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.

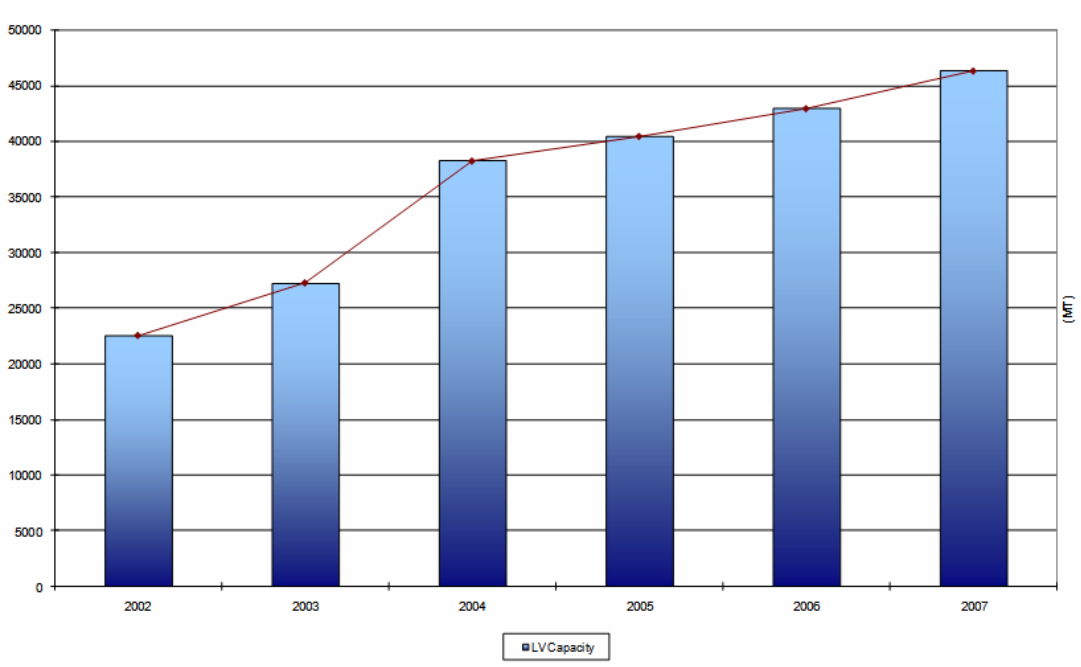
- ✓ Overhead lines: They come as bare conductors and used for earthing electrical systems (when soft drawn copper is used) and in

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.



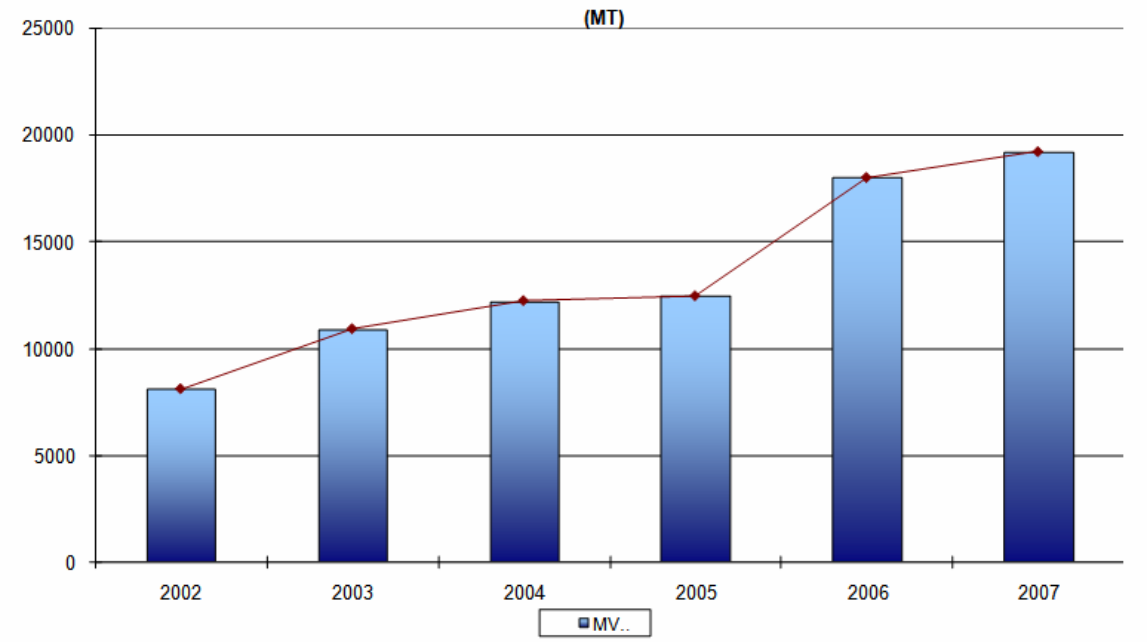
2. Medium & High Voltage Cables Plant:

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).

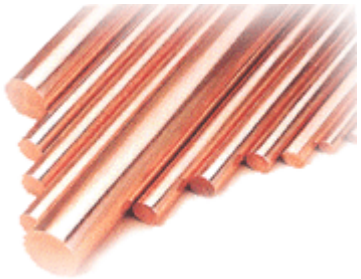
Our plants Capacity are continuously improved since year 2002 by installing state of the art machines, the most advanced CV lines and expanding our facilities.



3. **Copper Rod Plant**:

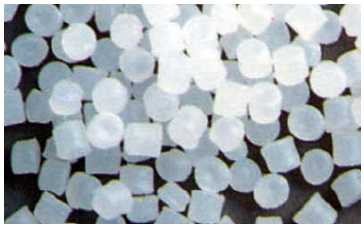
The plant produces Copper Rods using continuous casting technique with Copper Cathodes. The end product is a Copper Rod with the following characteristics:

- ✓ 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

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INDUSTRIES

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CABLES
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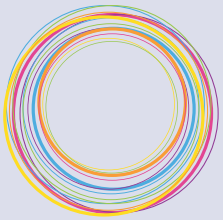

Jeddah cables COMPANY®
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LV Power distribution (<1KV)

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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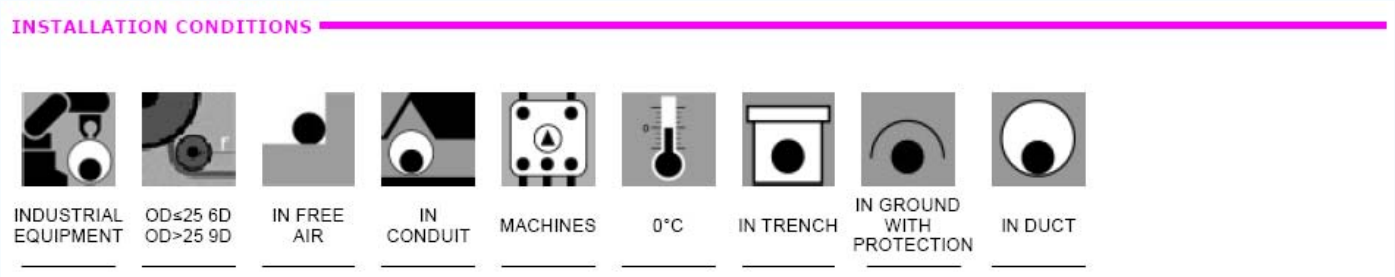
❖ Control Cables

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

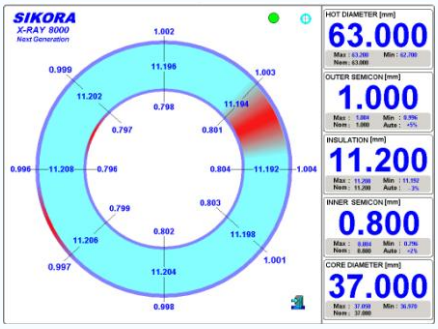
QC/QA TESTING

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

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