUND TEMPERATURE °C	20	25	30	35	40	45	50	55
PVC cables rated 70°C	1.00	0.95	0.90	0.84	0.78	0.71	0.63	0.54
PVC cables rated 85°C	1.00	0.96	0.92	0.87	0.83	0.78	0.73	0.67
XLPE cables rated 90°C	1.00	0.96	0.92	0.88	0.84	0.79	0.75	0.70

Table 2
RATING FACTORS K FOR VARIATION IN AIR TEMPERATURE

AIR TEMPERATURE °C	25	30	35	40	45	50	55
PVC cables rated 70°C	1.07	1.00	0.93	0.87	0.79	0.70	0.61
PVC cables rated 85°C	1.04	1.00	0.95	0.90	0.85	0.80	0.74
XLPE cables rated 90°C	1.04	1.00	0.96	0.91	0.87	0.82	0.76

Table 3
RATING FACTORS K FOR VARIATION IN GROUND DEPTH

DEPTH OF LAYING (m)	0.6	0.7	0.8	0.9	1.0	1.1	1.2
k	1.05	1.03	1.02	1.01	1.0	0.99	0.98

Table 4
RATING FACTORS K FOR VARIATION IN SOIL RESISTIVITY

SOIL RESISTIVITY (°C. cm/W)	80	90	100	120	150	200	250
k	1.17	1.12	1.07	1.0	0.91	0.80	0.73

Table 5
RATING FACTORS K FOR VARIATION OF MAX. OPERATING TEMPERATURES FOR PVC INSULATING CABLES

PVC RATED TEMPERATURE	70	85	105
RATING FACTOR	0.84	1.00	1.18

Table 6

TREFOIL OR FLAT FORMATION DERATING FACTORS FOR THREE SINGLE CORE CABLES LAID DIRECT IN GROUND

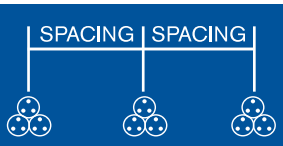
NUMBER OF CIRCUITS	SPACING SPACING  TREFOIL FORMATION				SPACING SPACING  TREFOIL FORMATION	
	TOUCHING		SPACING = 0.15 M		SPACING = 0.30 M	
NR	TREFOIL	FLAT	TREFOIL	FLAT	TREFOIL	FLAT
2	0.77	0.80	0.82	0.85	0.88	0.91
3	0.66	0.69	0.73	0.76	0.80	0.83
4	0.60	0.63	0.68	0.71	0.74	0.77
5	0.56	0.59	0.64	0.67	0.72	0.75
6	0.53	0.57	0.61	0.64	0.70	0.73

Table 7

TREFOIL OR FLAT FORMATION DERATING FACTORS FOR MULTI-CORE CABLES LAID DIRECT IN GROUND

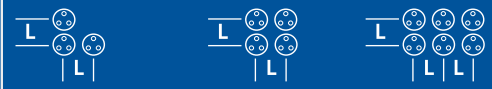
NUMBER OF CABLES	 TREFOIL FORMATION				 FLAT FORMATION	
	TOUCHING		SPACING = 0.15 M		SPACING = 0.30 M	
NR	TREFOIL	FLAT	TREFOIL	FLAT	TREFOIL	FLAT
2	0.81	0.81	0.87	0.87	0.91	0.91
3	0.69	0.70	0.76	0.78	0.82	0.84
4	0.62	0.63	0.72	0.74	0.77	0.81
5	0.58	0.60	0.66	0.70	0.73	0.78
6	0.54	0.56	0.63	0.67	0.70	0.76

Table 8

FLAT FORMATION DERATING FACTORS FOR THREE SINGLE CORE CABLES LAID IN FREE AIR

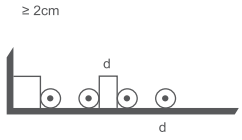
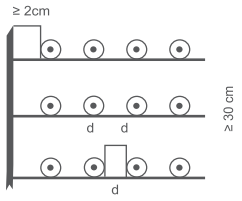
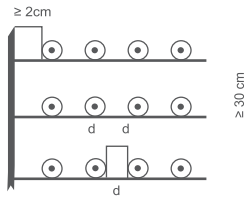
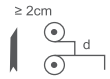
Clearance = Cable diameter (d)		Number of circuits			
Clearance from the wall 2 cm		1	2	3	
Laid on the Floor		0.92	0.89	0.88	
Laid cables troughs (circulation of air is restricted)	Number of troughs 1	0.92	0.89	0.88	
	2	0.87	0.84	0.83	
	3	0.84	0.82	0.81	
	6	0.82	0.80	0.79	
Laid on cable racks	Number of racks 1	1.00	0.97	0.96	
	2	0.97	0.94	0.93	
	3	0.96	0.93	0.92	
	6	0.94	0.91	0.90	
Arranged near the wall		0.94	0.91	0.89	
Arranged on the wall		0.89	0.86	0.84	

Table 9

TREFOIL TOUCHING FORMATION DERATING FACTORS FOR THREE SINGLE CORE CABLES IN FREE AIR

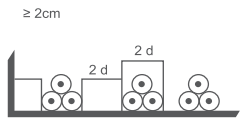
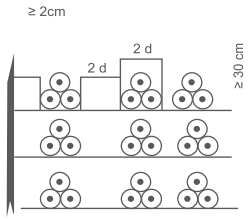
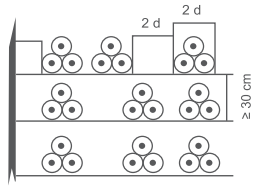
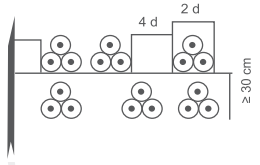
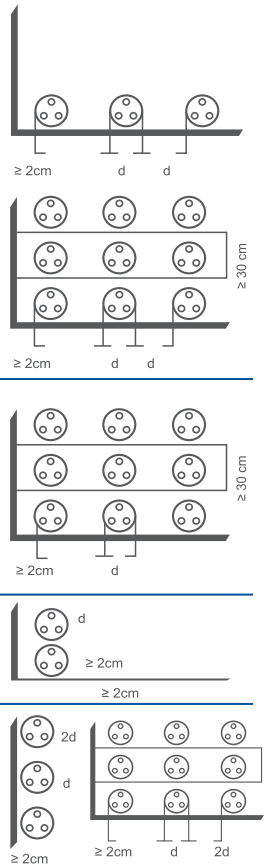
Clearance = 2 (d)		Number of circuits			
Clearance from the wall 2 cm		1	2	3	
Laid on the Floor		0.95	0.90	0.88	
Laid cables troughs (circulation of air is restricted)	Number of troughs 1	0.95	0.90	0.88	
	2	0.80	0.85	0.83	
	3	0.88	0.83	0.81	
	6	0.86	0.81	0.79	
Laid on cable racks	Number of racks 1	1.00	0.97	0.96	
	2	0.97	0.94	0.93	
	3	0.96	0.93	0.92	
	6	0.94	0.91	0.90	
Arrangements for which reduction of the current is not necessary					

Table 10

HORIZONTAL OR VERTICAL FORMATION DERATING FACTORS FOR MULTI-CORE CABLES LAID IN FREE AIR

Clearance = Cable diameter (d) Clearance from the wall ≥ 2 cm		Number of Cables 1	2	3	6	9
Laid on the Floor		0.95	0.90	0.88	0.85	0.84
	Number of troughs					
Laid cables	1	0.95	0.90	0.88	0.85	0.84
troughs	2	0.90	0.85	0.83	0.81	0.80
(circulation of air	3	0.88	0.83	0.81	0.79	0.78
is restricted)	6	0.86	0.81	0.79	0.77	0.76
	Number of racks					
Laid cables						
on cable racks	1	1.00	0.98	0.96	0.93	0.92
	2	1.00	0.95	0.93	0.90	0.89
	3	1.00	0.94	0.92	0.89	0.88
	6	1.00	0.93	0.90	0.87	0.86
Arranged near the wall		1.00	0.93	0.90	0.87	0.86



Arrangements for which reduction of the current is not necessary	Clearance from the wall	Clearance between cables
	≥ 2 cm	≥ 2d

Table 11

DERATING FACTORS FOR MULTI-CORE CABLES TOUCHING AND IN CONTACT WITH THE WALL IN FREE AIR

Clearance touching troughs and contact with wall		Number of Cables 1	2	3	6	9
Laid on the ground		0.90	0.84	0.80	0.75	0.73
	Number of troughs					
Laid cables	1	0.95	0.84	0.80	0.75	0.73
troughs	2	0.95	0.80	0.76	0.71	0.69
(circulation of air	3	0.95	0.78	0.74	0.70	0.68
is restricted)	6	0.95	0.76	0.72	0.68	0.66
	Number of racks					
	1	0.95	0.84	0.80	0.75	0.73
	2	0.95	0.80	0.76	0.71	0.69
Laid	3	0.95	0.78	0.74	0.70	0.68
on cable racks	6	0.95	0.76	0.72	0.68	0.66
Arranged near the wall		0.95	0.78	0.73	0.68	0.66

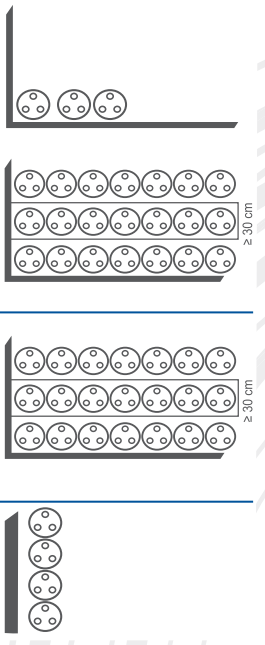


Table 12

SHORT CIRCUIT CURRENT FOR COPPER CONDUCTORS - XLPE INSULATED (KA) at (90/250)°C

Area (mm^2)	TIME (s)									
	0.1	0.2	0.3	0.4	0.5	1	2	3	4	5
16	7.24	5.12	4.18	3.62	3.24	2.29	1.62	1.32	1.14	1.02
25	11.31	8.00	6.53	5.66	5.06	3.58	2.53	2.07	1.79	1.60
35	15.84	11.20	9.14	7.92	7.08	5.01	3.54	2.89	2.50	2.24
50	22.62	16.00	13.06	11.31	10.11	7.15	5.06	4.13	3.58	3.20
70	31.67	22.40	18.29	15.84	14.16	10.02	7.08	5.78	5.01	4.48
95	42.98	30.39	24.82	21.49	19.22	13.59	9.61	7.85	6.80	6.08
120	54.30	38.39	31.34	27.15	24.28	17.17	12.14	9.91	8.59	7.68
150	67.87	47.99	39.19	33.94	30.35	21.46	15.18	12.39	10.73	9.60
185	83.71	59.19	48.33	41.85	37.42	26.47	18.72	15.28	13.24	11.94
240	108.59	76.79	62.70	54.30	48.56	34.34	24.28	19.83	17.17	15.36
300	135.74	95.98	78.37	67.87	60.71	42.93	30.35	24.78	21.46	19.20

Table 13

SHORT CIRCUIT CURRENT FOR ALUMINIUM CONDUCTORS - XLPE INSULATED (KA) at (90/250)°C

Area (mm^2)	TIME (s)									
	0.1	0.2	0.3	0.4	0.5	1	2	3	4	5
16	4.78	3.38	2.76	2.39	2.14	1.51	1.07	0.87	0.76	0.68
25	7.47	5.28	4.31	3.73	3.34	2.36	1.67	1.36	1.18	1.06
35	10.46	7.40	6.04	5.23	4.68	3.31	2.34	1.91	1.65	1.48
50	14.94	10.56	8.63	7.47	6.68	4.72	3.34	2.73	2.36	2.11
70	20.91	14.79	12.08	10.46	9.35	6.61	4.68	3.82	3.31	2.96
95	28.38	20.07	16.39	14.19	12.69	8.98	6.35	5.18	4.49	4.01
120	35.85	25.35	20.70	17.93	16.03	11.34	8.02	6.55	5.67	5.07
150	44.82	31.69	25.88	22.41	20.04	14.17	10.02	8.18	7.09	6.34
185	55.28	39.09	31.91	27.64	24.72	17.48	12.36	10.09	8.74	7.82
240	71.71	50.71	41.40	35.85	32.07	22.68	16.03	13.09	11.34	10.14
300	89.64	63.38	51.75	44.82	40.09	28.35	20.04	16.37	14.17	12.68

Table 14

SHORT CIRCUIT CURRENT FOR COPPER CONDUCTORS - PVC INSULATED (TYPE 5), AS PER TABLE 1 OF BS 6746 (KA) at (85/160)°C

Area (mm^2)	TIME (s)									
	0.1	0.2	0.3	0.4	0.5	1	2	3	4	5
16	5.25	3.71	3.03	2.63	2.35	1.66	1.17	0.96	0.83	0.74
25	8.20	5.80	4.74	4.10	3.67	2.59	1.83	1.50	1.30	1.16
35	11.49	8.12	6.63	5.74	5.14	3.63	2.57	2.10	1.82	1.62
50	16.41	11.60	9.47	8.20	7.34	5.19	3.67	3.00	2.59	2.32
70	22.97	16.24	13.26	11.49	10.27	7.26	5.14	4.19	3.63	3.25
95	31.18	22.05	18.00	15.59	13.94	9.86	6.97	5.69	4.93	4.41
120	39.38	27.85	22.74	19.69	17.61	12.45	8.81	7.19	6.23	5.57
150	49.23	34.81	28.42	24.61	22.01	15.57	11.01	8.99	7.78	6.96
185	60.71	42.93	35.05	30.36	27.15	19.20	13.58	11.08	9.60	8.59
240	78.76	55.69	45.47	39.38	35.22	24.91	17.61	14.38	12.45	11.14
300	98.45	69.62	56.84	49.23	44.03	31.13	22.01	17.97	15.57	13.92

Table 15

SHORT CIRCUIT CURRENT FOR ALUMINUM CONDUCTORS - PVC INSULATED (TYPE 5) as per TABLE 1 OF BS 6746 (KA) at (85/165) °C

Area (mm^2)	TIME (s)									
	0.1	0.2	0.3	0.4	0.5	1	2	3	4	5
16	3.47	2.45	2.00	1.74	1.55	1.10	0.78	0.63	0.55	0.49
25	5.42	3.83	3.13	2.71	2.43	1.71	1.21	0.99	0.86	0.77
35	7.59	5.37	4.38	3.80	3.40	2.40	1.70	1.39	1.20	1.07
50	10.85	7.67	6.26	5.42	4.85	3.43	2.43	1.98	1.71	1.53
70	15.18	10.74	8.77	7.59	6.79	4.80	3.40	2.77	2.40	2.15
95	20.61	14.57	11.90	10.30	9.22	6.52	4.61	3.76	3.26	2.91
120	26.03	18.41	15.03	13.01	11.64	8.23	5.82	4.75	4.12	3.68
150	32.54	23.01	18.79	16.27	14.55	10.29	7.28	5.94	5.14	4.60
185	40.13	28.38	23.17	20.06	17.95	12.69	8.97	7.33	6.34	5.68
240	52.06	36.81	30.06	26.03	23.28	16.46	11.64	9.50	8.23	7.36
300	65.07	46.01	37.57	32.54	29.10	20.58	14.55	11.88	10.29	9.20

Table 16

0.6/1 KV Cables
Single Core Unarmoured Cables, With Stranded Circular Copper Conductor, XLPE Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)		Voltage Drop (mV/Amp/meter)	
					
4	4.61	5.878	5.878	10.22	10.146
6	3.08	3.927	3.927	6.894	6.826
10	1.83	2.333	2.333	4.170	4.097
16	1.15	1.466	1.466	2.687	2.614
25	0.727	0.927	0.927	1.766	1.693
35	0524	0.668	0.668	1.321	1.248
50	0.387	0.493	0.494	1.025	0.953
70	0.268	0.342	0.343	0.765	0.693
95	0.193	0.247	0.248	0.272	0.529
120	0.153	0.196	0.197	0.510	0.438
150	0.124	0.159	0.160	0.447	0.376
185	0.0991	0.127	0.129	0.393	0.322
240	0.0754	0.098	0.100	0.342	0.272
300	0.0601	0.078	0.081	0.310	0.241
400	0.0470	0.062	0.066	0.278	0.211
500	0.0366	0.050	0.054	0.256	0.191
630	0.0283	0.040	0.045	0.237	0.173

Table 17

0.6/1 KV Cables
Single Core Unarmoured Cables, With Stranded Circular Aluminum Conductor, XLPE Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)		Voltage Drop (mV/Amp/meter)	
					
16	1.91	2.449	2.449	4.361	4.287
25	1.20	1.538	1.538	0.808	2.735
35	0.868	1.113	1.113	2.079	2.006
50	0.641	0.822	0.822	1.590	1.517
70	0.443	0.568	0.568	1.154	1.081
95	0.320	0.410	0.411	0.884	0.081
120	0.253	0.324	0.325	0.734	0.662
150	0.206	0.264	0.265	0.632	0.560
185	0.164	0.211	0.212	0.540	0.469
240	0.125	0.161	0.162	0.452	0.381
300	0.100	0.129	0.131	0.398	0.327
400	0.0778	0.101	0.103	0.349	0.279
500	0.0605	0.079	0.082	0.311	0.242
630	0.0469	0.062	0.066	0.280	0.213

The above data are based on:

- Max. operating temperature : 90 °C
- Power factor : 85
- Rated frequency : 60 Hz
- Distance between cables in flat formation: One cable diameter

Table 18

(0.6/1 KV Cable)
Single Core Unarmoured Cables, With Stranded Circular Copper Conductor, PVC Sheathed Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)		Voltage Drop (mV/Amp/meter)	
					
4	4.61	5.787	5.787	10.07	9.996
6	3.08	3.866	3.866	6.794	6.721
10	1.83	2.297	2.297	4.115	4.041
16	1.15	1.433	1.433	2.654	2.581
25	0.727	0.913	0.913	1.746	1.673
35	0524	0.658	0.658	1.307	1.234
50	0.387	0.486	0.486	1.018	0.945
70	0.268	0.337	0.337	0.758	0.686
95	0.193	0.243	0.244	0.597	0.526
120	0.153	0.193	0.194	0.509	0.437
150	0.124	0.156	0.158	0.446	0.375
185	0.0991	0.125	0.127	0.393	0.322
240	0.0754	0.096	0.098	0.341	0.271
300	0.0601	0.077	0.080	0.308	0.239
400	0.0470	0.062	0.065	0.280	0.212
500	0.0366	0.049	0.053	0.257	0.191
630	0.0283	0.039	0.045	0.237	0.173

Table 19

(0.6/1 KV Cables)
Single Core Unarmoured Cables, With Stranded Circular Aluminum Conductor, PVC Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)		Voltage Drop (mV/Amp/meter)	
					
16	1.91	2.410	2.410	4.297	4.224
25	1.20	1.514	1.514	0.769	2.695
35	0.868	1.095	1.095	2.051	2.978
50	0.641	0.809	0.809	1.567	1.494
70	0.443	0.559	0.559	1.137	1.064
95	0.320	0.404	0.405	0.872	0.799
120	0.253	0.319	0.320	0.459	0.653
150	0.206	0.260	0.261	0.623	0.551
185	0.164	0.207	0.208	0.532	0.461
240	0.125	0.158	0.160	0.447	0.376
300	0.100	0.127	0.129	0.393	0.322
400	0.0778	0.099	0.102	0.344	0.275
500	0.0605	0.078	0.081	0.307	0.239
630	0.0469	0.062	0.066	0.275	0.208

The above data are based on :
- Max. operating temperature : 90 °C
- Power factor : 0.85
- Rated frequency : 60 Hz
- Distance between cables in flat formation : One cable diameter

Table 20

(0.6/1 KV Cable)
Multcore Cables, With Stranded Copper Conductor, XLPE Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)	Voltage Drop (mV/Amp/meter)
1.5	12.1	15.428	22.82
2.5	7.41	9.448	14.01
4.0	4.61	5.878	8.747
6.0	3.08	3.927	5.871
10	1.83	2.333	3.519
16	1.15	1.446	2.239
25	0.727	0.927	1.446
35	0.524	0.669	1.063
50	0.387	0.494	0.809
70	0.268	0.343	0.585
95	0.193	0.248	0.444
120	0.153	0.197	0.368
150	0.124	0.161	0.315
185	0.0991	0.130	0.270
240	0.0754	0.101	0.226
300	0.0601	0.083	0.198
400	0.0470	0.067	0.176
500	0.0366	0.056	0.158

Table 21

(0.6/1 KV Cables)
Multicore Cables, With Stranded Aluminum Conductor, XLPE Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)	Voltage Drop (mV/Amp/meter)
16	1.91	2.449	3.686
25	1.20	1.538	2.347
35	0.868	1.113	1.717
50	0.641	0.822	1.292
70	0.443	0.568	0.918
95	0.320	0.411	0.684
120	0.253	0.326	0.557
150	0.206	0.266	0.469
185	0.164	0.212	0.391
240	0.125	0.163	0.317
300	0.100	0.132	0.271
400	0.0778	0.104	0.230
500	0.0605	0.083	0.199

The above data are based on:

- Max. operating temperature : 90 °C
- Power factor : 0.85
- Rated frequency : 60 Hz

Table 22

(0.6/1KV Cable)
Multcore Cables, With Stranded Copper Conductor, PVC Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)	Voltage Drop (mV/Amp/ meter)
1.5	12.1	15.191	22.476
2.5	7.41	9.303	13.800
4.0	4.61	5.787	8.624
6.0	3.08	3.867	5.791
10	1.83	2.297	3.474
16	1.15	1.444	2.212
25	0.727	0.913	1.430
35	0.524	0.658	1.053
50	0.387	0.486	0.803
70	0.268	0.337	0.581
95	0.193	0.244	0.443
120	0.153	0.194	0.367
150	0.124	0.158	0.315
185	0.0991	0.128	0.269
240	0.0754	0.099	0.226
300	0.0601	0.081	0.199
400	0.0470	0.066	0.176
500	0.0366	0.055	0.159

Table 23

(0.6/1KV Cable)
Multicore Cables, With Stranded Aluminum Conductor, PVC Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)	Voltage Drop (mV/Amp/ meter)
16	1.91	2.410	3.635
25	1.20	1.514	2.315
35	0.868	1.096	1.696
50	0.641	0.809	1.278
70	0.443	0.560	0.908
95	0.320	0.405	0.680
120	0.253	0.321	0.554
150	0.206	0.262	0.466
185	0.164	0.209	0.389
240	0.125	0.161	0.316
300	0.100	0.130	0.271
400	0.0778	0.103	0.230
500	0.0605	0.082	0.199

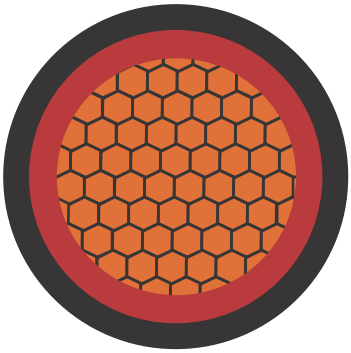
The above data are based on:

- Max. operating temperature : 90 °C
- Power factor : 0.85
- Rated frequency : 60 Hz

Single core cable

For outdoor installations in damp and wet locations

Type : CU/XLPE/PVC
Standard : IEC 60502-1
Rated Voltage : 0.6/1 KV
Conductor : Soft annealed stranded copper wires
Insulation : XLPE compound (or PVC or LSHF)
Jacketing : PVC compound (or LSHF or PE)



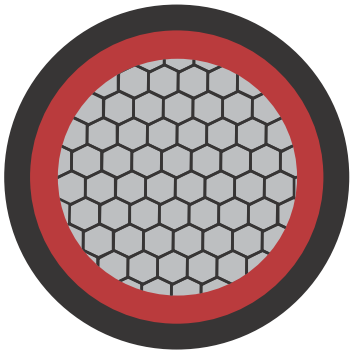
TECHNICAL INFORMATION

Nominal Cross Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING					
						Laid in ground			Laid in Free Air		
						⊙⊙⊙	⊙⊙	⊙	⊙	⊙⊙⊙	⊙⊙
NR x mm^2	mm	mm	mm	kg/km	ohm/km	A	A	A	A	A	A
STRANDED COPPER CONDUCTORS											
4	0.7	1.4	6.72	80	4.6100	59	56	43	59	53	44
6	0.7	1.4	7.13	100	3.0810	74	71	57	73	66	59
10	0.7	1.4	8.2	150	1.8300	97	93	74	94	88	76
16	0.7	1.4	9.2	205	1.1500	125	121	95	129	123	105
25	0.9	1.4	11	310	0.7270	163	154	120	159	152	135
35	0.9	1.4	12	400	0.5240	194	187	148	199	193	170
50	1.0	1.4	13	515	0.3870	228	217	177	246	234	205
70	1.1	1.4	15	720	0.2680	285	268	217	310	298	263
95	1.1	1.5	16.7	980	0.1930	336	319	262	386	374	322
120	1.2	1.5	18.4	1210	0.1530	388	371	296	450	439	380
150	1.4	1.6	20.5	1500	0.1240	428	405	336	509	497	433
185	1.6	1.6	22.5	1840	0.0991	490	462	382	591	579	491
240	1.7	1.7	25.4	2400	0.0754	564	530	439	725	714	597
300	1.8	1.8	27.8	2995	0.0601	638	593	496	918	842	690
400	2.0	1.9	31.2	3800	0.0470	735	673	559	995	971	796
500	2.2	2.0	34.7	4750	0.0366	827	752	621	1203	1100	907
630	2.4	2.2	41.7	6275	0.0283	946	844	707	1287	1264	1065
800	2.6	2.3	46.8	8260	0.0221	1060	935	798	1463	1439	1217
1000	2.8	2.4	51.1	9745	0.0176	1174	1015	866	1615	1591	1346

Single core cable

For outdoor and indoor installations in damp and wet locations

Type : AL/XLPE/PVC
Standard : IEC 60502-1
Rated Voltage : 0.6/1 KV
Conductor : Stranded Aluminum wires
Insulation : XLPE compound (or PVC or LSHF)
Jacketing : PVC compound (or LSHF or PE)

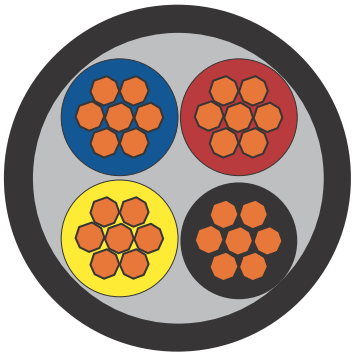


TECHNICAL INFORMATION

Nominal Cross Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING					
						Laid in ground			Laid in Free Air		
						⊙⊙⊙	⊙⊙	⊙	⊙	⊙⊙⊙	⊙⊙
mm²***	mm	mm	mm	kg/km	ohm/km	A	A	A	A	A	A
STRANDED COPPER CONDUCTORS											
16	0.7	1.4	9.21	115	1.9100	97	95	72	99	94	70
25	0.9	1.4	11.3	165	1.2000	123	120	91	129	123	105
35	0.9	1.4	12.01	205	0.8680	148	143	114	158	152	135
50	1.0	1.4	13.0	260	0.6410	177	169	131	193	187	164
70	1.1	1.4	16.0	340	0.4430	217	205	165	246	240	199
95	1.1	1.5	16.7	450	0.3200	257	245	194	316	304	240
120	1.2	1.5	18.4	550	0.2530	302	285	234	363	351	269
150	1.4	1.6	20.5	570	0.2060	336	319	257	415	404	333
185	1.6	1.6	24.2	830	0.1640	382	365	291	486	468	374
240	1.7	1.7	27.0	1050	0.1250	445	422	342	573	556	445
300	1.8	1.8	27.8	1300	0.1000	507	473	388	644	632	515
400	2.0	1.9	33.2	1610	0.0778	587	547	445	772	755	606
500	2.2	2.0	36.2	2000	0.0605	661	616	507	901	878	702
630	2.4	2.2	42.2	2520	0.0469	758	701	581	1053	1030	831
800	2.6	2.3	46.8	3150	0.0367	855	764	650	1193	1170	948
1000	2.8	2.4	51.8	3870	0.0291	946	832	707	1310	1287	1076

Multicore cable

For outdoor and indoor installations in damp and wet locations



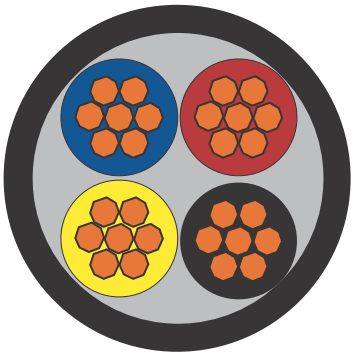
Type : CU/PVC/PVC
Standard : IEC 60502-1
Rated Voltage : 0.6/1 KV
Conductor : Soft annealed stranded copper wires (or Aluminum)
Insulation : PVC compound
Bedding : PVC compound (or LSHF or PE)
Jacketing : PVC compound (or LSHF or PE)

TECHNICAL INFORMATION

Nominal Cross Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
						Laid Direct in ground	Laid in Ducts	Laid in Free Air
NR X mm²	mm	mm	mm	kg/km	ohm/km	A	A	A
2*1.5	0.8	1.8	11.9	190	12.100	33	27	27
2*2.5	0.8	1.8	12.8	230	7.410	41	35	35
2*4	1.0	1.8	14.7	315	4.610	55	45	49
2*6	1.0	1.8	16.0	390	3.080	68	56	63
2*10	1.0	1.8	17.6	515	1.830	89	77	84
2*16	1.0	1.8	19.7	695	1.150	116	91	112
2*25	1.2	1.8	23.12	995	0.727	150	119	147
2*35	1.2	1.7	25.1	1020	0.524	177	147	182
3*1.5	0.8	1.8	12.4	215	12.100	29	25	22
3*2.5	0.8	1.8	13.4	270	7.410	37	32	28
3*4	1.0	1.8	15.4	370	4.610	49	42	39
3*6	1.0	1.8	16.7	460	3.080	61	50	49
3*10	1.0	1.8	18.6	630	1.830	82	67	64
3*16	1.0	1.8	20.8	860	1.150	102	84	91
3*25	1.2	1.8	24.5	1215	0.727	136	112	119
3*35	1.2	1.8	27.0	1615	0.524	163	133	140
	ph/N				ph/N			
3*10+6	1.0	1.8	19.6	715	1.83/3.08	82	67	67
3*16+10	1.0	1.8	22.0	983	1.15/1.83	102	84	91
3*25+16	1.2/1.0	1.8	25.7	1455	0.727/1.15	136	112	119
3*35+16	1.2/1.0	1.8	27.6	1740	0.524/1.15	163	133	140
4*1.5	0.8	1.8	13.2	250	12.100	29	25	22
4*2.5	0.8	1.8	14.3	315	7.410	37	32	28
4*4	1.0	1.8	16.8	440	4.610	49	42	39
4*6	1.0	1.8	18.0	550	3.080	61	50	49
4*10	1.0	1.8	20.2	775	1.830	82	67	64
4*16	1.0	1.8	22.6	1065	1.150	102	84	91
4*25	1.2	1.8	26.8	1580	0.727	136	112	119
4*35	1.2	1.8	29.4	2025	0.524	163	133	140
5*1.5	0.8	1.8	12.9	235	12.100	29	25	22
5*2.5	0.8	1.8	14.1	360	7.410	37	32	28
5*4	1.0	1.8	17.9	525	4.610	49	42	39
5*6	1.0	1.8	19.4	620	3.080	61	50	49

Multicore cable

For outdoor and indoor installations in damp and wet locations



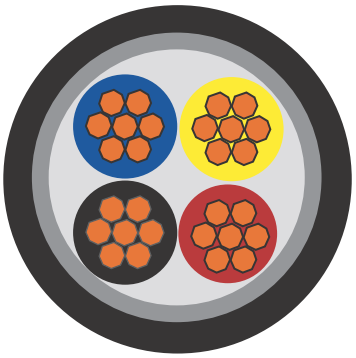
Type	:	CU/XLPE/PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6/1 KV
Conductor	:	Soft annealed stranded copper wires (or Aluminum)
Insulation	:	XLPE compound
Bedding	:	PVC compound (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)

TECHNICAL INFORMATION

Nominal Cross Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
						Laid Direct in ground	Laid in Ducts	Laid in Free Air
NR x mm^2	mm	mm	mm	kg/km	ohm/km	A	A	A
2*1.5	0.7	1.8	11.5	170	12.100	34	29	28
2*2.5	0.7	1.8	12.4	205	7.410	42	37	37
2*4	0.7	1.8	13.5	260	4.610	57	47	51
2*6	0.7	1.8	14.6	325	3.080	72	61	67
2*10	0.7	1.8	16.4	455	1.830	93	81	88
2*16	0.7	1.8	18.4	620	1.150	121	97	117
2*25	0.9	1.8	22.0	920	0.727	158	125	154
2*35	0.9	1.8	24.1	1140	0.524	189	157	185
3*1.5	0.7	1.8	12.0	190	12.100	30	27	25
3*2.5	0.7	1.8	13.0	235	7.410	40	34	36
3*4	0.7	1.8	14.1	315	4.610	51	42	46
3*6	0.7	1.8	15.3	400	3.080	65	53	56
3*10	0.7	1.8	17.3	555	1.830	86	70	76
3*16	0.7	1.8	19.5	770	1.150	111	88	99
3*25	0.9	1.8	23.3	1150	0.727	146	119	135
3*35	0.9	1.8	25.6	1480	0.524	177	140	161
3*10+6	0.7	1.8	18.1	625	1.83/3.08	86	70	76
3*16+10	0.7	1.8	20.4	880	1.15/1.83	111	88	99
3*25+16	0.9/0.7	1.8	24.2	1305	0.727/1.15	146	119	135
3*35+16	0.9/0.7	1.8	26.2	1620	0.524/1.15	177	140	161
4*1.5	0.7	1.8	12.8	225	12.100	30	27	25
4*2.5	0.7	1.8	14.0	290	7.410	40	34	36
4*4	0.7	1.8	15.2	375	4.610	51	42	46
4*6	0.7	1.8	16.6	480	3.080	65	53	56
4*10	0.7	1.8	18.6	675	1.830	86	70	76
4*16	0.7	1.8	21.1	955	1.150	111	88	99
4*25	0.9	1.8	25.3	1435	0.727	146	119	135
4*35	0.9	1.9	28.0	1865	0.524	177	140	161
5*1.5	0.7	1.8	13.6	255	12.100	30	27	25
5*2.5	0.7	1.8	14.8	330	7.410	40	34	36
5*4	0.7	1.8	16.3	430	4.610	51	42	46
5*6	0.7	1.8	17.8	600	3.080	65	53	56

Multicore cable

For outdoor and indoor installations in damp and wet locations



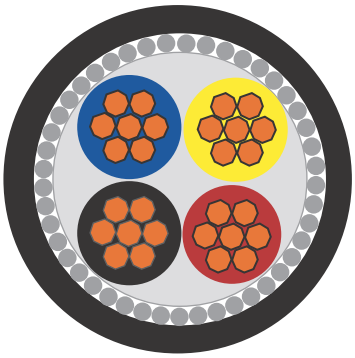
Type	:	CU/XLPE/STA/PVC
Strandard	:	IEC 60502-1
Rated Voltage	:	0.6/ 1 KV
Conductor	:	Soft annealed stranded copper wires (or Aluminum)
Insulation	:	XLPE compound
Bedding	:	PVC compound (or LSHF or PE)
Armouring	:	Steel Tape
Jacketing	:	PVC compound (or LSHF or PE)

TECHNICAL INFORMATION

Nominal Cross Section	Nominal Insulation Thickness	Nominal Diameter of S.Tape	Nominal Sheath Thickness	Approx overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
NR x mm^2	mm	mm	mm	mm	kg/km	ohm/km	A	A	A
2*6	0.7	0.20	1.8	15.4	415	3.080	71	60	66
2*10	0.7	0.20	1.8	17.2	550	1.830	92	80	87
2*16	0.7	0.20	1.8	19.3	725	1.150	120	96	115
2*25	0.9	0.20	1.8	22.8	1045	0.727	157	124	152
2*35	0.9	0.20	1.8	24.9	1305	0.524	187	154	183
3*6	0.7	0.20	1.8	16.1	485	3.080	64	51	55
3*10	0.7	0.20	1.8	18.1	655	1.830	84	69	75
3*16	0.7	0.20	1.8	20.1	885	1.150	109	87	98
3*25	0.9	0.20	1.8	24.1	1280	0.727	145	117	133
3*35	0.9	0.20	1.8	26.3	1630	0.524	174	139	159
3*10+6	0.7	0.20	1.8	18.9	735	1.83/3.08	84	69	75
3*16*+10	0.7	0.20	1.8	21.3	1005	0.15/1.83	109	87	98
3*25+16	0.9/0.7	0.20	1.8	25	1495	0.727/1.15	145	117	133
3*35+16	0.9/0.7	0.20	1.8	27	1800	0.524/1.15	174	139	159
4*6	0.7	0.20	1.8	17.3	575	3.080	64	51	55
4*10	0.7	0.20	1.8	18.6	675	1.830	84	69	75
4*16	0.7	0.20	1.8	21.1	955	1.150	109	87	98
4*25	0.9	0.20	1.8	25.3	1435	0.727	145	117	133
4*35	0.9	0.20	1.8	27.9	1860	0.524	174	139	159
5*4	0.7	0.20	1.8	16.3	430	4.610	50	41	44
5*6	0.7	0.20	1.8	17.8	600	3.0800	64	51	55

Multicore cable

For outdoor and indoor installations in damp and wet locations



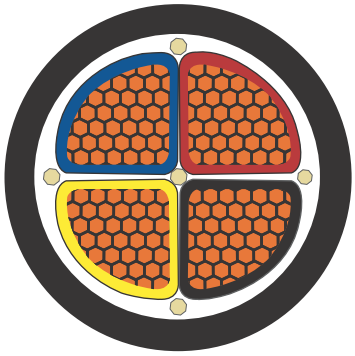
Type	:	CU / XLPE / SWA / PVC
Standartd	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Soft annealed stranded copper wires
Insulation	:	XLPE compoound (or PVC or LSHF)
Bedding	:	PVC compound (or LSHF or PE)
Armouring	:	Steel Wires
Jacketing	:	PVC compound (or LSHF or PE)

TECHNICAL INFORMATION

Nominal Cross Section	Nominal Insulation Thickness	Nominal Diameter of S.Wire	Nominal Sheath Thickness	Approx overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
NR x mm^2	mm	mm	mm	mm	kg/km	ohm/km	A	A	A
2*1.5	0.7	0.9	1.8	13.3	345	12.100	35	30	29
2*2.5	0.7	0.9	1.8	14.2	395	7.410	43	39	39
2*4	0.7	0.9	1.8	15.2	470	4.610	58	48	53
2*6	0.7	0.9	1.8	16.4	555	3.080	73	62	68
2*10	0.7	0.9	1.8	18.2	700	1.830	95	82	89
2*16	0.7	0.9	1.8	20.2	905	1.150	122	98	118
2*25	0.9	1.60	1.8	25.1	1545	0.727	160	126	156
2*35	0.9	1.60	1.8	27.0	1845	0.524	192	158	187
3*1.5	0.7	0.9	1.8	13.8	385	12.100	31	28	26
3*2.5	0.7	0.9	1.8	14.7	435	7.410	41	35	37
3*4	0.7	0.9	1.8	15.9	525	4.610	52	43	47
3*6	0.7	0.9	1.8	17.1	635	3.080	66	54	57
3*10	0.7	0.9	1.8	19.1	825	1.830	87	71	77
3*16	0.7	0.9	1.8	21.3	1085	1.150	112	89	101
3*25	0.9	1.60	1.8	26.5	1825	0.727	148	121	136
3*35	0.9	1.60	1.8	28.8	2220	0.524	180	143	164
3*10+6	0.7	0.9	1.8	20.0	1000	1.83/3.08	87	71	77
3*16+10	0.7	1.60	1.8	22.2	1205	1.15/1.83	112	89	101
3*25+16	0.9/0.7	1.60	1.8	27.4	1920	727/1.15	148	121	136
3*35+16	0.9/0.7	1.60	1.8	29.13	2485	24/1.15	180	143	164
4*1.5	0.7	0.9	1.8	14.6	420	12.100	31	28	26
4*2.5	0.7	0.9	1.8	15.6	495	7.410	41	35	37
4*4	0.7	0.9	1.8	16.19	605	4.610	52	43	47
4*6	0.7	0.9	1.8	18.13	735	3.080	66	54	57
4*10	0.7	0.9	1.8	20.5	935	1.830	87	71	77
4*16	0.7	1.60	1.8	24.13	1505	1.150	112	89	101
4*25	0.9	1.60	1.8	28.5	2075	0.727	148	121	136
4*35	0.9	1.60	1.8	31.3	2570	0.524	180	143	164
5*1.5	0.7	0.9	1.8	15.4	450	12.100	31	28	26
5*2.5	0.7	0.9	1.8	16.6	535	7.410	41	35	37
5*4	0.7	0.9	1.8	18.1	700	4.610	52	43	47
5*6	0.7	0.9	1.8	19.6	855	3.080	66	54	57

Multicore cable

For outdoor and indoor installations in damp and wet locations



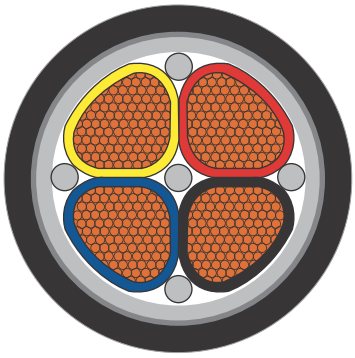
Type : CU / XLPE / PVC
Standard : IEC 60502-1
Rated Voltage : 0.6 / 1 KV
Conductor : Soft annealed stranded copper wires
Insulation : XLPE compoound (or PVC)
Bedding : PVC compound (LSHF or PE)
Jacketing : PVC compound (LSHF or PE)

TECHNICAL INFORMATION

Nominal Cross Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
						Laid Direct in ground	Laid in Ducts	Laid in Free Air
NR x mm^2	mm	mm	mm	kg/km	ohm/km	A	A	A
3*50+25	1.0/0.9	1.8	25.8	1845	0.3870/0.727	211	170	199
3*70+35	1.1/0.9	1.9	29.6	2565	0.268/0.524	251	211	240
3*95+50	1.1/1.0	2.1	33.5	3465	0.1930/0.387	302	246	298
3*120+70	1.2/1.1	2.2	37.4	4385	0.153/0.268	348	287	345
3*150+70	1.4/1.1	2.3	41.2	5280	0.124/0.268	382	322	392
3*185+95	1.6/1.1	2.5	46.1	6645	0.0991/0.93	428	363	450
3*240+120	1.7/1.2	2.7	51.6	8610	0.0754/0.153	496	427	538
3*300+150	1.8/1.4	2.9	56.9	10720	0.0601/0.124	559	474	626
3*400+185	2.0/1.6	3.1	64.6	13635	0.0470/0.0991	638	544	720
3*500+240	2.2/1.7	3.3	71.8	17115	0.0336/0.0754	718	620	819
4*50	1.0	1.8	27	2010	0.387	211	170	199
4*70	1.1	2.0	31.3	2850	0.268	251	211	240
4*95	1.1	2.1	34.6	3885	0.193	302	246	298
4*120	1.2	2.3	39.6	4905	0.153	348	287	345
4*150	1.4	2.4	43.6	5055	0.124	382	322	392
4*185	1.6	2.6	48.6	7495	0.0991	428	363	440
4*240	1.7	2.8	54.4	9785	0.0754	496	427	538
4*300	1.8	3.0	60.0	12205	0.0601	559	474	626
4*400	2.0	3.3	68.6	155540	0.0470	638	544	720
4*500	2.2	3.5	76.2	19415	0.0366	718	620	819

Multicore cable

For outdoor and indoor installations in damp and wet locations



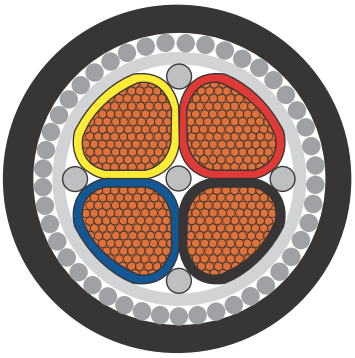
Type	:	CU / XLPE / STA/ PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6/1 KV
Conductor	:	Soft annealed stranded copper wires
Insulation	:	XLPE compound (or PVC)
Bedding	:	PVC compound (or LSHF or PE)
Armouring	:	Steel Tape (or LSHF or PE)
Jacketing	:	PVC compound

TECHNICAL INFORMATION

Nominal Cross	Nominal Insulation Thickness	Nominal Diameter of S.Tape	Nominal Sheath Thickness	Approx overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
NR x mm2	mm	mm	mm	mm	kg/km	kg/km	A	A	A
3*50+25	1.0/0.9	0.20	1.9	28.8	2145	0.387/0.727	211	170	199
3*70+35	1.1/0.9	0.20	2.0	33.0	2945	0.268/0.524	251	211	240
3*95+50	1.1/1.0	0.20	2.2	38.1	4255	0.193/0.387	302	246	298
3*120+70	1.2/1.1	0.50	2.3	42.0	5240	0.153/0.268	348	287	345
3*150+70	1.4/1.1	0.50	2.4	46.2	6280	0.124/0.268	382	322	392
3*185+95	1.6/1.1	0.50	2.6	51.1	7750	0.0991/0.193	428	363	450
3*240+120	1.7/1.2	0.50	2.8	57	9905	0.0754/0.153	496	427	538
3*300+150	1.8/1.4	0.50	3.0	62.3	12140	0.0607/0.124	559	474	626
3*400+185	2.0/1.6	0.50	3.2	70.0	15090	0.0475/0.0991	638	544	720
3*500+240	2.2/1.7	0.50	3.2	77.2	18855	0.0366	718	620	819
4*50	1.0	0.20	1.9	30.0	2375	0.3870	211	170	199
4*70	1.1	0.20	2.1	34.7	3270	0.2680	251	211	240
4*95	1.1	0.50	2.2	39.6	4705	0.1930	302	246	298
4*120	1.2	0.50	2.4	43.7	5805	0.1530	348	287	345
4*150	1.4	0.50	2.6	48.8	7125	0.1240	382	322	392
4*185	1.6	0.50	2.7	53.6	8650	0.0991	428	363	450
4*240	1.7	0.50	2.9	60.2	11190	0.0754	496	427	538
4*300	1.8	0.50	3.1	65.4	13720	0.0601	559	474	626
4*400	2.0	0.50	3.4	74.8	17280	0.0470	638	544	720
4*500	2.2	0.50	3.7	82.2	21330	0.036	718	620	816

Multicore cable

For outdoor and indoor installations in damp and wet locations



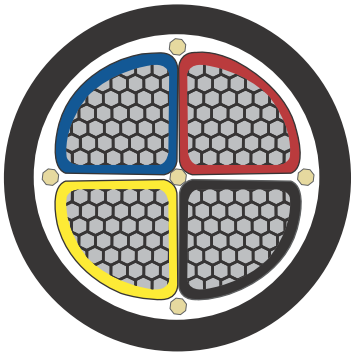
Type : CU / XLPE / SWA / PVC
Standard : IEC 60502-1
Rated Voltage : 0.6 / 1 KV
Conductor : Soft annealed stranded copper wires
Insulation : XLPE compound (or PVC or LSHF)
Bedding : PVC compound (or LSHF or PE)
Armouring : Steel Wires
Jacketing : PVC compound (or LSHF or PE)

TECHNICAL INFORMATION

Nominal Cross	Nominal Insulation	Nominal Diameter of S.Wire	Nominal Sheath Thickness	Approx overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
NR x mm²	mm	mm	mm	kg/km	ohm/km	kg/km	A	A	A
3*50+25	1.0/0.9	1.6	1.9	31.6	2805	0.387/0.727	211	170	205
3*70+35	1.1/0.9	2.00	2.1	36.4	3950	0.268/0.524	251	211	246
3*95+50	1.1/1.0	2.00	2.2	40.1	5000	0.193/0.387	302	246	304
3*120+70	1.2/1.1	2.0	2.3	44.0	6115	0.153/0.268	348	287	351
3*150+70	1.4/1.1	2.50	2.5	49.4	7690	0.124/0.268	382	322	398
3*185+95	1.6/1.1	2.50	2.7	54.6	9265	0.0991/0.193	428	363	456
3*240+120	1.7/1.2	2.50	2.9	60.2	11600	0.0754/0.153	496	427	544
3*300+150	1.8/1.4	2.50	3.0	65.3	13940	0.0601/0.124	559	474	632
3*400+185	2.0/1.6	3.15	3.4	76.1	18370	0.0470/0.0991	638	544	725
3*500+240	2.2/1.7	3.15	3.6	82.3	22150	0.0366/0.0754	718	620	825
4*50	1.0	1.60	2.0	32.6	3035	0.3870	211	170	205
4*70	1.1	2.00	2.2	38.1	4315	0.2680	251	211	246
4-95	1.1	2.00	2.3	41.8	5530	0.1930	302	246	304
4*120	1.2	2.50	2.5	46.9	71112	0.1530	348	287	351
4*150	1.4	2.50	2.6	51.8	8555	0.1240	382	322	398
4*185	1.6	2.50	2.8	56.8	10250	0.0991	428	363	456
4*240	1.7	2.50	3.0	63.0	12945	0.0754	496	427	544
4*300	1.8	2.50	3.2	68.6	15675	0.0601	559	474	632
4*400	2.0	3.15	3.5	79.3	20630	0.0470	638	544	725
4*500	2.2	3.15	3.8	87.1	25120	0.0366	718	620	825

Multicore cable

For outdoor and indoor installations in damp and wet locations



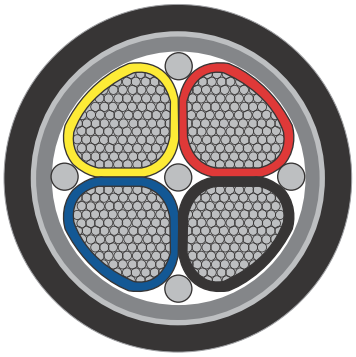
Type : AL / XLPE / PVC
Standard : IEC 60502-1
Rated Voltage : 0.6 / 1 KV
Conductor : Drawn Aluminum wires
Insulation : XLPE compound (or PVC or LSHF)
Bedding : PVC compound (or LSHF or PE)
Armouring : Steel Wires
Jacketing : PVC compound (or LSHF or PE)

TECHNICAL INFORMATION

Nominal Cross Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
						Laid Direct in ground	Laid in Ducts	Laid in Free Air
NR x mm^2	mm	mm	mm	kg/km	ohm/km	A	A	A
3*50+25	1.0/0.9	1.8	25.8	805	0.641/1.20	165	129	152
3*70+35	1.1/0.9	1.9	29.6	1105	0.443/0.868	200	164	187
3*95+50	1.1/1.0	2.1	33.5	1425	0.320/0.641	239	193	228
3*120+70	1.2/1.1	2.2	37.8	1795	0.253/0.443	268	222	263
3*150+70	1.4/1.1	2.3	41.9	2300	0.206/0.443	302	252	310
3*185+95	1.6/1.1	2.5	46.1	2670	0.164/0.320	331	281	351
3*240+120	1.7/1.2	2.7	51.6	3395	0.125/0.253	388	328	421
3*300+150	1.8/1.4	2.8	57.1	4175	0.100/0.206	445	369	497
3*400+185	2.0/1.6	3.1	65.0	5300	0.0778/0.164	513	433	573
3*500+240	2.2/1.7	3.4	71.8	7220	0.0605/0.125	581	497	655
4*50	1.0	1.8	27.0	860	0.6410	165	129	152
4*70	1.1	2.0	31.3	1100	0.4430	200	164	187
4-95	1.1	2.1	35.0	1565	0.3200	239	193	228
4*120	1.2	2.3	39.5	2020	0.2530	268	222	263
4*150	1.4	2.4	43.6	2470	0.2060	302	252	310
4*185	1.6	2.5	48.4	2965	0.1640	331	281	351
4*240	1.7	2.8	54.4	3825	0.1250	388	328	421
4*300	1.8	3.0	60.0	4685	0.1000	4445	369	497
4*400	2.0	3.3	72.2	6280	0.0778	513	433	573
4*500	2.2	3.5	76.5	7615	0.0605	581	497	655

Multicore cable

For outdoor and indoor installations in damp and wet locations



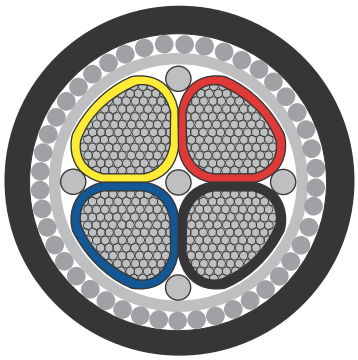
Type	:	AL / XLPE /STA/ PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Drawn Aluminum Wires
Insulation	:	XLPE compoound (or PVC or LSHF)
Bedding	:	PVC compound (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)

TECHNICAL INFORMATION

Nominal Cross Section	Nominal Insulation Thickness	Nominal Diameter of S.Tape	Nominal Sheath Thickness	Approx overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
NR x mm^2	mm	mm	mm	mm	kg/km	ohm/km	A	A	A
3*50	1.0	0.20	0.20	27.0	1000	0.641	165	129	152
3*70	1.1	0.20	0.20	30.4	1210	0.443	200	164	187
3*95	1.1	0.20	0.20	34.2	1650	0.320	239	193	228
3*120	1.2	0.50	0.50	38.8	2340	0.253	268	222	263
3*150	1.4	0.50	0.50	42.5	2770	0.206	302	252	310
3*185	1.6	0.50	0.50	47.2	3350	0.1640	331	281	351
3*240	1.7	0.50	0.50	52.2	4280	0.1250	388	328	421
3*300	1.8	0.50	0.50	57.6	5020	0.1000	445	369	497
3*400	2.0	0.50	0.50	64.4	6230	0.0778	513	433	573
3*500	2.2	0.50	0.50	71.0	7540	0.0605	581	497	655
3*50+25	1.0/0.9	0.20	0.20	29.5	1200	0.641/1.20	165	129	152
3*70+35	1.1/0.9	0.20	0.20	33.5	1500	0.443/0.868	200	164	187
3*95+50	1.1/1.0	0.50	0.50	38.3	1970	0.320/0.641	239	193	228
3*120+70	1.2/1.1	0.50	0.50	42.2	2710	0.253/0.443	268	222	263
3*150+70	1.4/1.1	0.50	0.50	46.7	3180	0.206/0.443	302	252	310
3*185+95	1.6/1.1	0.50	0.50	51.4	3530	0.164/0.320	331	281	351
3*240+120	1.7/1.2	0.50	0.50	57.0	4600	0.125/0.253	388	328	421
3*300+150	1.8/1.4	0.50	0.50	62.8	5920	0.100/0.206	445	369	497
3*400+185	2.0/1.6	0.50	0.50	70.4	7200	0.0778/0.164	513	433	573
3*500+240	2.0/1.7	0.50	0.50	77.0	9040	0.0605/0.125	581	497	655
4*50	1.0	0.20	0.20	30.4	1210	0.6410	165	129	152
4*70	1.1	0.20	0.20	34.7	1595	0.4430	200	164	187
4*95	1.1	0.50	0.50	40.4	2540	0.3200	239	193	228
4*120	1.2	0.50	0.50	43.8	3020	0.2530	268	222	263
4*150	1.4	0.50	0.50	49.0	3670	0.2060	302	252	310
4*185	1.6	0.50	0.50	53.6	4380	0.1640	331	281	351
4*240	1.7	0.50	0.50	60.0	4430	0.1250	388	328	421
4*300	1.8	0.50	0.50	65.4	6125	0.1000	449	369	497
4*400	2.0	0.50	0.50	73.6	7550	0.0778	513	433	573
4*500	2.3	0.50	0.50	81.6	9990	0.0605	581	497	655

Multicore cable

For outdoor and indoor installations in damp and wet locations



Type	:	AL / XLPE / SWA / PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6/1 KV
Conductor	:	Drawn Aluminum Wires
Insulation	:	XLPE compound (or PVC or LSHF)
Bedding	:	PVC compound (or LSHF or PE)
Armouring	:	Steel Tape
Jacketing	:	PVC compound (or LSHF or PE

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal Diameter of S.Wire	Nominal Sheath Thickness	Approx overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
NR x mm^2	mm	mm	mm	mm	kg/km	ohm/km	A	A	A
	ph/N					ph/N			
3*50+25	1.0/0.9	2.00	1.9	31.6	1870	0.641/1.20	165	129	158
3*70+35	1.1/0.9	2.00	2.1	36.8	2500	0.443/0.868	200	164	193
3*95+50	1.1/1.0	2.00	2.2	40.1	2955	0.320/0.641	239	193	234
3*120+70	1.2/1.1	2.50	2.3	44.2	3690	0.253/0.443	268	222	269
3*150+70	1.4/1.1	2.50	2.5	49.8	4525	0.206/0.443	302	252	316
3*185+95	1.6/1.1	2.50	2.7	55.0	5330	0.164/0.320	331	281	357
3*240+120	1.7/1.2	2.50	2.9	60.6	6445	0.125/0.253	388	328	427
3*300+150	1.8/1.4	2.50	3.0	65.3	7400	0.100/0.206	445	369	503
3*400+185	2.0/1.6	3.15	3.3	73.4	9450	0.0778/0.164	513	433	579
3*500+240	2.2/1.7	3.15	3.6	81.6	12270	0.0605/0.125	581	497	661
4*50	1.0	1.60	2.0	32.6	1880	0.6410	165	129	158
4*70	1.1	2.0	2.2	38.1	2660	0.4430	200	164	193
4*95	1.1	2.00	2.3	41.8	3170	0.3200	239	193	234
4*120	1.2	2.50	2.5	46.9	4195	0.2530	268	222	269
4*150	1.4	2.50	2.6	51.8	4915	0.2060	302	252	316
4*185	1.6	2.50	2.8	56.8	5750	0.1640	331	281	357
4*240	1.7	2.50	3.0	63.0	6980	0.1250	388	328	427
4*300	1.8	2.50	3.2	68.6	8155	0.1000	445	369	503
4*400	2.0	3.15	3.6	80.5	11315	0.0778	513	433	579
4*500	2.2	3.15	3.7	86.9	13025	0.0605	581	497	661

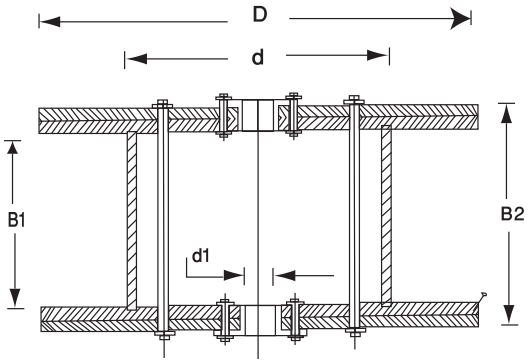
Conversion Table

Multiply	by	to obtain
WEIGHT - Imperial		
Ounces	28.3495	grams
Pounds (Av)	453.59	grams
Pounds (Av)	0.45359	kilograms
Tons (short)	907.19	kilograms
Tons (long)	1016.05	kilograms
WEIGHT - Metric		
Grams	0.03527	ounces
Grams	0.002205	pounds
Kilograms	35.274	ounces
Kilograms	2.2046	pounds
Kilograms	0.001102	tons (short)
Kilograms	0.0009842	tons (long)
MISCELLANEOUS - Imperial		
Pounds per 1000 feet	1.48816	kilograms per kilometer
Pounds per mile	0.28185	kilograms per kilometer
Pounds per square inch	0.0007031	kilograms per square millimeter
Pounds per square inch	0.07031	kilograms per square centimeter
Feet per second	18.288	meters per minute
Feet per second	1.09728	kilometers per hour
Mils per hour	1.60935	kilometers per hour
Ohms per 1000 feet	3.28083	ohms per kilometer
Ohms per mile	0.62137	ohms per kilometer
Decibels per 1000 feet	3.28083	decibels per kilometer
Decibels per mile	0.62137	decibels per kilometer
Decibles	0.1153	nepers
MISCELLANEOUS - Metric		
Kilograms per kilometer	0.67197	pounds per 1000 feet
Kilograms per kilometer	3.54795	pounds per mile
Kilograms per square millimeter	1422.34	pounds per square inch
Kilograms per square centimeter	14.2234	pounds per square inch
Grams per cubic cm	0.03613	pounds per cubic inch
Meters per minute	0.05468	feet per second
Kilometer per hour	0.91134	feet per second
Kilometer per hour	0.62137	miles per hour
Ohms per kilometer	0.3048	ohms per 1000 feet
Ohms per kilometer	1.6093	ohms per mile
Decibels per kilometer	0.3048	decibels per 1000 feet
Decibels per kilometer	1.6093	decibles per mile
TEMPERATURE		
°Fahrenheit	5/9 (°F)-32	°Celsius
°Celsius	9/5 (°C) + 32	°Fahrenheit

Multiply	by	to obtain
LENGTH - Imperial		
Mils	0.001	inches
Mils	0.0254	millimeters
Inches	1000	mils
Inches	25.40	millimeters
Inches	2.54	centimeters
Feet	30.48	centimeters
Feet	0.3048	meters
Feet (thousands of)	0.3048	kilometers
Yards	0.9144	meters
Mils	1.6093	kilometers
LENGTH - Imperial		
Millimeters	39.37	mils
Millimeters	0.03937	inches
Centimeters	0.3937	inches
Centimeters	0.032808	feet
Meters	39.37	inches
Meters	3.2808	feet
Meters	1.0936	yards
Kilometers	3280.83	feet
Kilometers	0.62137	mils
AREA - Imperial		
Square mils	1.2732	circular mills
Square mils	0.000001	square inches
Circular mils	0.7854	square mils
Circular mils	0.0000007854	square inches
Circular mils	0.00050657	square millimeters
Square inches	1000000	square mils
Square inches	1273240	circular mils
Square inches	645.16	square millimeters
Square inches	6.4516	square centimeters
Square inches	0.09290	square meters
Square inches	0.8361	square meters
AREA - Metric		
Square millimeters	1973.52	circular mills
Square millimeters	0.00155	square inches
Square centimeters	0.155	square inches
Square meters	10.7638	square feet
Square meters	1.19599	square yards
VOLUME - Imperial		
Cubic inches	16.38716	cubic centimeters
Cubic feet	0.028317	cubic meters
VOLUME - U.S.		
Quarts (liquid)	0.9463	cubic centimeters
Gallaons	3.7854	cubic meters
VOLUME - Metric		
Cubic centimeters	0.06102	cubic inches
Cubic meters	35.3145	cubic feet
Litres	1.05668	quarts (Liquid U.S.)
Litres	0.26417	gallons (U.S.)

Packing

International practice is to supply cables on wooden drums or as appropriate plastic spools. At the customers request we will also supply steel drums for improved on-site performance & handling.
The finished drums may be - when requested by our customer - closed with a continuous lagging with a wood having approximate thickness 2.00 mm.



Drum Dimensions:

D	d	d1	B1	B2
600	300	85	450	580
700	350	85	530	660
800	400	85	530	660
900	450	85	630	760
1000	500	85	630	772
1100	550	85	630	772
1200	600	85	850	992
1300	650	85	850	992
1400	700	85	850	992
1500	750	110	850	1020
1600	800	110	850	1020
1700	850	110	850	1020
1800	900	110	850	1032
1900	950	110	850	1032
2000	1000	110	980	1174
2100	1050	110	980	1174
2200	1100	110	1230	1274
2300	1150	110	1280	1432
2400	1200	110	1280	1482
2500	1250	110	1280	1482
2600	1300	110	1280	1432
2700	1350	110	1280	1482
2800	1400	110	1280	1482
2900	1450	110	1280	1482
3000	1500	110	1280	1482

Legend

D	=	Flange Diameter (mm)
d	=	Barrel Diameter (mm)
d1	=	Benz hole diameter (mm)
B1	=	Distance between flanges (mm)
B2	=	Overall Width (mm)

Selection Form: Low Voltage

This form needs to be filled in order to help Jeddah Cables Company prepare the right quotation:

Standard & Specification

- ☐ IEC
- ☐ BS
- ☐ Others: _____

Conductor

- Type
  - ☐ Copper
  - ☐ Aluminum
- Size (mm^2) _____
- Shape
  - ☐ Round Circular
  - ☐ Round Compacted
  - ☐ Compacted Sectoral
- Number of Cores: _____

Insulation Type

- ☐ PVC
- ☐ XLPE
- ☐ Low Smoke Halogen Free (LSHF)

Armoring Type (If Any)

- Single Core Cables:
  - ☐ Al Wire Armor (AWA)
  - ☐ Double Al Tape Armor (ATA)
- Multi Core Cables:
  - ☐ Steel Wire Armor (SWA)
  - ☐ Double Steel Tape Armor (STA)

Jacket Type

- ☐ PVC
- ☐ PE
- ☐ Low Smoke Halogen Free (LSHF)

Special Requirements _____

_____

_____

P.O.Box 31248 Jeddah 21497, KSA **Tel.:** +966 2 636 0770 **Fax:** +966 2 636 4695
e-mail: info@cables.energya.com www.cables.energya.com

Jeddah cables COMPANY

P.O.Box 31248 Jeddah 21497, KSA
Tel.: +966 2 636 0770
Fax: +966 2 636 4695
e-mail: info@cables.energya.com
www.cables.energya.com

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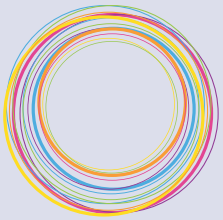


Jeddah cables COMPANY®
A Company of Energya Cables

Control Cables

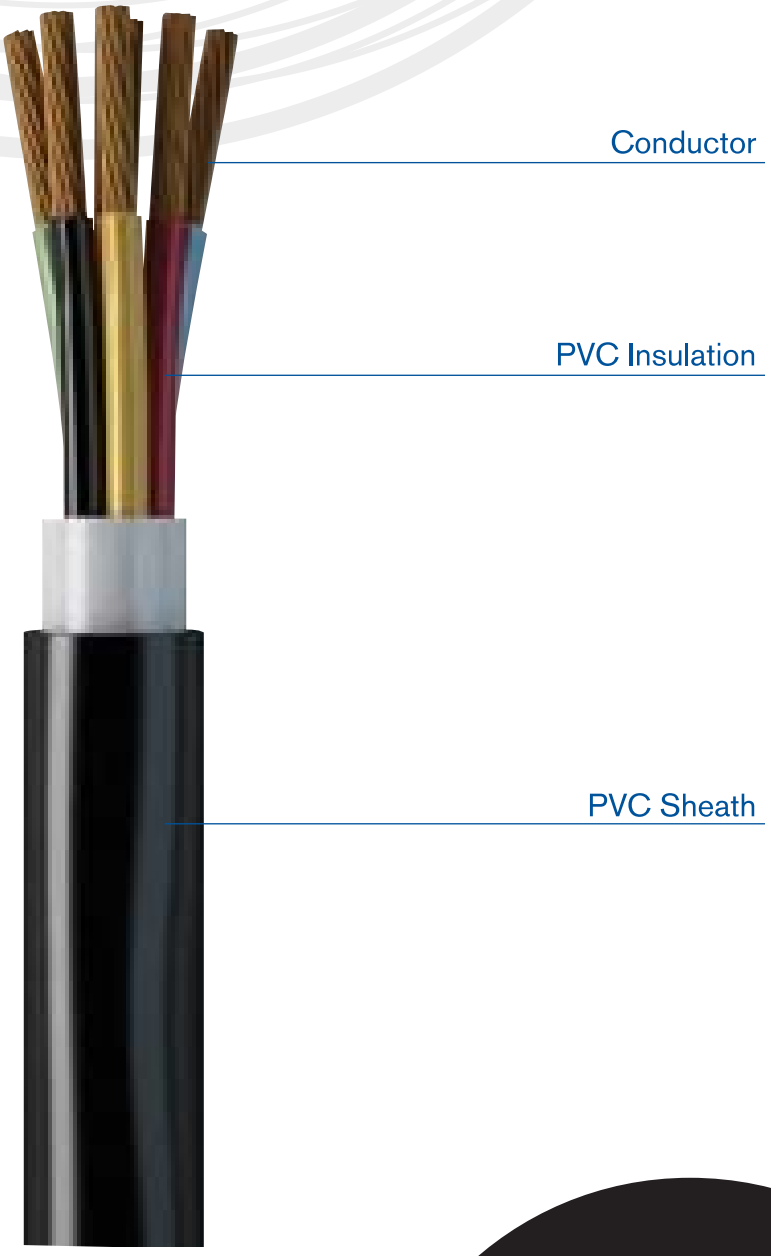
elsewedy HELAL®

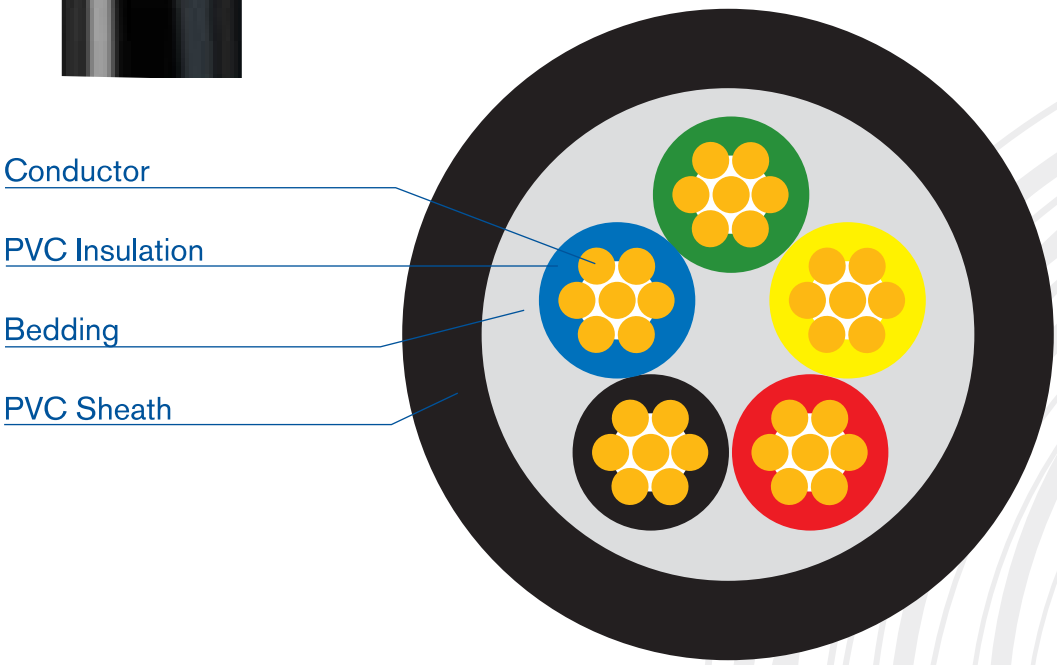
Introduction

Control Cables are used for outdoor/indoor installations for transmitting signals and connecting control units in the industry, railways, and traffic signals. Control cables are usually made of multiple cores such as 7, 10, 12, 14, and 16 cores; and control cables may be armored or unarmored.

In this catalogue, we cover all technical aspects of Jeddah Cable Company Control Cables. We included design considerations such as number of cores, type of insulation material, insulation thickness, sheath material, and sheath thicknesses. Cables Electrical Parameters such as conductor DC resistance and current ratings are included as well.

Jeddah Cable Company Control Cables are manufactured based on international standards such as IEC 60502-1. We are also capable of manufacturing according to client requirements and needs.


Conductor
PVC Insulation
PVC Sheath


Conductor
PVC Insulation
Bedding
PVC Sheath

General Information

Standards

The cables described in this catalogue are all standard types, and their performances has been proved in operation. Construction and tests are in accordance with the recommendation of IEC publications where applicable.

Control cables in accordance to other standards (e.g. BS, VDE, NEMA) can be manufactured upon customer's request.

Variation in Production and Delivery Options

The provided data is approximate and subject to manufacturing tolerance
Delivery length tolerance is ± 5%

Jacket Marking

Standard embossed outer jacket marking consisting of:
1 - Name of manufacturer
2 - Type designation, size of conductor, rated voltage and standard.
3 - Continuous length marking every meter.
4 - Year of manufacture.

Laying Information

Minimum Bending Radius During Installation

During laying, the bending radius should not be smaller than values given below.
The radius depends on the outer diameter (D_0) of the cable.

PVC and XLPE insulated Cables

Conductor	Construction	Outer diameter (mm)	Min. Radius
Stranded Copper	Armoured or Unarmoured	Any	8 D_o

Electrical Parameters Of The Cables
DC Resistance of Conductor

The maximum DC resistance values of conductors at 20°C are as per "IEC 60228" standard.
DC resistances per unit length of the conductor at other conductor temperature is given by:

$$R = R_0 [1+ \alpha_{20°C} (t - 20°C)]$$

Where:
R = DC resistance at temperature t °C Ω/KM
R_0 = DC resistance at temperature 20°C Ω/KM (given in the relative tables for each type of cable)
t = Conductor temperature °C
$\alpha_{20°C}$ = Temperature coefficient at 20°C 1/°C
For copper conductor $\alpha_{20°C}$= 0.00393

Multicore cable

For outdoor and indooor installations in damp and wet locations

Type : CU / PVC / PVC
Standartd : IEC 60502-1
Rated Voltage : 0.6 / 1 KV
Conductor : Soft annealed stranded copper wires(or soild copper)
Insulation : PVC compound rated 70°C or 85°C (XLPE or LSHF)
Jacketing : PVC compound (or LSHF)

TECHNICAL INFORMATION

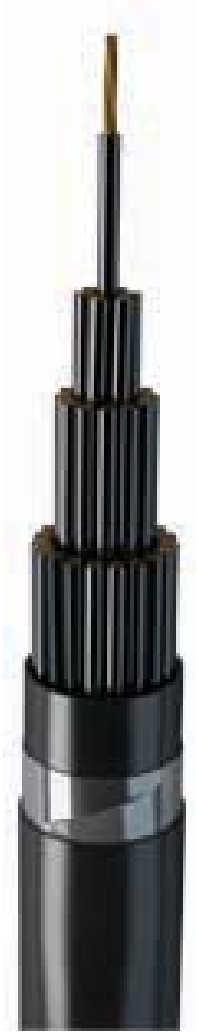
Nominal Cross Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
						Laid Direct in ground	Laid in Ducts	Laid in Free Air
n x mm^2	mm	mm	mm	kg/km	ohm/km	A	A	A
5*1.5	0.8	1.8	12.9	235	12.10	25	22	19
7*1.5	0.8	1.8	13.1	280	12.10	22	20	17
10*1.5	0.8	1.8	16.3	365	12.10	19	18	16
12*1.5	0.8	1.8	16.7	435	12.10	18	16	15
14*1.5	0.8	1.8	18.3	450	12.10	16	15	13
16*1.5	0.8	1.8	19.3	530	12.10	15	14	13
19*1.5	0.8	1.8	19.4	610	12.10	14	13	11
24*1.5	0.8	1.8	22.6	725	12.10	12	11	11
30*1.5	0.8	1.8	23.9	865	12.10	11	11	9
37*1.5	0.8	1.8	25.7	1045	12.10	10	9	8
5*2.5	0.8	1.8	14.1	300	7.41	33	29	25
7*2.5	0.8	1.8	15.2	360	7.41	30	26	22
10*2.5	0.8	1.8	18.3	480	7.41	27	23	20
12*2.5	0.8	1.8	19.4	535	7.41	25	22	19
14*2.5	0.8	1.8	19.6	640	7.41	22	20	17
16*2.5	0.8	1.8	20.5	705	7.41	20	18	15
19*2.5	0.8	1.8	22.5	835	7.41	19	17	15
24*2.5	0.8	1.8	25.1	985	7.41	18	16	13
30*2.5	0.8	1.8	26.8	1220	7.41	16	14	12
37*2.5	0.8	1.9	29.9	1520	7.41	14	13	11
5*4	1.0	1.8	17.9	525	4.61	42	36	34
7*4	1.0	1.8	19.3	645	4.61	38	33	30
10*4	1.0	1.8	22.6	720	4.61	34	30	27
12*4	1.0	1.8	24.5	470	4.61	31	27	25
14*4	1.0	1.8	25	950	4.61	28	24	22
16*4	1.0	1.8	25.85	1140	4.61	27	23	21
19*4	1.0	1.8	28.4	1510	4.61	25	21	20
24*4	1.0	1.9	31.3	1580	4.61	22	19	17
30*4	1.0	2.0	34.2	1965	4.61	20	17	15
37*4	1.0	2.1	37.1	2510	4.61	18	16	14

Multicore cable

For outdoor installations in damp and wet locations

Type : CU / PVC / STA / PVC
Standartd : IEC 60502-1
Rated Voltage: 0.6 / 1 KV
Conductor : Soft annealed stranded copper wires(or solid copper)
Insulation : PVC compound rated 70°C or 85°C (XLPE or LSHF)
Bedding : PVC compound (or LSHF)
Armouring : Steel Tape
Jacketing : PVC compound (or LSHF)

TECHNICAL INFORMATION



Nominal Cross Section	Nominal Insulation Thickness	Nominal S.Tape Thickness	Nominal Sheath Thickness	Approx. overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
n x mm2	mm	mm	mm	mm	kg/km	ohm/km	A	A	A
7*15	0.8	0.2	1.8	15.9	445	12.10	22	20	17
10*1.5	0.8	0.2	1.8	19.1	555	12.10	19	18	16
12*1.5	0.8	0.2	1.8	19.9	625	12.10	18	16	15
14*1.5	0.8	0.2	1.8	20.3	670	12.10	16	15	14
16*1.5	0.8	0.2	1.8	21.17	765	12.10	15	14	13
19*1.5	0.8	0.2	1.8	22.2	820	12.10	14	13	12
24*1.5	0.8	0.2	1.8	25.8	1020	12.10	12	12	11
30*1.5	0.8	0.2	1.8	27.1	1185	12.10	11	11	9
37*1.5	0.8	0.2	1.8	28.5	1330	12.10	10	9	8
5*2.5	0.8	0.2	1.8	16.1	460	7.41	33	29	25
7*2.5	0.8	0.2	1.8	17.2	535	7.41	30	26	22
10*2.5	0.8	0.2	1.8	19.9	820	7.41	27	23	20
12*2.5	0.8	0.2	1.8	21.4	858	7.41	25	22	19
14*2.5	0.8	0.2	1.8	22.3	880	7.41	22	20	17
16*2.5	0.8	0.2	1.8	24.5	1115	7.41	20	18	16
19*2.5	0.8	0.2	1.8	26.1	1170	7.41	19	17	15
24*2.5	0.8	0.2	1.8	28.1	1350	7.41	18	16	13
30*2.5	0.8	0.2	1.9	31.9	1915	7.41	16	14	12
37*2.5	0.8	0.2	1.9	31.9	1960	7.41	14	13	11
5*4	1.0	0.2	1.8	18.7	630	4.61	42	36	34
7*4	1.0	0.2	1.8	20.1	740	4.61	38	33	30
10*4	1.0	0.2	1.8	24.6	960	4.61	34	30	27
12*4	1.0	0.2	1.8	25.3	1120	4.61	31	27	25
14*4	1.0	0.2	1.8	26.5	1270	4.61	28	24	22
16*4	1.0	0.2	1.8	27.8	1390	4.61	27	23	21
19*4	1.0	0.2	1.8	29.2	1610	4.61	25	21	20
24*4	1.0	0.2	2.0	34.5	2030	4.61	22	19	17
30*4	1.0	0.2	2.0	36.4	2660	4.61	20	17	15
37*4	1.0	0.5	2.2	40.7	3250	4.61	18	16	14

Multicore cable

For outdoor installations in damp and wet locations

Type : CU / PVC / SWA / PVC
Standartd : IEC 60502-1
Rated Voltage: 0.6 / 1 KV
Conductor : Soft annealed stranded copper wires (or solid copper)
Insulation : PVC compound rated 70°C or 85°C (XLPE or LSHF)
Bedding : PVC compound (or LSHF)
Armouring : Steel Wires
Jacketing : PVC compound (or LSHF)

TECHNICAL INFORMATION

Nominal Cross Section	Nominal Insulation Thickness	Nominal S.Wire Diameter	Nominal Sheath Thickness	Approx overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
nXmm²	mm	mm	mm	mm	kg/km	ohm/km	A	A	A
7*15	0.8	0.9	1.8	16.9	590	12.10	22	20	17
10*1.5	0.8	0.9	1.8	20.0	760	12.10	19	18	16
12*1.5	0.8	0.9	1.8	20.5	845	12.10	18	16	15
14*1.5	0.8	1.6	1.8	24.6	1140	12.10	16	15	14
16*1.5	0.8	1.6	1.8	25.8	1205	12.10	15	14	13
19*1.5	0.8	1.6	1.8	27.8	1365	12.10	14	13	12
24*1.5	0.8	1.6	1.8	29.1	1555	12.10	12	12	11
30*1.5	0.8	1.6	1.8	31.1	1735	12.10	11	11	9
37*1.5	0.8	1.6	1.9	17.1	2145	12.10	10	9	8
5*2.5	0.8	0.9	1.8	18.2	615	7.41	33	29	25
7*2.5	0.8	0.9	1.8	21.7	705	7.41	30	26	22
10*2.5	0.8	0.9	1.8	22.4	875	7.41	27	23	20
12*2.5	0.8	0.9	1.8	24.6	970	7.41	25	22	19
14*2.5	0.8	1.6	1.8	25.8	1430	7.41	22	20	17
16*2.5	0.8	1.6	1.8	26.9	1510	7.41	20	18	16
19*2.5	0.8	1.6	1.8	31.2	1615	7.41	19	17	15
24*2.5	0.8	1.6	1.9	32.1	2190	7.41	18	16	13
30*2.5	0.8	1.6	1.9	34.5	2450	7.41	16	14	12
37*2.5	0.8	1.6	2.0	19.7	2555	7.41	14	13	11
5*4	1.0	0.9	1.8	21.1	820	4.61	42	36	34
7*4	1.0	0.9	1.8	26.9	955	4.61	38	33	30
10*4	1.0	1.6	1.8	27.7	1490	4.61	34	30	27
12*4	1.0	1.6	1.8	28.8	1805	4.61	31	27	25
14*4	1.0	1.6	1.8	30.2	1805	4.61	28	24	22
16*4	1.0	1.6	1.8	31.8	2040	4.61	27	23	21
19*4	1.0	1.6	1.9	37.9	2260	4.61	25	21	20
24*4	1.0	2.0	2.1	37.7	2985	4.61	22	19	17
30*4	1.0	2.0	2.1	39.8	3560	4.61	20	17	15
37*4	1.0	2.0	2.2	42.4	3920	4.61	18	16	14

Conversion Table

Multiply	by	to obtain
WEIGHT - Imperial		
Ounces	28.3495	grams
Pounds (Av)	453.59	grams
Pounds (Av)	0.45359	kilograms
Tons (short)	907.19	kilograms
Tons (long)	1016.05	kilograms
WEIGHT - Metric		
Grams	0.03527	ounces
Grams	0.002205	pounds
Kilograms	35.274	ounces
Kilograms	2.2046	pounds
Kilograms	0.001102	tons (short)
Kilograms	0.0009842	tons (long)
MISCELLANEOUS - Imperial		
Pounds per 1000 feet	1.48816	kilograms per kilometer
Pounds per mile	0.28185	kilograms per kilometer
Pounds per square inch	0.0007031	kilograms per square millimeter
Pounds per square inch	0.07031	kilograms per square centimeter
Feet per second	18.288	meters per minute
Feet per second	1.09728	kilometers per hour
Mils per hour	1.60935	kilometers per hour
Ohms per 1000 feet	3.28083	ohms per kilometer
Ohms per mile	0.62137	ohms per kilometer
Decibels per 1000 feet	3.28083	decibels per kilometer
Decibels per mile	0.62137	decibels per kilometer
Decibles	0.1153	nepers
MISCELLANEOUS - Metric		
Kilograms per kilometer	0.67197	pounds per 1000 feet
Kilograms per kilometer	3.54795	pounds per mile
Kilograms per square millimeter	1422.34	pounds per square inch
Kilograms per square centimeter	14.2234	pounds per square inch
Grams per cubic cm	0.03613	pounds per cubic inch
Meters per minute	0.05468	feet per second
Kilometer per hour	0.91134	feet per second
Kilometer per hour	0.62137	miles per hour
Ohms per kilometer	0.3048	ohms per 1000 feet
Ohms per kilometer	1.6093	ohms per mile
Decibels per kilometer	0.3048	decibels per 1000 feet
Decibels per kilometer	1.6093	decibles per mile
TEMPERATURE		
°Fahrenheit	5/9 (°F)-32	°Celsius
°Celsius	9/5 (°C) + 32	°Fahrenheit

Multiply	by	to obtain
LENGTH - Imperial		
Mils	0.001	inches
Mils	0.0254	millimeters
Inches	1000	mils
Inches	25.40	millimeters
Inches	2.54	centimeters
Feet	30.48	centimeters
Feet	0.3048	meters
Feet (thousands of)	0.3048	kilometers
Yards	0.9144	meters
Mils	1.6093	kilometers
LENGTH - Imperial		
Millimeters	39.37	mils
Millimeters	0.03937	inches
Centimeters	0.3937	inches
Centimeters	0.032808	feet
Meters	39.37	inches
Meters	3.2808	feet
Meters	1.0936	yards
Kilometers	3280.83	feet
Kilometers	0.62137	mils
AREA - Imperial		
Square mils	1.2732	circular mills
Square mils	0.000001	square inches
Circular mils	0.7854	square mils
Circular mils	0.0000007854	square inches
Circular mils	0.00050657	square millimeters
Square inches	1000000	square mils
Square inches	1273240	circular mils
Square inches	645.16	square millimeters
Square inches	6.4516	square centimeters
Square inches	0.09290	square meters
Square inches	0.8361	square meters
AREA - Metric		
Square millimeters	1973.52	circular mills
Square millimeters	0.00155	square inches
Square centimeters	0.155	square inches
Square meters	10.7638	square feet
Square meters	1.19599	square yards
VOLUME - Imperial		
Cubic inches	16.38716	cubic centimeters
Cubic feet	0.028317	cubic meters
VOLUME - U.S.		
Quarts (liquid)	0.9463	cubic centimeters
Gallaons	3.7854	cubic meters
VOLUME - Metric		
Cubic centimeters	0.06102	cubic inches
Cubic meters	35.3145	cubic feet
Litres	1.05668	quarts (Liquid U.S.)
Litres	0.26417	gallons

Selection form: Control Cables

This form needs to be filled in order to help Jeddah Cables Company prepare the night quitation

Standard & Specification

- ☐ IEC
- ☐ BS
- ☐ Others _____

Cu Conductor

- Size (mm^2) _____
- Number of Cores _____

Insulation Type

- ☐ PVC
- ☐ XLPE
- ☐ Low Smoke Halogen Free (LSHF)

Armoring Type (if Any)

- ☐ Steel Wire Armor (SWA)
- ☐ Double Steel Tape Armor (STA)

Jacket Type

- ☐ PVC
- ☐ Low Smoke Halogen Free (LSHF)

Special Requirements _____

_____

_____

P.O.Box 31248 Jeddah 21497, KSA **Tel.:** +966 2 636 0770 **Fax:** +966 2 636 4695
e-mail: info@cables.energya.com www.cables.energya.com

Jeddah cables COMPANY

P.O.Box 31248 Jeddah 21497, KSA
Tel.: +966 2 636 0770
Fax: +966 2 636 4695
e-mail: info@cables.energya.com
www.cables.energya.com

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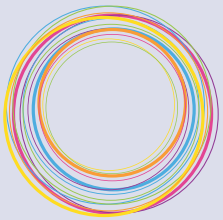

Jeddah cables COMPANY®
A Company of Energya Cables

Indoor Cables

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Introduction

Building Wires are used for fixed indoor installations inside conduits and within walls.
Building Wires with multi-cores can be used to connect a power supply to large loads such as air conditioning systems. Examples include: copper conductors with PVC insulation (NYA) and copper with PVC insulation and nylon jacketing (THHN).

In this catalogue, we cover all technical aspects of Jeddah Cable Company Indoor Cables. We included design considerations such as type of insulation material, insulation thicknesses, sheath material, and sheath thicknesses. Cables electrical parameters such as conductor DC resistance and current ratings are included as well.

Jeddah Cable Company Indoor Cables are manufactured based on international standards such as IEC 60227, BS 6004, and UL 83. We are also capable of manufacturing according to client requirements and needs.

Standards

The indoor cables described in this catalogue are all standard types, and their performances has been proved in operation.
Construction and tests are in accordance with the recommendation of IEC publications where applicable. indoor cables in accordance to other standards (e.g. BS, VDE, NEMA) can be manufactured upon customer's request.

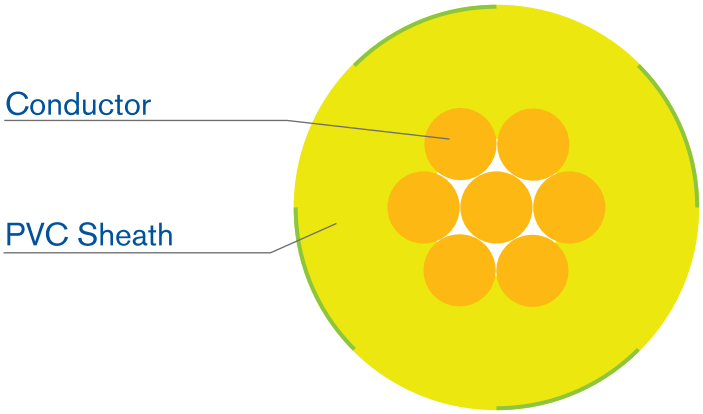
Variation in Production and Delivery Options

- The provided data is approximate and subject to manufacturing tolerance
- Delivery length tolerance is ± 5%
- Other product sizes are available upon customer's request

Jacket Marking

Standard embossed outer jacket marking consisting of:

1. Name of manufacturer
2. Type designation, size of conductor, rated voltage and standard
3. Continuous length marking every meter (if applicable)
4. Year of manufacture



Laying Information

Minimum Bending Radius During Installation

During laying, the bending radius should not be smaller than values given below.
The radius depends on the outer diameter (D_O) of the cable.

Cable for Fixed Wiring

Insulation	Conductor	Outer diameter (mm)	Min. Radius (mm)
PVC or (LSHF)	Copper (solid strand or flexible)	Up to 10 10 - 25 Above 25	3 D_O 4 D_O 6 D_O

Electrical Parameters Of The Cables

DC Resistance of Conductor

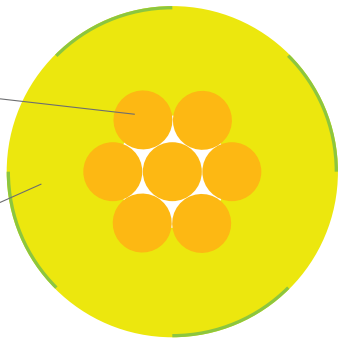
The Maximum DC resistance values of conductors at 20ºC are as per "IEC 60228" standard.
DC resistance per unit length of the conductor at other conductor temperature θ is given by:

$$R = R_O [1+\alpha_{20°C} (t - 20ºC)]$$

Where:
R = DC resistance at temperature t ºC Ω/km
R_O = D.C resistance at temperature 20ºC Ω/km (given in the relative tables for each type of (cable)
t = Conductor temperature ºC
α20 = Temperature coefficient at 20ºC 1/ºC
For copper conductor $\alpha_{20°C}$ = 0.00393

Single Core

For indoor fixed installation in dry location



Type : CU / PVC
Standartd : IEC 60227
Nominal Voltage: 450/750 volt
Conductor : Soft annealed solid or stranded copper wires
Insulation : PVC compound rated 85°C (or LSHF)
Packing : Plastic spools-coils or non returnable wood drums as per customer requirement

TECHNICAL INFORMATION

Nominal Cross Section	Nominal Insulation Thickness	Approx Overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING	
					Laid in Conduits	Laid in Free Air
mm^2	mm	mm	kg/km	ohm/km	A	A
Copper Solid Conductors						
1.5	0.7	2.8	20	12.1	21	28
2.5	0.8	3.4	35	7.41	27	38
4	0.8	3.84	46	4.61	34	50
6	0.8	4.31	65	3.08	43	66
10	1.0	5.6	109	1.83	60	89
Copper Stranded Conductors						
1.5	0.7	2.96	20	12.1	21	28
2.5	0.8	3.58	32	7.41	27	38
4	0.8	4.12	50	4.61	34	50
6	0.8	4.7	70	3.08	43	66
10	1.0	6.0	115	1.83	60	89
16	1.0	7.0	170	1.15	78	115
25	1.2	8.7	270	0.727	103	152
35	1.2	9.8	360	0.524	126	189
50	1.4	11.0	475	0.387	157	235
70	1.4	12.7	665	0.268	196	291
95	1.6	14.7	925	0.193	239	350
120	1.6	16.2	1145	0.153	280	410
150	1.8	18.1	1425	0.124	316	473
185	2.0	20.1	1765	0.0991	364	545
240	2.2	23.0	2325	0.0754	431	650
300	2.4	25.4	2900	0.0601	494	690
400	2.6	28.6	3700	0.0470	566	916

Single Core

For fixed installation where particular flexibility is required

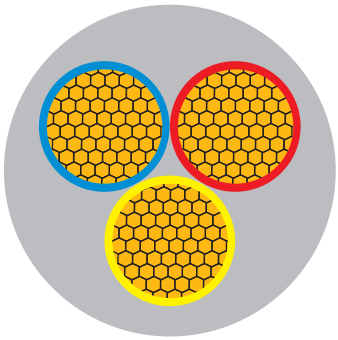
Type : CU / PVC
Standartd : IEC 60227
Nominal Voltage: 300/500 & 450/750 volt
Conductor : Soft annealed copper fine wires
Insulation : PVC compound rated 85°C (or LSHF)
Packing : Plastic spools-coils or non returnable wood drums as per customer requirements

TECHNICAL INFORMATION

Nominal Cross Section	Nominal Insulation Thickness	Approx Overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING	
					Laid in Conduits	Laid in Free Air
mm^2	mm	mm	kg/km	ohm/km	A	A
0.50	0.6	2.1	8.5	39.0	8	11
0.75	0.6	2.2	10	26.0	11	17
1.0	0.6	2.5	15	19.5	14	22
1.5	0.7	3	20	13.3	21	28
2.5	0.8	3.6	35	7.98	27	38
4	0.8	4.5	50	4.95	34	50
6	0.8	5.2	70	3.30	43	66
10	1.0	6.6	115	1.91	60	89
16	1.0	7.1	170	1.21	78	115
25	1.2	9.5	245	0.780	103	152
35	1.2	10.9	365	0.554	126	189
50	1.4	13	515	0.386	157	235
70	1.4	15.1	700	0.272	196	291
95	1.6	17.3	925	0.206	239	350
120	1.6	17.7	1150	0.161	280	410
150	1.6	19	1390	0.129	316	473
185	2.0	24	1825	0.106	364	545
240	2.2	27.4	2330	0.0801	430	566

Multicore Cables

For indoor movable installations in dry location

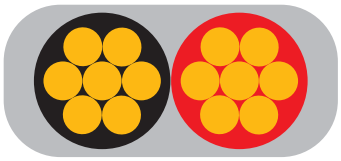


Type	:	CU / PVC/PVC
Standartd	:	IEC 60227
Nominal Voltage:		300/500 Volt
Conductor	:	Soft annealed copper fine wires
Insulation	:	PVC compound rated 70°C or 85°C
Jacketing	:	PVC compound (or LSHF)
Packing	:	Plastic spools-coils or non returnable wood drums as per customer requirements

TECHNICAL INFORMATION

Nominal Cross Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx Overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING	
						Laid in Conduits	Laid in Free Air
n x mm^2	mm	mm	mm	kg/km	ohm/km	A	A
2*0.75	0.6	0.8	6.0	55	26.0	8	15
2*1.0	0.6	0.8	6.6	65	19.5	10	18
2*1.5	0.7	0.8	7.6	90	13.3	13	22
2*2.5	0.8	1.0	9.2	135	7.98	18	30
3*0.75	0.6	0.8	6.5	65	26.0	8	15
3*1.0	0.6	0.8	7.7	80	19.5	10	18
3*1.5	0.7	0.9	8.3	115	13.3	13	22
3*2.5	0.8	1.1	10	170	7.98	18	28
4*0.75	0.6	0.8	6.9	80	26.0	7	14
4*1.0	0.6	0.8	7.7	90	19.5	9	17
4*1.5	0.7	1.0	9.3	145	13.3	12	21
4*2.5	0.8	1.1	10.9	210	7.98	16	28
5*0.75	0.6	0.9	8.8	105	26.0	7	14
5*1.0	0.6	0.9	9.5	125	19.5	9	17
5*1.5	0.7	1.1	10.3	170	13.3	12	21
5*2.5	0.8	1.2	12.1	245	7.98	16	28

Multicore Cables



For indoor fixed installation in dry location

Type : CU / PVC/PVC
Standartd : BS 6004
Nominal Voltage : 300/500 volt
Conductor : Soft annealed solid or stranded copper wires
Insulation : PVC compound rated 70°C or 85°C
Jacketing : PVC compound(or LSHF)
Packing : Plastic spools-coils or non returnable wood drums as per customer requirements

TECHNICAL INFORMATION

Nominal Cross Section	No. of Wires in Cord	Nominal Insu. Thick	No. of Wires in Earth Cond.	Nominal Sheath Thick	Approx Overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C		CURRENT RATING	
									Laid in Conduit	Laid in Free Air
n x mm²	NR	mm	NR	mm	mm	KG/KM	Ins. cond	earth cond	A	A
I-Twin and Three Core Flat Cables without Earth Continuity Conductor										
2*1.5	1			0.9	7.4*4.6	65	11.9		14	17
2*2.5	1			1.0	8.7*5.36	95	7.14		20	23
2*4	7			1.0	11.4*7.2	140	4.52		26	30
2*6	7			1.1	12.7*8.0	190	3.02		33	38
2*10	7			1.2	15.6*9.4	310	1.79		44	53
2*16	7			1.3	18*10.8	450	1.13		58	70
3*1.5	1	0.7		0.9	10.15*4.6	95	11.9		14	17
3*2.5	1	0.8		1.0	12.1*5.36	140	7.14		20	23
3*4	7	0.8		1.1	15.6*7.4	215	4.52		26	30
3*6	7	0.8		1.1	17.5*8.5	285	3.02		33	38
3*10	7	1.0		1.2	22.0*9.8	460	1.79		44	53
3*16	7	1.0		1.3	25.4*11	670	1.13		58	70
II-Twin and Three Core Flat Cables with Earth Continuity Conductor										
2*1.5+1	1	0.7	1	0.9	8.9*5.2	75	11.9	17.7	13	14
2*2.5+1	1	0.8	1	1.0	10.2*6.0	110	7.14	17.7	18	20
2*4+1.5	7	0.8	1	1.0	12.6*7.2	165	4.52	11.9	24	26
2*6+2.5	7	0.8	1	1.0	14.4*8.0	230	3.02	7.41	30	33
2*10+4	7	1.0	7	1.2	18.2*9.6	370	1.79	4.52	40	44
2*16+6	7	1.0	7	1.3	21.4*11	535	1.13	3.0	51	59
3*1.5+1	1	0.7	1	0.9	11.8*5.4	105	11.9	17.7	13	14
3*2.5+1	1	0.8	1	1.0	13.8*6.2	150	7.14	17.7	18	20
3*4+1.5	7	0.8	1	1.1	17.27*7.4	245	4.52	11.9	24	26
3*6+2.5	7	0.8	1	1.1	19.4*8.0	320	3.02	7.14	30	33
3*10+4	7	1.0	7	1.2	24.8*9.8	520	1.79	4.52	40	44
3*16+6	7	1.0	7	1.3	28.6*10	755	1.13	3.02	51	59

Conversion Table

Multiply	by	to obtain
WEIGHT - Imperial		
Ounces	28.3495	grams
Pounds (Av)	453.59	grams
Pounds (Av)	0.45359	kilograms
Tons (short)	907.19	kilograms
Tons (long)	1016.05	kilograms
WEIGHT - Metric		
Grams	0.03527	ounces
Grams	0.002205	pounds
Kilograms	35.274	ounces
Kilograms	2.2046	pounds
Kilograms	0.001102	tons (short)
Kilograms	0.0009842	tons (long)
MISCELLANEOUS - Imperial		
Pounds per 1000 feet	1.48816	kilograms per kilometer
Pounds per mile	0.28185	kilograms per kilometer
Pounds per square inch	0.0007031	kilograms per square millimeter
Pounds per square inch	0.07031	kilograms per square centimeter
Feet per second	18.288	meters per minute
Feet per second	1.09728	kilometers per hour
Mils per hour	1.60935	kilometers per hour
Ohms per 1000 feet	3.28083	ohms per kilometer
Ohms per mile	0.62137	ohms per kilometer
Decibels per 1000 feet	3.28083	decibels per kilometer
Decibels per mile	0.62137	decibels per kilometer
Decibles	0.1153	nepers
MISCELLANEOUS - Metric		
Kilograms per kilometer	0.67197	pounds per 1000 feet
Kilograms per kilometer	3.54795	pounds per mile
Kilograms per square millimeter	1422.34	pounds per square inch
Kilograms per square centimeter	14.2234	pounds per square inch
Grams per cubic cm	0.03613	pounds per cubic inch
Meters per minute	0.05468	feet per second
Kilometer per hour	0.91134	feet per second
Kilometer per hour	0.62137	miles per hour
Ohms per kilometer	0.3048	ohms per 1000 feet
Ohms per kilometer	1.6093	ohms per mile
Decibels per kilometer	0.3048	decibels per 1000 feet
Decibels per kilometer	1.6093	decibles per mile
TEMPERATURE		
°Fahrenheit	5/9 (°F)-32	°Celsius
°Celsius	9/5 (°C) + 32	°Fahrenheit

Multiply	by	to obtain
LENGTH - Imperial		
Mils	0.001	inches
Mils	0.0254	millimeters
Inches	1000	mils
Inches	25.40	millimeters
Inches	2.54	centimeters
Feet	30.48	centimeters
Feet	0.3048	meters
Feet (thousands of)	0.3048	kilometers
Yards	0.9144	meters
Mils	1.6093	kilometers
LENGTH - Imperial		
Millimeters	39.37	mils
Millimeters	0.03937	inches
Centimeters	0.3937	inches
Centimeters	0.032808	feet
Meters	39.37	inches
Meters	3.2808	feet
Meters	1.0936	yards
Kilometers	3280.83	feet
Kilometers	0.62137	mils
AREA - Imperial		
Square mils	1.2732	circular mills
Square mils	0.000001	square inches
Circular mils	0.7854	square mils
Circular mils	0.0000007854	square inches
Circular mils	0.00050657	square millimeters
Square inches	1000000	square mils
Square inches	1273240	circular mils
Square inches	645.16	square millimeters
Square inches	6.4516	square centimeters
Square inches	0.09290	square meters
Square inches	0.8361	square meters
AREA - Metric		
Square millimeters	1973.52	circular mills
Square millimeters	0.00155	square inches
Square centimeters	0.155	square inches
Square meters	10.7638	square feet
Square meters	1.19599	square yards
VOLUME - Imperial		
Cubic inches	16.38716	cubic centimeters
Cubic feet	0.028317	cubic meters
VOLUME - U.S.		
Quarts (liquid)	0.9463	cubic centimeters
Gallaons	3.7854	cubic meters
VOLUME - Metric		
Cubic centimeters	0.06102	cubic inches
Cubic meters	35.3145	cubic feet
Litres	1.05668	quarts (Liquid U.S.)
Litres	0.26417	gallons

Selection form: Indoor Cables

This form needs to be filled in order to help Jeddah Cables Company prepare the night quitation

Standard & Specification

- ☐ IEC
- ☐ BS
- ☐ UL
- ☐ Others _____

Cu Conductor

- Size (mm^2) _____
- Temper
  - ☐ Solid
  - ☐ Stranded
  - ☐ Flexible Stranded
- Number of Cores _____

Insulation Type

- ☐ PVC
- ☐ Low Smoke Halogen Free (LSHF)

Jacket Type (if Any)

- ☐ PVC
- ☐ Low Smoke Halogen Free (LSHF)
- ☐ Nylon (THHN)

Special Requirements _____

_____

_____

P.O.Box 31248 Jeddah 21497, KSA **Tel.:** +966 2 636 0770 **Fax:** +966 2 636 4695
e-mail: info@cables.energya.com www.cables.energya.com

Jeddah cables COMPANY

P.O.Box 31248 Jeddah 21497, KSA
Tel.: +966 2 636 0770
Fax: +966 2 636 4695
e-mail: info@cables.energya.com
www.cables.energya.com