

Foreword

This catalogue contains the dimensions, electrical properties and installation data on POWER-X (XLPE insulated power cables) according to British Standards, 69-30 and IET wiring regulation Seventeenth Edition: 2008+A1:2010.

ACL Cables PLC is proud to establish a relationship with you and we are offering you a reliability of over five decades of cable manufacturing since 1962, coupled with the developing technological efficiency of electric cables. We have ventured as far Europe, Africa, Asia to New Zealand and Australia since 1989 with POWER-X and our journey of Innovation will continue.

We would also express our sincere thanks to our customers and well wishes who had already established a mutually beneficial relationship. We hope this catalogue to be of good aid and use.

ACL CABLES PLC

2016 June
(Fifth Edition)



Certificates of Excellence



ISO 9001 : 2008



ISO 14001 : 2004

Awards of Excellence



Taiki Akimoto
5s Merit
Award
2007



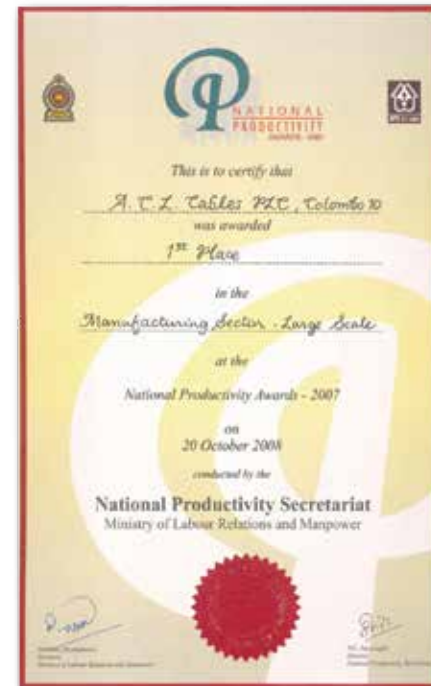
Industrial
Excellence Award
In Extra Large
Manufacturing
Category
2007



Highest Sri Lanka Award for Quality



National Quality Award
Large Manufacturing
Category
2007



Highest Sri Lanka Award for Productivity

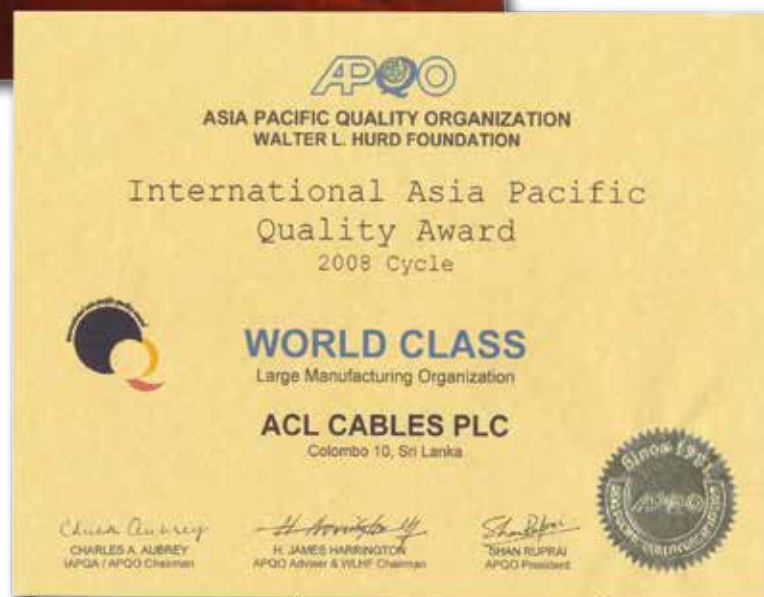


National Productivity Award
Large Manufacturing Sector
2007



Winner of World Class Award or the Highest Award of International Asia Pacific Quality Organization in 2008

Beating National Quality Award Winners of 46 Countries in the Asia Pacific Region which included countries such as Japan, Australia, Mexico, Singapore, India, Korea Taiwan etc.



Industrial Excellence Crystal Award
Extra Large Manufacturing Category
-2009



Award for Excellence Performance in Material Efficiency
Manufacturing Large Category
2013



National Cleaner Production Award
Large Category
2013



B2B Brand of the year at SLIM Brand Excellence
2015



Global Commerce Excellence Export Award 2014
Awarded by Shippers Academy in Association with
Central Bank of Sri Lanka

In recognition of export and technological leadership created by
ACL Cables PLC, which has significantly contributed to the growth
of National Economy.



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ACL – Since 1962

ACL is the largest manufacturer of cables in Sri Lanka having pioneered the industry in 1962. ACL holds 45% share of the local market and produce the widest range of cables in Sri Lanka. Today, ACL has grown to be a Group of companies holding 70% share of the cable market in Sri Lanka.

ACL is the most sought – after brand of cables in Sri Lanka, having supplied 80% of the requirements of Duty Free projects owned by overseas investors and approved by the Board of Investment, beating foreign supplies of cables. All leading factories, hotels, commercial buildings and warehouses have used ACL Cables.

ACL continues to innovate and lead the field in the introduction of new products modern technology and machinery. In the five decades of it's existence, the Company has evolved as a specialized manufacturer and supplier of the widest range of quality cables and conductors in the country, while possessing the **most advanced technology in the Asian region** for the manufacture of low voltage Cross Linked Polyethylene cables (XLPE).

Concept at ACL

Modern industries and technologies have opened forth a wide range of endeavors and ventures in the Island of Sri Lanka. ACL ushered a new era in power sector and dedicated itself to the cause of transmission, distribution and utilization of electrical energy for all cross sections of the country. With a rich heritage of over five decades, ACL offers it's products, which not only meet the stipulated requirements of the governing National and International specifications, but far exceeding them.

Excellence through "Total Quality Management" is the catchword at ACL. Since its inception ACL has striven not only to upgrade the product quality but to bring into practice superior management of men to make its place in the international market. Professionalism, advanced know – how and technology, customer services have been the hallmark of ACL. Its concept is translated into every length of product through co – ordinated efforts of professionals on job.

ACL Technology

From the inception ACL has been acquiring foreign technology for the development of existing and new products. In the year 1962, ACL commenced business with technical assistance arranged through the Colombo based liaison office of Mitsui. The Japanese Technology, Machinery, & Engineers helped ACL to establish a Foundation of Quality products. Thereafter, ACL joined hands with two cable companies in India to establish the manufacture of Aluminum Conductors and Armored Cables.

One of the company's most notable technology transfer agreements in recent times have been with NOKIA Cables of Finland for the manufacture of XLPE insulated Cables, Aerial Bundled Cables and Aluminum Alloy Conductors.

Having obtained technology from NOKIA on two occasions in the year 1989 and 1993, ACL upgraded its technology on XLPE insulated Aerial Bundled Cables to surpass National French Standard NFC 33 – 209 in the year 1998 through its own Research and Development. This feat not matched in the region by any other manufacturer at that time. The technology so achieved is employed in the manufacture of XLPE insulated Armoured and Unarmoured power cables. These developments offer many benefits to valued customers and in order to highlight those benefits it was decided to name all our XPLE insulated cables under the brand name **Power – X**.

Having obtained ISO 9002 certification in the year 1998, ACL was awarded the prestigious ISO 9001 – 2000 certificate in the Year 2002. In the same year ACL was awarded ISO 14001 : 1997 Environmental Management Systems Certification.

ACL - TECHNOLOGICAL DEVELOPMENT

- 1962 - Establishment of ACL with technical assistance from Mitsui of Japan.
- 1978 - Introduction of Wire Drawing facility.
- 1981 - Acquisition of Technology from Alind of India for drawing and processing of Aluminium Conductors to jointly manufacture and supply 1400 MT of AAC-Fly Conductor to Ceylon Electricity Board.
- 1985 - Manufacture of Armoured Power and Control Cables for the first time in Sri Lanka with Indian Technical assistance.
- 1989 - Acquisition of Technology from NOKIA of Finland to jointly manufacture XLPE insulated Aerial Bundled Cables to execute an order for 800 km of that product on an ADB funded tender floated by Lanka Electricity Company.
- 1993 - Acquisition of Technology from NOKIA of Finland to draw and age Aluminium Alloy and establishment of aging furnace.
- 1993 - Establishment of ACL Plastics Limited for the manufacture of our own PVC Compound.
- 1994 - Pilot Project for 11kV partially insulated conductors working with Ceylon Electricity Board.
- 1998 - Successfully upgraded XLPE Extrusion Technology to National French Standard NFC 33-209 and won 500 km order for Aerial Bundled Cables from Ceylon Electricity Board.

- 2005 - Introduction of Flame Retardant (FR), Flame Retardant Low Smoke (FRLS) and Low Smoke Halogen Free (LSHF) cables with technical assistance from a British Company.
- 2007 - Setting up of Aluminium Rod Plant with a total capacity of 24000 Metric Tons per annum.
- 2010 - Re - launch of 11 kV & 33 kV ACL SAX as per new specifications of CEB with the second pilot project.
- 2013 - Manufacture of Fire Survival cables to maintain circuit integrity under fire conditions in accordance with BS 6387:1994, for the first time in Sri Lanka.

ACL - CORPORATE HIGHLIGHTS

- 1962 - Commencement as a member of Associated Motorways Group (AMW) of Companies under the name Associated Cables Ltd.
- 1976 - Converted to a Public Limited Liability Company.
- 1978 - Moved out of AMW Group.
- 1982 - Establishment of own island wide distribution network.
- 1990 - Change of Company name in to ACL Cables Limited
- 1991 - Establishment of ACL Plastics Limited
- 1995 - Acquisition of Ceylon Bulbs and Electricals Limited.
- 1999 - Purchase of 75% of shares of the second largest cable manufacturer in the Island.
- 2002 - Setting up of state of the art Magnet Wire project.
- 2007 - Establishment of ACL Metals & Alloys (PVT)Ltd.
- 2011 - Setting up of Copper Plant
- 2011 - Shifting of ACL Head Office to newly constructed four storied own building at Colombo 08.
- 2013 - Establishment of ACL Electric PVT (Ltd) for manufacture of switches

OTHER ACHIEVEMENTS OF ACL

- 1995 - **Commencement of Export of Cables**
In August 1995 US\$ 269,650/- worth of Alloy Conductors were exported to Rural Electrification Board, Bangladesh. In November 1995 US\$ 117,609/- worth of Armoured Cables were exported to Maldives Electricity Board, Maldives.
- 1998 - **Achievement of ISO 9002:1994 Quality Management System Certificate**
Achieved prestigious ISO 9002:1994 Quality Management System Certificate.
- 2002 - **Achievement of ISO 9001: 2000 Quality Management System Certificate**
Achieved prestigious ISO 901:2000 Quality Management System certificate.
- 2002 - **Introduction of “ACL FLEXI” cables to the Sri Lanka market.**
Introduced a series of domestic wires with super flexibility in the range of 1.0mm² - 6mm².
- 2002 - **Achievement of ISO 14001:1997 Environmental Management System Certificate**
Achieved prestigious ISO 14001:1997 Environmental Management System Certificate.
- 2004 - Large scale export of Aerial Bundled Cables to India.
- 2004 - Achievement of IS 694 Product Certificate from Bureau of Indian Standards.
- 2007 - Taiki Akimoto 5 S Merit Award.
- 2007/2008 - Industrial Excellence Gold Award in Extra Large Manufacturing category.
- 2007 - National Quality Award - Large Scale Manufacturing category (highest award for Quality in Sri Lanka).
- 2007 - National Productivity Award - Large Scale Manufacturing category (highest award for Productivity in Sri Lanka).
- 2008 - Highest Award of Asia Pacific Quality Organization called the World Class Award (A record to date among all Sri Lankan manufactures).
- 2008 - Commencement of Export of cable to Australia.
- 2009 - Industrial Excellence Crystal Award in Extra Large Manufacturing category.
- 2011 - Commencement of Export of cable to New Zealand.
- 2013 - National Cleaner Production Award in recognition of Excellence in Resource Efficient & Production Practices in Manufacturing Large Category.
- 2013 - Special Award for Excellence Performance in Material Efficiency in Manufacturing Large Category.
- 2015 - B2B Brand of the Year - Gold. At Slim Brand Excellence 2015.

“ACL” - PRODUCTS

BARE CONDUCTORS



All Aluminium Conductors (AAC)

All Aluminium Alloy Conductors (AAAC)

Aluminium Conductors Steel Reinforced (ACSR/GZ ,ACSR/AC) to BS, ASTM, CSA and DIN, Standards. Sizes up to 750mm²

For low, medium and high voltage electricity, transmission and distribution.

* BS 215 Part 1, BS 215 Part 2, BSEN 50183, SLS 750 Part 1, SLS 750 Part 2, IS 398 Part 1, IS 398 Part 4

“ACL SAX “ COVERED CONDUCTORS (CC)



This is an area where ACL lead the Asian region and remain second to none in the World. Partially Insulated Conductors or Covered Conductors are used for medium voltage distribution of electricity by Power Distribution companies to improve Reliability and Safety.

Traditional Bare Conductors are prone to failure due to vegetation. A superior alternative to Bare Conductors are Fully Insulated Cables (Underground or aerial) but those are prohibitively expensive for country wide usage. Therefore, ACL has developed a range of Partially Insulated Conductors (Covered Conductors) branded as ACLSAX –V which is relatively in-expensive. The extensive Research & Development done by ACL, has made ACLSAX-V, not only to meet BSEN 50397-1:2006, but to surpasses it. In addition, ACL joins hands with ENSTO of Finland to supply their Fittings along with ACLSAX-V Conductors since it is absolutely essential to use (a) Correct Conductors, (b) Correct Fittings and (c) Correct installation Techniques as specified by the 3 separate British standards covering Partially Insulated Conductors. Without such rigorous adherence to Standards, Partially Insulated Conductors may fail to deliver optimum results as we have seen in some parts of the world. Therefore, ACL promotes ACLSAX-V as a Complete System.

The three BS standards are

* BSEN 50397-1:2006, BSEN 50397-2 :2009 & BSEN 50397-3:2010

HOUSE/BUILDING WIRES



Cu/PVC and Cu/PVC/PVC cables to BS, SLS, IS & IEC Standards in 300/500V, 450/750V, 1100V and 600/1000V sizes 1mm² to 1000mm²

Single core upto 1000mm²

2 Core up to 70mm²

3 or 3 1/2 core upto 400mm²

4 core up to 400mm²

Cu/PVC Green Earth Wire

For wiring of houses/commercial buildings and distribution of electricity within factories.

BS 6004, BS 6346, SLS 733, SLS 987, IS 694, IS 1554, IEC 60502

These total range is now available in fire retardant, low smoke, halogen free properties.

ARMoured & UNARMoured POWER CABLES



To BS, IEC, SLS Standards 600/1000V & IS 1100V -Cu or Al, PVC insulated and Cu or Al, XLPE insulated

Power cables single core up to 1000mm²

2 Core up to 400 mm² 3 or 3 1/2 Core upto 400mm²

4 Core up to 400 mm² 5 Core up to 50mm²

For distribution of electricity within cities, factories and buildings.

* BS 6346, BS 5467, SLS 1186, IS 1554, IEC 60502

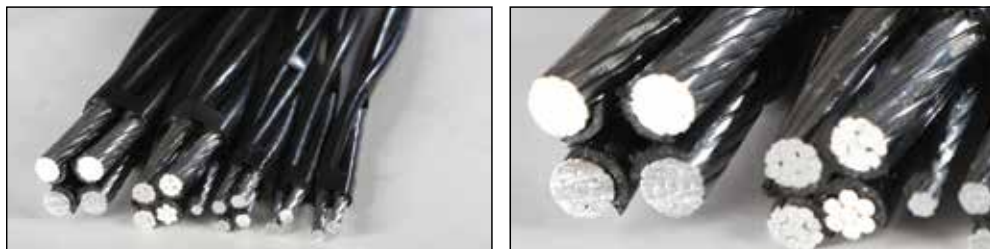
CONTROL CABLES



Cu/PVC Control Cables sizes 1.5mm², 2.5mm², and 4mm². Number of cores range from 5 to 48 cores and conform to BS 6346, 600/1000 V and IS 1554 1100V. Can be armoured or unarmoured and either screened or unscreened.

* BS 6346, IS 1554

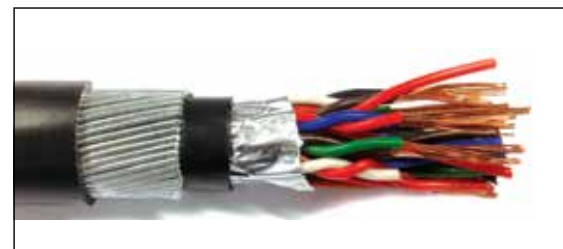
XLPE INSULATED AERIAL BUNDLED CABLES (ABC)



To NFC 33-209, 600/1000V and IS 14255, 1100V Size 16mm², 25mm², 35mm², 50mm², 70mm², 95mm², 120mm², (2 core, 4 core, 5 core and 6 core) for rural and semi-urban low voltage distribution of electricity.

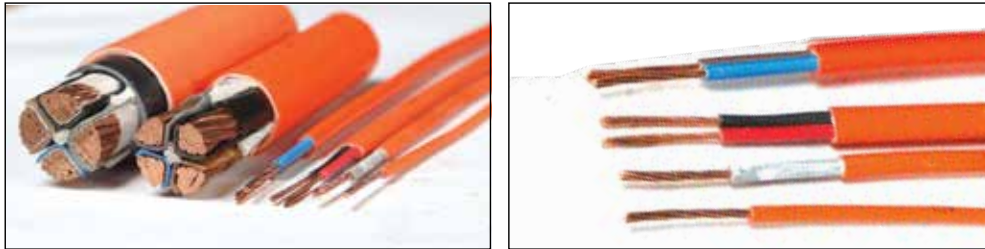
* NFC 33-209, IS 14255

INSTRUMENTATION CABLES



Multicore, screened instrument cables, conductor of annealed solid/stranded/flexible copper/tinned copper, insulated with PVC/PE, twisted pair/triode/quad, screened with mylar aluminium and provided with copper drainwire, laid up circular, overall screened and finally sheathed with PVC/PE for data and signal transmission without external interference.

ACL Fire Retardant Cables – FR, FRLS & LSHF



ACL FIRE RETARDANT Cables are to be used in any building in lieu of traditional PVC insulated Cables – which spread a fire easily. The main function of Fire Retardant Cables is to prevent spread of fire originated probably due to an electrical short circuit.

ACL has 3 different grades of Fire Retardant Cables. 1. ACL FIREGUARD (FR), 2. Fire Retardant Low Smoke (FRLS) – both made of modified PVC. Third variety is ACL FIREZERO (LSHF) which unlike the other two, is completely free of PVC and is the highest grade of Fire Retardant Cable manufactured and recommended by ACL. Since All FIREZERO is free of PVC, it emits negligible amounts of Acidic gasses and Smoke even if it is caught in a fire. These Cables conform to following standards -

* ASTM D2863 :2013 ,IEC 60332-1:2004 ,IEC 60754-1:2011, IEC 61034-2 :2005 &IEC 60754-2:1997

ACL Fire Resistant Cables – ACL FIRESURVIVOR



These cables are needed to supply electricity to circuits which become critically important in the midst of a Fire. In a building caught on fire, Electrical circuits providing electricity to Fire Alarms, Escape Lights, Exhaust Fans, Sprinklers, Lifts etc. become critically important not only to extinguish the fire but also to help in evacuation of people.

Cables for those equipment should be wired with ACL FIRESURVIVOR Cables which can provide uninterrupted electricity (circuit integrity) in the midst of a fire having a temperature of 950 deg centigrade for 3 hours. These Cables conform to the following standards -

* BS 6387:2013 & IEC 60331-21 :1999-04

* CWZ - PLWRI

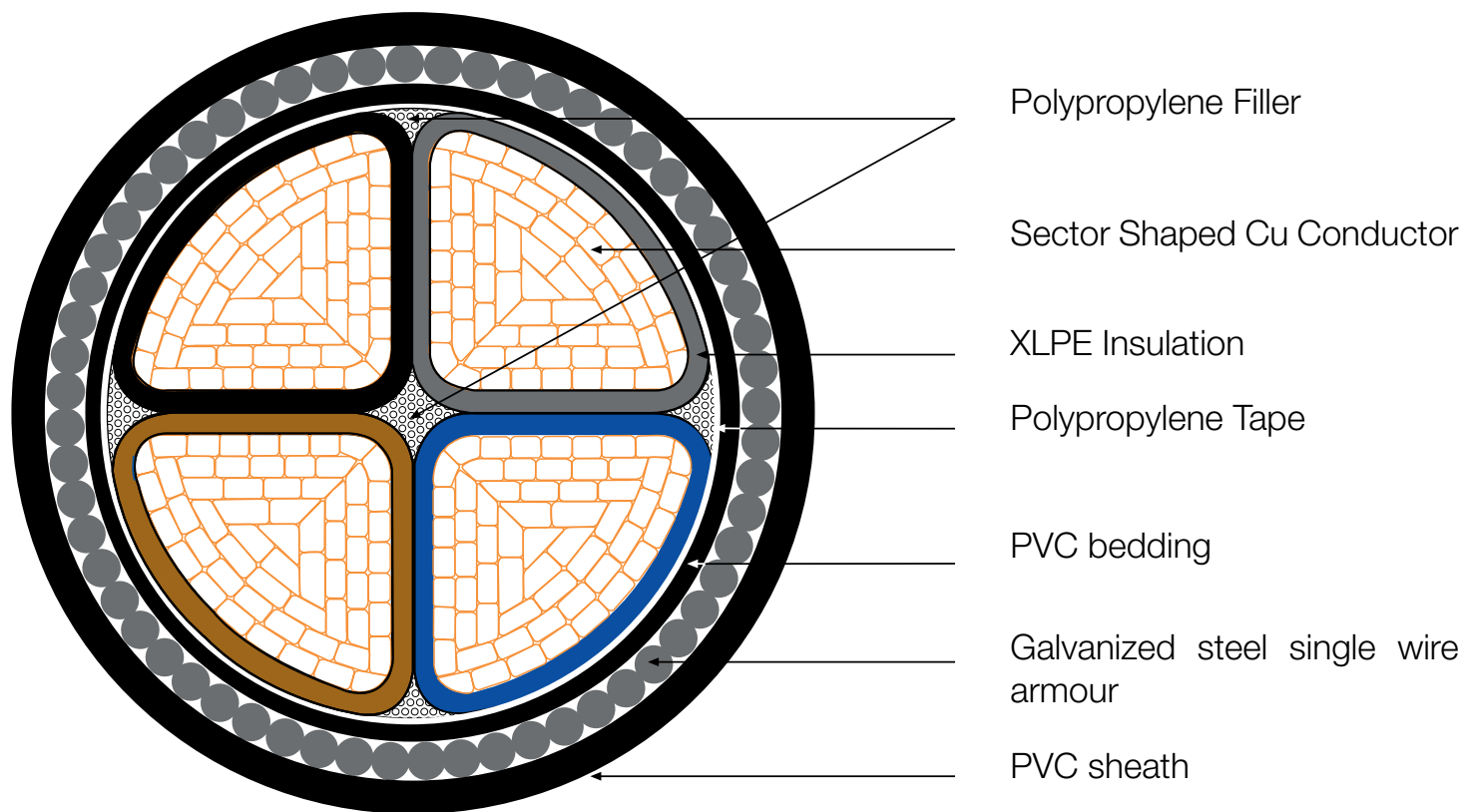
COPPER BUS BARS AND BUS BAR DUCT SYSTEMS



Bus bar systems” refers to conductors that take the form of a bar or bars of copper conductor. The bars may be exposed or enclosed. Bus bars are used within electrical installations for distributing power from a supply point to a number of output circuits. They may be used in a variety of configurations ranging from vertical risers, carrying current to each floor of a multi-storey building, to bars used entirely within a distribution panel or within an industrial process related switchboard, distribution board , substation panels and ,battery banks, ect .

These bus bars or bus bar duct systems may have one or more joints to assure proper length and configuration and one or more take-off points connected to end-use equipment.

it is necessary to use more expensive grade of high conductivity copper which is specially produced for this purpose. This type of copper, known as ‘oxygen-free high conductivity copper’, is normally produced by melting and casting under a protective atmosphere. The result is a high purity copper containing 99.95% copper. In additionally, these products are fully type tested to the standard of. IEC 60439-2 & 3



Cross Sectional Drawing of 4 Core Armoured Cable

ACL Facilities

State of the art manufacturing facilities and testing equipment from leaders of Europe, ensure highest standards of products.



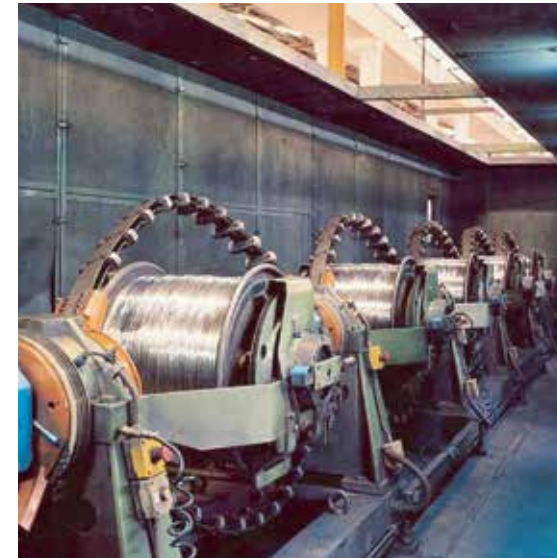
12 channel copper upward casting induction furnace for the manufacture of 8mm diameter oxygen free copper rods .



Aluminium melting furnace and rod mill for the manufacturing of 9.5mm diameter Aluminum and Aluminum Alloy Rods.



Annealed Copper without dust being drawn at 30m/sec on 15 draft angular shaft. Separate motor driven Sictra rod break down machine



Seven Strand Aluminium conductor is being stranded on 1400 rpm 630 DIN bobbin Skip Strander at 150m/min



Batch loading of Copper wires in 630 DIN Spools on 61 strand high speed Tandem Strander.



Extrusion of outer sheath of 4x400mm² at the rate of 800kg of PVC per hour on an 120mm Extruder.



Assembly of an Aerial Bundled Cable on a Bow strander machine at 180m/min



Drum Twister Machine for the assembly and armouring of Power Cables



Heavy duty, high boddin weight, Planetary Strander line for assemblins of LA / MV Aerial Bundled Cables



Centralized warehouse for live inventory management

QUALITY ASSURANCE DEPARTMENT

Testing facilities



Electronic Tensile Tester - To Obtain tensile strength & elongation values of Power - X Cables up to 4 x 400 mm².



High precision automatic Resisrana Bridge used for the measurement of electrical resistance of Power - X Cables up to 1000 mm²



Oxygen index and temperature index tester for the testing of fire retardant properties of low smoke halogen free power cables.



Testing of vertical flame spread of vertically mounted bunched wires or cables .



Testing of vertical flame spread of low smoke halogen free power cables.



Measuring of the vertical flame propagation of low smoke halogen free power cables.



Profile Projector & Digimatic mini Processor -
To obtain accurate measurement of thickness of insulated cores of Power - X Cables.

ACL POWER - X

A UNIQUE ACHIEVEMENT IN THE REGION

One of the biggest technological break throughs of ACL is the development of XLPE technology for Aerial Bundled Cables (ABC) to highest standards of the world namely, National French Standard NFC 33-209. Having acquired technology from Nokia of Finland in the year 1989, ACL upgraded its XLPE technology through in-house research and development to surpass NFC 33-209. Benefits of these developments are applied to other XLPE cables as well. Therefore, ACL leads the low voltage XLPE technology in the region. This is the reason why ACL market XLPE cables under the trade name Power-X. For XLPE insulated ABC, ACL remains the only manufacturer in the region to have a comprehensive Type Test Reports in line with NFC 33-209:1996 2nd publication, September 2005 and issued by Laboratoire Central Des Industries Electrique of France

POWER-X CABLES

Listed in this publication are products manufactured in accordance with

- 1) BS 5467:1997 - 600/1000V and 1900/3300V "Armoured electric cables
Incorporating having thermosetting insulation."
Amendment No : 1
- 2) BS 5467:1989 - "Cables with thermosetting insulation for electricity supply for rated voltage of up to and including 600/1000V and up to and including 1900/3300V
- 3) BS 7889:1997 - "600/1000V single core unarmoured electric cables having thermosetting insulation."
- 4) IEC 60502-1 :2004 - "Power cables with extruded insulation and their accessories for rated voltages"

GENERAL CONSTRUCTION

CONDUCTOR

Copper conductors are manufactured from plain, annealed, high conductivity, drawn copper wires according to BS 6360:1991. In single core cables all conductors are circular while multicore cables conductors are generally circular up to 16 sq.mm and shaped above 16 sq.mm.

BS specifies only solid aluminium conductors for power cables. However, in this publication stranded aluminium conductors have been considered for better flexibility and ease in installation. These conductors are made from aluminium of the grade 1350 as specified in BS 2627.

INSULATION

Insulation consists of GP 8 XLPE Compound complying with BS 7655:section 1.3/1.2:1993 "insulation and sheathing materials for cables" which is applied by extrusion to form a compact homogeneous layer.

CORE IDENTIFICATION

No. of Cores	Core colour
Single	Brown or Blue
Two	Brown, Blue
Three	Brown, Black, Grey
Four	Brown, Black, Grey, Blue
Five	Green and Yellow, Blue, Brown, Black, Grey
Six core and above for Auxiliary cables	Black with number printed in white.

FILLERS AND BEDDING

The cable cores are laid up with circular fillers of non-hygroscopic material between the cores where necessary. Single core cables have extruded PVC bedding whilst multicore cables have either PVC extruded bedding or at least two layers of suitable tape to provide bedding for the armour.

ARMOUR

To protect the cable from mechanical damage and to provide earth continuity, armour is provided with wires, helically applied over the bedding. Multicore armoured cables are armour with single layer of galvanized round steel wires, while single core cables intended for use in A/C systems are armoured with non-magnetic materials, i.e. aluminium wires.

OVER SHEATH

All cables are provided with an extruded outer sheath of black PVC complying with the requirements of BS 7655: section 4.2: 1997. Outer sheath of special PVC with 85°C operating temperature or anti-termite properties may be provided, if specified.

EMBOSSING AND MARKING (XLPE)

The oversheath of each cable is embossed with legend ACL ELECTRIC CABLES followed by voltage grade, size and type. If required, the cables could be supplied with sequentially marked length. Where the cable is multicore, the ends of each length are marked red or green. The sequence of core colour is clockwise at red marked end.

CROSS-LINKED POLYETHYLENE

PVC and conventional polyethylene (PE) are thermoplastic materials. By the use of a special additive and post extrusion treatment in a manner resembling the vulcanization of rubber, the properties of polyethylene are considerably changed because it becomes cross-linked and thermosetting. The good attributes of polyethylene are still retained, but at high temperatures the toughness and physical properties are improved. In particular there is greatly enhanced resistance to deformation. This provides an important advantage in cable ratings.

ACL technology on XLPE is vastly superior to many available in the market and therefore, traded under the brand name "Power-X".

COMPARISON WITH PVC INSULATED CABLES

The basic construction of XLPE cables is similar to that of PVC cables produced to BS 6346. Therefore, they have all the advantages of PVC cables in terms of cleanliness, ease of handling and simple jointing. The only obvious physical difference is that XLPE is a more robust material, thus allowing the insulation thickness to be reduced, which in turn allows a corresponding reduction in the overall size of the cable.

The main consideration in a comparison with PVC cables is that XLPE permits the operating temperature of the cable to be raised considerably without suffering from thermal deformation or degradation. Continuous ratings for XLPE are based on 90°C instead of 70°C for PVC and short circuit ratings are vastly improved. Moreover if conductor size is governed by rating rather than voltage drop, it is often possible to use a smaller cable. Furthermore, the short-circuit temperature of PVC is only 150°C while that of XLPE is 250°C. This makes XLPE insulated cables durable and more resilient to short - circuiting.

Used for generator wiring, switchgear wiring appliance and equipment wiring where cable is subject to bending/mobility during installation and/or use.

MAIN TECHNICAL CHARACTERISTICS	COMPARISON OF PVC vs XLPE				
	Units	Values			
		PVC TYPE 9	PVC TI 1	PVC TM 1	XLPE
Permittivity (50Hz,20 °C)			4 - 7		2.3-5.2
Dielectric Loss Factor(50Hz,20 °C)			0.05 - 0.07		0.0004
Volume Resistivity(20 °C)	ohm.cm		10 ¹³		10 ¹⁶
Max. Conductor temperature	°C		70		90
Max. short circuit temperature of conductor	°C		160		250
Tensile strength of insulation min.	N/mm ²	12.5	12.5	12.5	12.5
Elongation at break of insulation min	%	150	125	125	200
Insulation Resistance constant (Min. K value)	MΩ.Km	at 20 °C 0.0035	at 70 °C 0.0035	-	at 90 °C 3.67
Thermal Ageing Characteristics					
Maximum Variation -Tensile strength	%	25 (at 100°C ,168 hrs)	20 (at 80°C ,168 hrs)	20 (at 80°C ,168 hrs)	25 (at 135°C ,168 hrs)
Maximum Variation -Elongation at break	%	25 (at 100°C ,168 hrs)	20 (at 80°C ,168 hrs)	20 (at 80°C ,168 hrs)	20 (at 135°C ,168 hrs)

PROPERTIES OF COPPER & ALUMINIUM

Characteristics	Units	COPPER		ALUMINIUM	
		Hard Drawn	Annealed	Hard Drawn	Annealed
Melting Point	°C		1083		659
Specific Gravity	-		8.89		2.703
Tensile Strength	kgf/mm ²	34-47	20-28	12-20	7-14
Electrical Resistivity at 20°C	mW-cm	1.777	1.724	2.8264	2.803
Conductivity at 20°C	%IACS	97	100	60	61
Temperature Coefficient of Resistance at 20°C per °C	-	0.00381	0.00393	0.0040	0.0042
Coefficient of Linear Expansion	10 ⁻⁶ /°C		17		23
Thermal Conductivity	W/°C.cm		3.85		2.39
	Cal/°C.S.cm		0.92		0.53
Specific Heat	J/°C.cm ³		3.4		2.4
	Cal/°C.g		0.092		0.21

NOTES ON TABLES

Dimensions and Weights

All dimensions and weights given in the tables are approximate. When selecting a suitable gland size for these cables it will be advisable to allow for a small positive tolerance on the dimensions given.

Bending Radius

During installation, XLPE cables should not be bent to a radius smaller than that are given in the appropriate tables.

Sustained Current Rating (50Hz AC)

Generally, the current rating will be altered if there is a variation in the standard conditions. The rating for most conditions can be calculated by multiplying the sustained current rating by the factor(s) given in the appropriate adjustment table(s). Current Ratings given in this book are extracted from ERA Report 69-30 (part V).

Standard Conditions

The following conditions have been used to calculate the current ratings given in the tables:

Thermal resistivity of soil (g)	=	2.5 K .m/W
Standard Ground Temperature	=	20°C
Ambient Air Temperature	=	30°C
Maximum conductor Temperature	=	90°C
Depth of burial, from ground surface to	=	0.7 m for 600/1000V cables
Centre of cable, to center of duct,		
or to centre of trefoil group of cables or ducts		

All armoured cables solidly bonded (ie. Bonded at both ends of the cables)

Bonding of Non-magnetic Armour of single core cable

Ratings are given for single-core cables with non-magnetic armour solidly bonded (bonded at both ends of the cables.) Slightly higher ratings may be achieved by single point bonding (binding at one point only along the cable length) although in practice, application will be limited and confined mainly to short runs of the larger conductor size.

Overload Conditions

Cross-linked polyethylene cables can, without undue detriment safely operate at an increased conductor temperature of 130°C subject to a maximum aggregate period of 36 hours per annum.

The permissible current rating under overload conditions is given by multiplying the sustained current rating by the factor given in the appropriate adjustment table on tables.

Short-circuit Current Ratings

In addition to the normal sustained current ratings, consideration must also be given to short circuit ratings when selecting cable size. Ratings for given durations are listed in the tables.

Note :

The following formula can be used to obtain the value of short circuit current, I in kA for any time t seconds between 0.2 and 3.0 seconds.

$$I = I_1 / (t)^{1/2}$$

Where I_1 = short – circuit current in kA for 1.0 second,

short circuit ratings are based on :

- Symmetrical conductor temperature rise, 90°C to 250°C.
- Earth fault armour temperature rise 85°C to 160°C

Voltage Drop

To calculate the voltage drop in volts the tabulated value of voltage drop (mV/A/m) is to be multiplied by the design current of the circuit (I), the length of run in meters (L), and divided by 1000 (to convert to volts)

$$\text{Voltage Drop} = \frac{(\text{mV/A/m}) \times I \times L}{1000}$$

Permissible voltage drop through out the complete installation is 4% of the nominal supply voltage. (generally 230V for single phase and 415V for three phase in Sri Lanka)

OTHER CONSTRUCTIONS

All cables listed in this publication are complying with the relevant British standards. It is possible to supply cables with minor differences in construction if sufficient quantity is required.

In this connection it should be noted that cables in accordance with IEC standards or any other standards specially manufactured on request.

GUIDELINES FOR THE SELECTION OF THE REQUIRED SIZE OF CABLE

To select a suitable size of cable :

1. Find out the actual cable current of the load by considering its system polarity (d.c. or single phase a.c. or three phase a.c.)
2. By considering the method of installation, find out whether there are any de-rating factors applicable to the situation.
3. Go through the applicable sustained Current rating table and select a cable which is having a slightly higher current rating.
4. Multiply by applicable de-rating factors and adjust the current rating accordingly. This adjusted current rating should be higher than the required current. If it is not, consider the next higher size of cable.

Now, check for voltage drop :

1. Take the voltage drop value from the data tables relevant to the selected cable. (mV/A/m)
2. Multiply by the actual current in the cable (NOT the current rating)
3. Multiply by the length of run. (m)
4. Divide the result by 1000 to convert milli volts in to volts.

Example :

85m of four core Cu/XLPE/SWA/PVC cable has to be installed direct in ground to carry 95A load. Supply voltage is 415V, three phase system 50Hz a.c. Following installation conditions are to be considered when selecting a suitable cable :

Ambient air temperature	= 30°C	Ground temperature	= 20°C
Depth of laying	= 0.5m	Soil thermal resistivity	= 1.5 Km/W

This cable is to be laid parallel and in touching formation to an existing cable which carries same load.

In this example, the required current is given as 95A.

From Table 41, we can select 4x25 Cu/XLPE/SWA/PVC CABLE which is having a sustained current rating of 96A.

Now consider the given installation conditions and find out applicable de-rating factors to find out the actual current rating.

For ambient temperature	= 1.00 (from Adj. Table 1)
For Ground temperature	= 1.00 (from Adj. Table 2)
For soil thermal resistivity	= 1.28 (from Adj. Table 3)
For depth of laying	= 1.03 (from Adj. Table 4)
For grouping	= 0.75 (from Adj. Table 5)
Actual Current Rating	= $96 \times 1 \times 1 \times 1.28 \times 1.03 \times 0.75$
	= 94.9 A

94.9A < 95A (required rating). Therefore, actual current rating of the selected cable is not sufficient for this application. It is required to select the next higher size.

i.e. 4x35 Cu/XLPE/SWA/PVC (X – 50)

Actual Current rating	= $115 \times 1.0 \times 1.0 \times 1.28 \times 1.03 \times 0.75$
	= 113.7 A

113.7A > 95A This cable satisfies the requirement.

Now Check for voltage drop :

for X – 50 voltage drop	= 1.15mV/A/m (from table 41)
-------------------------	-------------------------------

Actual Voltage drop	= $\frac{\text{mV/A/m} \times I \times L}{1000}$
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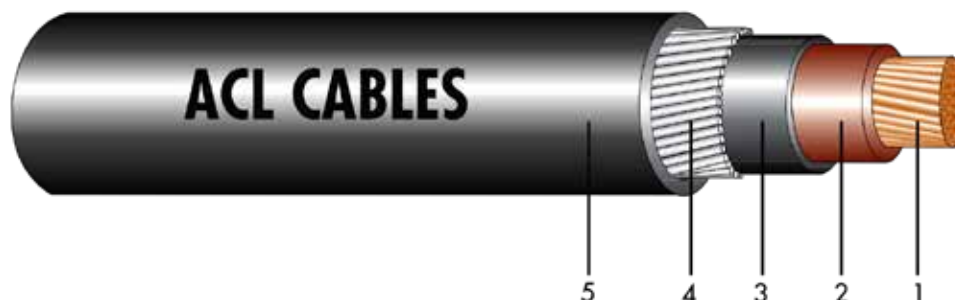
Therefore, Actual voltage drop	= $\frac{1.15 \times 95 \times 85}{1000}$
	= 9.28 V

This should be checked against the permissible voltage drop which is 5% of the nominal system voltage.

Permissible voltage drop	= $\frac{5}{100} \times 415 = 20.75 \text{ V}$
--------------------------	--

actual volt drop 9.28V < permissible volt drop 20.75V

Therefore, the selected cable satisfies the permissible voltage drop requirement.



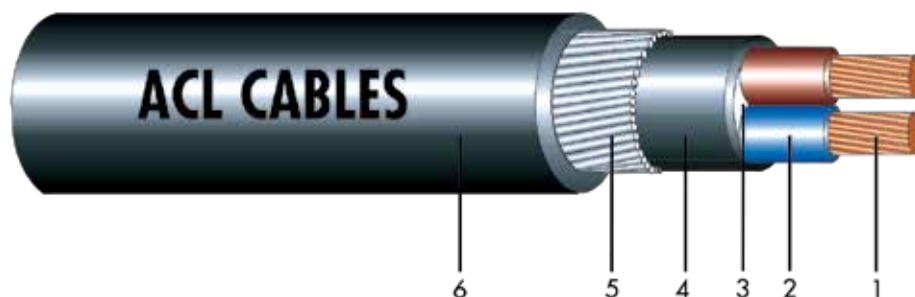
1. Cu Conductor
2. XLPE Insulation
3. PVC Bedding
4. Al Wire Armour
5. PVC Sheath

1 Core Armoured Cables - Cu/XLPE/AWA/PVC

600/1000V BS 5467:1997

ITEM CODE	UNIT	X-1	X-2	X-3	X-4	X-5	X-6	X-7	X-8	X-9	X-10	X-11	X-12	X-13
Nominal Area of Conductor	sq.mm	50	70	95	120	150	185	240	300	400	500	630	800	1000
Nominal Thickness of insulation	mm	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8	2.0	2.2	2.4	2.6	2.8
Thickness of Extruded bedding	mm	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.0	1.2	1.2	1.2	1.4	1.4
Aluminium Armour wire diameter	mm	0.9	1.25	1.25	1.25	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.5	2.5
Thickness of oversheath	mm	1.5	1.5	1.6	1.6	1.7	1.8	1.8	1.9	2.0	2.1	2.2	2.4	2.5
Maximum armour resistance at 20°C	ohm/km	1.3	0.75	0.67	0.61	0.42	0.38	0.34	0.31	0.22	0.20	0.18	0.13	0.12
Gross armour wire area	sq.mm	26	42	47	52	76	84	94	104	147	163	182	260	284
Maximum resistance of Conductor	D.C. at 20° C ohm/km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283	0.0221	0.0176
	A.C. at 90° C ohm/km	0.493	0.341	0.246	0.196	0.159	0.128	0.098	0.079	0.063	0.051	0.042	0.036	0.032
Inductance	mH/km	0.327	0.319	0.306	0.295	0.300	0.295	0.284	0.278	0.279	0.274	0.269	0.268	0.263
Reactance at 50Hz	ohm/km	0.103	0.100	0.096	0.093	0.094	0.093	0.089	0.087	0.088	0.086	0.085	0.084	0.083
Impedance at 90°c	ohm/km	0.504	0.355	0.264	0.217	0.185	0.158	0.133	0.118	0.108	0.100	0.094	0.092	0.089
Maximum symmetrical short - circuit ratings	for 0.2 Sec kA	16.0	22.4	30.4	38.4	48.0	59.2	76.8	96.0	128.0	160.0	201.6	256.0	319.9
	for 1.0 Sec kA	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9	57.2	71.5	90.1	114.5	143.1
	for 3.0 Sec kA	4.1	5.8	7.8	9.9	12.4	15.3	19.8	24.8	33.0	41.3	52.0	66.1	82.6
Maximum earth - fault short - circuit current ratings	for 0.2 Sec kA	4.0	6.4	7.2	8.0	11.7	12.9	14.4	16.0	22.5	25.0	27.9	39.9	43.6
	for 1.0 Sec kA	1.8	2.9	3.2	3.6	5.2	5.8	6.4	7.1	10.1	11.2	12.5	17.8	19.5
	for 3.0 Sec kA	1.0	1.7	1.9	2.1	3.0	3.3	3.7	4.1	5.8	6.5	7.2	10.3	11.2
Approximate overall diameter	mm	17.5	20.2	22.3	24.2	27.4	30.0	32.8	35.6	40.5	44.2	48.8	55.4	60.6
Approximate Cable weight	kg/km	689.0	958.8	1256.6	1526.6	1917.2	2346.0	2959.9	3619.2	4655.0	5741.1	7221.3	9267.5	11459.1
Minimum bending radius	mm	105	121	134	145	164	180	197	214	243	265	293	332	364
Nominal Drum Length	m	1000	1000	1000	1000	1000	750	750	500	500	500	250	250	250
Size of the Drum		D - 2	D-3	D-3	D-5	D-5	D-5	D-5	D-5	D-5	D-8	D-7	D-9	D-12
Drum Weight	kg	138	145	145	225	225	225	225	225	225	255	245	265	510
Gross weight of the Cable Drum	kg	827	1104	1402	1752	2142	1985	2445	2035	2553	3126	2050	2582	3375

TABLE - 1



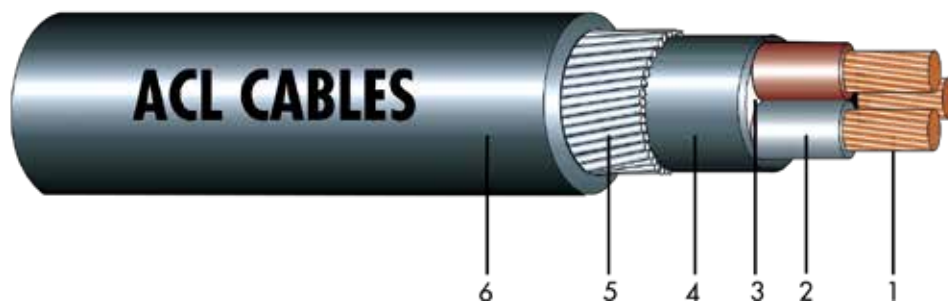
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Bedding
5. Galvanized Steel Wire Armour
6. PVC Sheath

2 Core Armoured Cables - Cu/XLPE/SWA/PVC With Circular Conductors

600/1000V BS 5467:1997

ITEM CODE	UNIT	X-14	X-15	X-16	X-17	X-18	X-19	X-20	X-21
Nominal Area of Conductor	sq.mm	1.5	2.5	4	6	10	16	25	35
Nominal Thickness of insulation	mm	0.6	0.7	0.7	0.7	0.7	0.7	0.9	0.9
Thickness of Extruded bedding	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	1.0
Galvanized Steel Armour wire diameter	mm	0.9	0.9	0.9	0.9	0.9	1.25	1.25	1.6
Thickness of oversheath	mm	1.3	1.4	1.4	1.4	1.5	1.5	1.6	1.7
Maximum armour resistance at 20°C	ohm/km	10.2	8.8	7.9	7.0	6.0	3.7	3.7	2.6
Gross armour wire area	sq.mm	15	17	19	22	26	42	42	60
Maximum resistance	D.C. at 20° C	12.1	7.41	4.61	3.08	1.83	1.15	0.727	0.524
of Conductor	A.C. at 90° C	-	-	-	-	-	1.460	0.927	0.668
Inductance	mH/km	-	-	-	-	-	0.251	0.252	0.246
Reactance at 50Hz	ohm/km	-	-	-	-	-	0.079	0.079	0.077
Impedance at 90°C	ohm/km	-	-	-	-	-	1.462	0.930	0.672
Maximum symmetrical	for 0.2 Sec	kA	0.5	0.8	1.3	1.9	3.2	5.1	11.2
short - circuit current	for 1.0 Sec	kA	0.2	0.4	0.6	0.9	1.4	2.3	5.0
ratings	for 3.0 Sec	kA	0.1	0.2	0.3	0.5	0.8	1.3	2.9
Maximum earth - fault	for 0.2 Sec	kA	1.3	1.4	1.6	1.8	2.2	3.5	5.0
short - circuit current	for 1.0 Sec	kA	0.6	0.6	0.7	0.8	1.0	1.6	2.3
ratings	for 3.0 Sec	kA	0.3	0.4	0.4	0.5	0.6	0.9	1.3
Approximate overall diameter	mm	12.1	13.6	14.7	15.9	18.0	20.4	24.1	27.7
Approximate Cable weight	kg/km	253.5	322.1	388.7	472.0	632.7	930.4	1298.5	1788.1
Minimum bending radius	mm	73	82	88	95	108	122	145	166
Nominal Drum Length	m	1000	1000	1000	1000	1000	1000	750	500
Size of the Drum		D-1	D-1	D-1	D-2	D-2	D-4	D-4	D-4
Drum Weight	kg	60	60	60	138	138	150	150	150
Gross weight of the Cable Drum	kg	314	382	449	610	771	1080	1124	1044

TABLE - 2



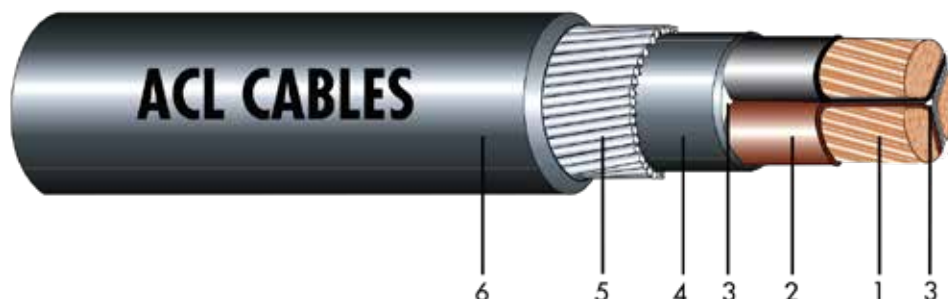
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Bedding
5. Galvanized Steel Wire Armour
6. PVC Sheath

3 Core Armoured Cables - Cu/XLPE/SWA/PVC With Circular Conductors

600/1000V BS 5467:1997

ITEM CODE	UNIT	X-22	X-23	X-24	X-25	X-26	X-27	X-28	X-29
Nominal Area of Conductor	sq.mm	1.5	2.5	4	6	10	16	25	35
Nominal Thickness of insulation	mm	0.6	0.7	0.7	0.7	0.7	0.7	0.9	0.9
Thickness of Extruded bedding	mm	0.8	0.8	0.8	0.8	0.8	0.8	1.0	1.0
Galvanized Steel Armour wire diameter	mm	0.9	0.9	0.9	0.9	1.25	1.25	1.6	1.6
Thickness of oversheath	mm	1.3	1.4	1.4	1.4	1.5	1.6	1.7	1.8
Maximum armour resistance at 20°C	ohm/km	9.5	8.2	7.5	6.7	4.0	3.5	2.5	2.3
Gross armour wire area	sq.mm	16	19	20	23	39	45	62	68
Maximum resistance	D.C. at 20° C	12.1	7.41	4.61	3.08	1.83	1.15	0.727	0.524
of Conductor	A.C. at 90° C	-	-	-	-	-	1.460	0.927	0.668
Inductance	mH/km	-	-	-	-	-	0.251	0.252	0.246
Reactance at 50Hz	ohm/km	-	-	-	-	-	0.079	0.079	0.077
Impedance at 90°c	ohm/km	-	-	-	-	-	1.462	0.930	0.672
Maximum symmetrical	for 0.2 Sec	kA	0.5	0.8	1.3	1.9	3.2	5.1	8.0
short - circuit current	for 1.0 Sec	kA	0.2	0.4	0.6	0.9	1.4	2.3	3.6
ratings	for 3.0 Sec	kA	0.1	0.2	0.3	0.5	0.8	1.3	2.1
Maximum earth - fault	for 0.2 Sec	kA	1.3	1.6	1.7	1.9	3.3	3.8	5.2
short - circuit current	for 1.0 Sec	kA	0.6	0.7	0.8	0.9	1.5	1.7	2.3
ratings	for 3.0 Sec	kA	0.3	0.4	0.4	0.5	0.8	1.0	1.3
Approximate overall diameter	mm	12.6	14.1	15.3	16.6	19.5	21.6	26.7	29.4
Approximate Cable weight	kg/km	278.1	361.9	442.9	545.1	834.4	1115.5	1734.7	2184.3
Minimum bending radius	mm	76	85	92	100	117	130	160	176
Nominal Drum Length	m	1000	1000	1000	1000	1000	1000	500	500
Size of the Drum		D-1	D-1	D-1	D-2	D-2	D-3	D-4	D-4
Drum Weight	kg	60	60	60	138	138	145	150	150
Gross weight of the Cable Drum	kg	338	422	503	683	972	1261	1017	1242

TABLE - 3



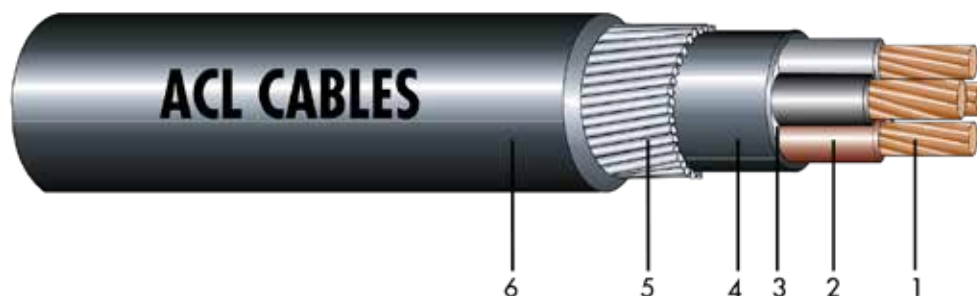
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Bedding
5. Galvanized Steel Wire Armour
6. PVC Sheath

3 Core Armoured Cables - Cu/XLPE/SWA/PVC With Sector Shaped Conductors

600/1000V BS 5467:1997

ITEM CODE	UNIT	X-30 25	X-31 35	X-32 50	X-33 70	X-34 95	X-35 120	X-36 150	X-37 185	X-38 240	X-39 300	X-40 400
Nominal Area of Conductor	sq.mm											
Nominal Thickness of insulation	mm	0.9	0.9	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8	2.0
Thickness of Extruded bedding	mm	1.0	1.0	1.0	1.0	1.2	1.2	1.4	1.4	1.4	1.6	1.6
Galvanized Steel Armour wire diameter	mm	1.6	1.6	1.6	1.6	2.0	2.0	2.5	2.5	2.5	2.5	2.5
Thickness of oversheath	mm	1.7	1.8	1.8	1.9	2.1	2.2	2.3	2.4	2.6	2.7	2.9
Maximum armour resistance at 20°C	ohm/km	2.50	2.30	2.00	1.80	1.30	1.20	0.78	0.71	0.63	0.58	0.52
Gross armour wire area	sq.mm	62	68	78	90	128	141	201	220	250	269	304
Maximum resistance of Conductor	D.C. at 20° C ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470
	A.C. at 90° C ohm/km	0.927	0.668	0.493	0.342	0.254	0.196	0.159	0.128	0.0988	0.0798	0.064
Inductance	mH/km	0.256	0.249	0.247	0.235	0.229	0.228	0.230	0.225	0.226	0.224	0.223
Reactance at 50Hz	ohm/km	0.081	0.078	0.078	0.074	0.072	0.072	0.072	0.071	0.071	0.070	0.070
Impedance at 90°C	ohm/km	0.930	0.673	0.499	0.350	0.264	0.209	0.175	0.146	0.122	0.106	0.095
Maximum symmetrical short - circuit current ratings	for 0.2 Sec kA	8.0	11.2	16.0	22.4	30.4	38.4	48.0	59.2	76.8	96.0	128.0
	for 1.0 Sec kA	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9	57.2
	for 3.0 Sec kA	2.1	2.9	4.1	5.8	7.8	9.9	12.4	15.3	19.8	24.8	33.0
Maximum earth - fault short - circuit current ratings	for 0.2 Sec kA	5.2	5.7	6.6	7.6	10.8	11.8	16.9	18.5	21.0	22.6	25.5
	for 1.0 Sec kA	2.3	2.6	2.9	3.4	4.8	5.3	7.6	8.3	9.4	10.1	11.4
	for 3.0 Sec kA	1.3	1.5	1.7	2.0	2.8	3.1	4.4	4.8	5.4	5.8	6.6
Approximate overall diameter	mm	23.6	25.7	28.5	32.2	37.0	40.4	45.5	49.8	55.1	60.2	66.6
Approximate Cable weight	kg/km	1481.6	1834.7	2384.2	3132.4	4324.7	5160.0	6595.1	8022.3	9975.1	12054.6	14956.5
Minimum bending radius	mm	189	206	228	258	296	323	364	398	441	482	533
Nominal Drum Length	m	500	500	500	500	500	500	500	350	250	250	250
Size of the Drum		D-2	D-4	D-4	D-6	D-6	D-11	D-11	D-12	D-12	-	-
Drum Weight	kg	138	150	150	230	230	495	495	510	510	-	-
Gross weight of the Cable Drum	kg	879	1067	1342	1796	2392	3075	3793	3318	3004	3014	3739

TABLE - 4



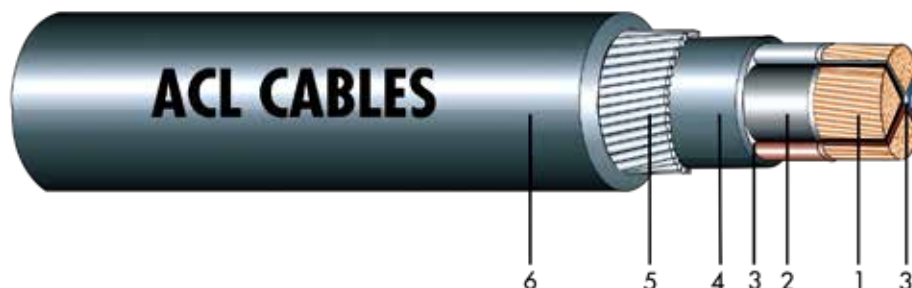
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Bedding
5. Galvanized Steel Wire Armour
6. PVC Sheath

4 Core Armoured Cables - Cu/XLPE/SWA/PVC With Circular Conductors

600/1000V BS 5467:1997

ITEM CODE	UNIT	X-41	X-42	X-43	X-44	X-45	X-46	X-47	X-48
Nominal Area of Conductor	sq.mm	1.5	2.5	4	6	10	16	25	35
Nominal Thickness of insulation	mm	0.6	0.7	0.7	0.7	0.7	0.7	0.9	0.9
Thickness of Extruded bedding	mm	0.8	0.8	0.8	0.8	0.8	0.8	1.0	1.0
Galvanized Steel Armour wire diameter	mm	0.9	0.9	0.9	1.25	1.25	1.25	1.6	1.6
Thickness of oversheath	mm	1.3	1.4	1.4	1.5	1.5	1.6	1.7	1.8
Maximum armour resistance at 20°C	ohm/km	8.8	7.7	6.8	4.3	3.7	3.1	2.3	2.0
Gross armour wire area	sq.mm	17	20	22	36	42	50	70	78
Maximum resistance	D.C. at 20° C	12.1	7.41	4.61	3.08	1.83	1.15	0.727	0.524
of Conductor	A.C. at 90° C	-	-	-	-	-	1.460	0.927	0.668
Inductance	mH/km	-	-	-	-	-	0.251	0.252	0.246
Reactance at 50Hz	ohm/km	-	-	-	-	-	0.079	0.079	0.077
Impedance at 90°C	ohm/km	-	-	-	-	-	1.462	0.930	0.672
Maximum symmetrical	for 0.2 Sec	kA	0.5	0.8	1.3	1.9	3.2	5.1	11.2
short - circuit current	for 1.0 Sec	kA	0.2	0.4	0.6	0.9	1.4	2.3	5.0
ratings	for 3.0 Sec	kA	0.1	0.2	0.3	0.5	0.8	1.3	2.9
Maximum earth - fault	for 0.2 Sec	kA	1.4	1.7	1.8	3.0	3.5	4.2	6.6
short - circuit current	for 1.0 Sec	kA	0.6	0.8	0.8	1.4	1.6	1.9	2.9
ratings	for 3.0 Sec	kA	0.4	0.4	0.5	0.8	0.9	1.1	1.7
Approximate overall diameter	mm	13.3	15.0	16.4	18.7	21.1	23.4	28.9	31.9
Approximate Cable weight	kg/km	320.7	412.7	516.8	738.4	1008.4	1363.6	2116.5	2671.9
Minimum bending radius	mm	80	90	98	112	127	140	173	191
Nominal Drum Length	m	1000	1000	1000	1000	1000	1000	500	500
Size of the Drum		D-1	D-1	D-2	D-2	D-3	D-3	D-4	D-5
Drum Weight	kg	60	60	138	138	145	145	150	225
Gross weight of the Cable Drum	kg	381	473	655	876	1153	1509	1208	1561

TABLE - 5



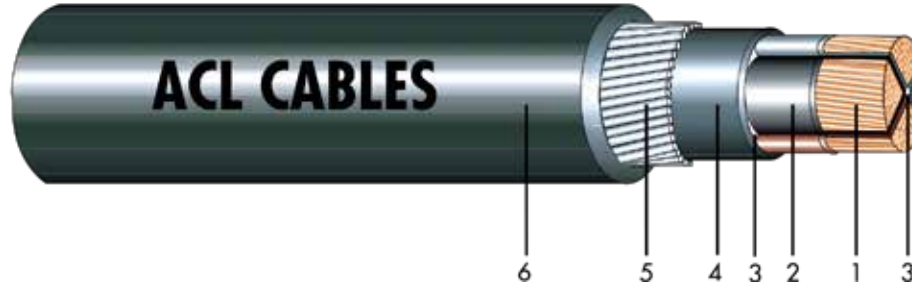
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Bedding
5. Galvanized Steel Wire Armour
6. PVC Sheath

4 Core Armoured Cables - Cu/XLPE/SWA/PVC With Sector Shaped Conductors

600/1000V BS 5467:1997

ITEM CODE	UNIT	X-49 25	X-50 35	X-51 50	X-52 70	X-53 95	X-54 120	X-55 150	X-56 185	X-57 240	X-58 300	X-59 400
Nominal Area of Conductor	sq.mm											
Nominal Thickness of insulation	mm	0.9	0.9	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8	2.0
Thickness of Extruded bedding	mm	1.0	1.0	1.0	1.2	1.2	1.4	1.4	1.4	1.6	1.6	1.8
Galvanized Steel Armour wire diameter	mm	1.6	1.6	1.6	2.0	2.0	2.5	2.5	2.5	2.5	2.5	3.15
Thickness of oversheath	mm	1.7	1.8	1.9	2.1	2.2	2.3	2.4	2.6	2.7	2.9	3.2
Maximum armour resistance at 20°C	ohm/km	2.3	2.0	1.8	1.2	1.10	0.76	0.68	0.61	0.54	0.49	0.35
Gross armour wire area	sq.mm	70	78	90	131	147	206	230	255	289	319	452
Maximum resistance of Conductor	D.C. at 20° C ohm/km A.C. at 90° C ohm/km	0.727 0.927	0.524 0.668	0.387 0.493	0.268 0.342	0.193 0.254	0.153 0.196	0.124 0.159	0.0991 0.128	0.0754 0.099	0.0601 0.080	0.0470 0.064
Inductance	mH/km	0.256	0.249	0.247	0.235	0.229	0.228	0.230	0.225	0.226	0.224	0.223
Reactance at 50Hz	ohm/km	0.081	0.078	0.078	0.074	0.072	0.072	0.072	0.071	0.071	0.070	0.070
Impedance at 90°C	ohm/km	0.930	0.673	0.499	0.350	0.264	0.209	0.175	0.146	0.122	0.106	0.095
Maximum symmetrical short - circuit current ratings	for 0.2 Sec kA for 1.0 Sec kA for 3.0 Sec kA	8.0 3.6 2.1	11.2 5.0 2.9	16.0 7.2 4.1	22.4 10.0 5.8	30.4 13.6 7.8	38.4 17.2 9.9	48.0 21.5 12.4	59.2 26.5 15.3	76.8 34.3 19.8	96.0 42.9 24.8	128.0 57.2 33.0
Maximum earth - fault short - circuit current ratings	for 0.2 Sec kA for 1.0 Sec kA for 3.0 Sec kA	5.9 2.6 1.5	6.6 2.9 1.7	7.6 3.4 2.0	11.0 4.9 2.8	12.4 5.5 3.2	17.3 7.7 4.5	19.3 8.6 5.0	21.4 9.6 5.5	24.3 10.9 6.3	26.8 12.0 6.9	38.0 17.0 9.8
Approximate overall diameter	mm	26.1	28.6	32.0	37.7	41.7	47.1	51.4	56.6	63.0	68.8	78.1
Approximate Cable weight	kg/km	1877.3	2350.3	3002.9	4269.3	5514.7	6993.2	8373.1	10058.5	12703.1	15404.2	19998.1
Minimum bending radius	mm	209	229	256	302	334	377	411	453	504	550	625
Nominal Drum Length	m	500	500	500	500	500	500	350	350	-	-	-
Size of the Drum		D-4	D-4	D-6	D-6	D-11	D-11	D-12	D-13	-	-	-
Drum Weight	kg	150	150	230	230	495	495	510	565	-	-	-
Gross weight of the Cable Drum	kg	1089	1325	1731	2365	3252	3992	3441	4085	-	-	-

TABLE - 6



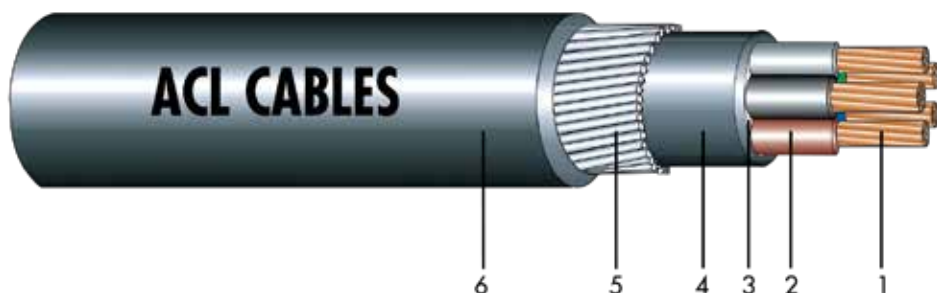
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Bedding
5. Galvanized Steel Wire Armour
6. PVC Sheath

4 Core Armoured Cables - Cu/XLPE/SWA/PVC Reduced Neutral Conductor

600/1000V IEC 60502 -1:2004

ITEM CODE	UNIT	X-60 _{IEC}	X-61 _{IEC}	X-62 _{IEC}	X-63 _{IEC}	X-64 _{IEC}	X-65 _{IEC}	X-66 _{IEC}	X-67 _{IEC}	X-68 _{IEC}	X-69 _{IEC}	X-71 _{IEC}
Nominal Area of Conductor	sq.mm	25/16	35/16	50/25	70/35	95/50	120/70	150/70	185/95	240/120	300/150	400/185
Nominal Thickness of insulation	mm	0.9/0.7	0.9/0.7	1.0/0.9	1.1/0.9	1.1/1.0	1.2/1.1	1.4/1.1	1.6/1.1	1.7/1.2	1.8/1.4	2.0/1.6
Thickness of Extruded bedding	mm	1.0	1.0	1.0	1.2	1.2	1.2	1.4	1.4	1.6	1.6	1.6
Galvanized Steel Armour wire diameter	mm	1.60	1.60	1.60	2.00	2.00	2.00	2.00	2.50	2.50	2.50	3.15
Thickness of oversheath	mm	1.8	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	3.1	3.40
Maximum armour resistance at 200C	ohm/km	2.3	2.1	1.9	1.3	1.1	0.96	0.71	0.63	0.56	0.52	0.46
Gross armour wire area	sq.mm	70	76	86	128	144	163	220	250	279	304	343
Maximum resistance D.C. at 20° C	ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470
of Phase Conductor A.C. at 90° C	ohm/km	0.927	0.668	0.493	0.342	0.254	0.196	0.159	0.128	0.099	0.080	0.064
Maximum resistance of Neutral Conductor D.C. at 20° C	ohm/km	1.15	1.150	0.727	0.524	0.387	0.268	0.268	0.193	0.153	0.124	0.0991
Inductance	mH/km	0.252	0.246	0.247	0.235	0.229	0.228	0.230	0.225	0.226	0.224	0.223
Reactance at 50Hz	ohm/km	0.079	0.077	0.078	0.074	0.072	0.072	0.072	0.071	0.071	0.070	0.070
Impedance at 900c	ohm/km	0.930	0.672	0.499	0.350	0.264	0.209	0.175	0.146	0.122	0.107	0.095
Maximum symmetrical short - circuit current ratings for 0.2 Sec	kA	8.0	11.2	16.0	22.4	30.4	38.4	48.0	59.2	76.8	96.0	128.0
for 1.0 Sec	kA	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9	57.2
for 3.0 Sec	kA	2.1	2.9	4.1	5.8	7.8	9.9	12.4	15.3	19.8	24.8	33.0
Maximum earth - fault short - circuit current ratings for 0.2 Sec	kA	5.9	6.4	7.2	10.8	12.1	13.7	18.5	21.0	23.4	25.5	28.8
for 1.0 Sec	kA	2.6	2.9	3.2	4.8	5.4	6.1	8.3	9.4	10.5	11.4	12.9
for 3.0 Sec	kA	1.5	1.6	1.9	2.8	3.1	3.5	4.8	5.4	6.1	6.6	7.4
Approximate overall diameter	mm	28.3	30.3	29.8	35.2	38.6	43.0	45.8	51.2	57.1	61.5	69.6
Approximate Cable weight	kg/km	1973.2	2351.6	2663.8	3813.6	4891.1	6014.4	7000.8	8954.3	11292.1	13579.6	17557.8
Minimum bending radius	mm	226	242	238	282	309	344	366	410	457	492	557
Nominal Drum Length	m	500	500	500	500	500	500	350	350			
Size of the Drum		D - 3	D - 5	D - 7	D - 9	D - 8	D - 11	D - 8	D - 11			
Drum Weight	kg	145	225	245	265	255	495	255	495			
Gross weight of the Cable Drum	kg	1132	1401	1577	2172	2701	3502	2705	3629			

TABLE -7



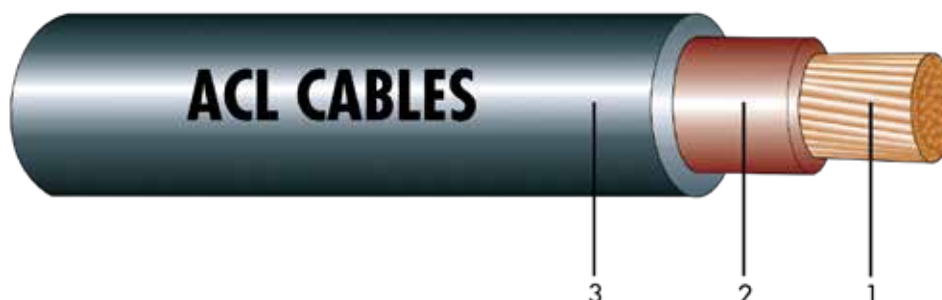
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Bedding
5. Galvanized Steel Wire Armour
6. PVC Sheath

5 Core Armoured Cables - Cu/XLPE/SWA/PVC with Circular Conductor

600/1000V BS 5467:1997

ITEM CODE	UNIT	X-72	X-73	X-74	X-75	X-76	X-77	X-78	X-79	X-80	X-81
Nominal Area of Conductor	sq.mm	1.5	2.5	4	6	10	16	25	35	50	70
Nominal Thickness of insulation	mm	0.6	0.7	0.7	0.7	0.7	0.7	0.9	0.9	1.0	1.1
Thickness of Extruded bedding	mm	0.8	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.2	1.2
Galvanized Steel Armour wire diameter	mm	0.9	0.9	0.9	1.25	1.25	1.6	1.6	1.6	2.0	2.0
Thickness of oversheath	mm	1.4	1.4	1.5	1.5	1.6	1.7	1.8	1.9	2.0	2.2
Maximum armour resistance at 20°C	ohm/km	8.2	6.8	6.2	3.9	3.4	2.2	1.8	1.6	1.1	0.94
Gross armour wire area	sq.mm	19	22	25	40	46	72	88	100	144	166
Maximum resistance	D.C. at 20° C	ohm/km	12.1	7.41	4.61	3.08	1.83	1.15	0.727	0.524	0.387
of Conductor	A.C. at 90° C	ohm/km	-	-	-	-	1.460	0.927	0.668	0.494	0.342
Inductance	mH/km	-	-	-	-	-	0.251	0.252	0.246	0.235	0.231
Reactance at 50Hz	ohm/km	-	-	-	-	-	0.079	0.079	0.077	0.074	0.073
Impedance at 90°c	ohm/km	-	-	-	-	-	1.462	0.930	0.672	0.499	0.350
Maximum symmetrical	for 0.2 Sec	kA	0.5	0.8	1.3	1.9	3.2	5.1	8.0	11.2	22.4
short - circuit	for 1.0 Sec	kA	0.2	0.4	0.6	0.9	1.4	2.3	3.6	5.0	10.0
current ratings	for 3.0 Sec	kA	0.1	0.2	0.3	0.5	0.8	1.3	2.1	2.9	5.8
Maximum earth - fault	for 0.2 Sec	kA	1.6	1.8	2.1	3.4	3.9	6.1	7.4	8.4	14.0
short - circuit	for 1.0 Sec	kA	0.7	0.8	0.9	1.5	1.7	2.7	3.3	3.8	6.2
current ratings	for 3.0 Sec	kA	0.4	0.5	0.5	0.9	1.0	1.6	1.9	2.2	3.6
Approximate overall diameter	mm	14.3	16.1	17.8	20.0	22.9	26.6	31.5	34.8	40.4	46.3
Approximate Cable weight	kg/km	356.7	463.4	595.7	835.8	1175.5	1756.2	2514.3	3187.3	4327.5	5800.0
Minimum bending radius	mm	86	97	107	120	137	160	189	209	242	278
Nominal Drum Length	m	1000	1000	1000	1000	1000	1000	500	500	500	500
Size of the Drum		D - 1	D - 1	D - 2	D - 2	D - 3	D - 3	D - 3	D - 3	D - 5	D - 8
Drum Weight	kg	60	60	138	138	145	145	145	145	225	255
Gross weight of the Cable Drum	kg	417	523	734	974	1321	1901	1402	1739	2389	3155

TABLE - 8



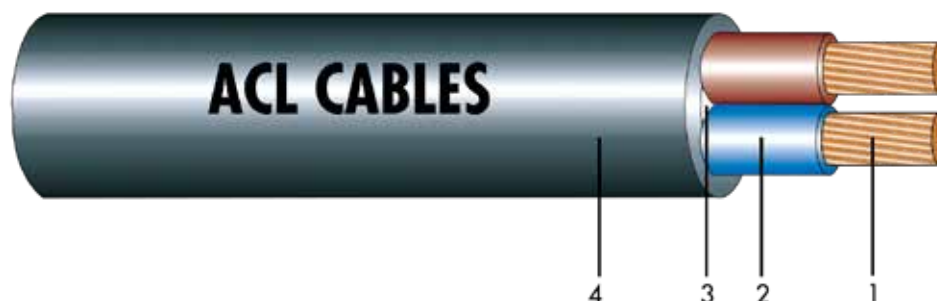
1. Cu Conductor
2. XLPE Insulation
3. PVC Sheath

1 Core Unarmoured Cables - Cu/XLPE/PVC

600/1000V BS 7889:1997

ITEM CODE	UNIT	X-82	X-83	X-84	X-85	X-86	X-87	X-88	X-89	X-90	X-91	X-92	X-93	X-94
Nominal Area of Conductor	sq.mm	50	70	95	120	150	185	240	300	400	500	630	800	1000
Nominal Thickness of insulation	mm	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8	2.0	2.2	2.4	2.6	2.8
Thickness of oversheath	mm	1.4	1.4	1.5	1.5	1.6	1.6	1.7	1.8	1.9	2.0	2.2	2.3	2.4
Maximum resistance of Conductor	D.C. at 20° C ohm/km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283	0.0221	0.0176
	A.C. at 90° C ohm/km	0.493	0.341	0.246	0.196	0.159	0.128	0.0981	0.0792	0.063	0.051	0.042	0.036	0.032
Inductance	mH/km	0.280	0.271	0.262	0.256	0.256	0.253	0.248	0.245	0.243	0.241	0.241	0.237	0.235
Reactance at 50Hz	ohm/km	0.088	0.085	0.082	0.080	0.080	0.080	0.078	0.077	0.076	0.076	0.076	0.074	0.074
Impedance at 90°c	ohm/km	0.501	0.351	0.259	0.212	0.178	0.151	0.125	0.110	0.099	0.091	0.087	0.083	0.080
Maximum symmetrical short - circuit current ratings	for 0.2 Sec kA	16.0	22.4	30.4	38.4	48.0	59.2	76.8	96.0	128.0	160.0	201.6	256.0	319.9
	for 1.0 Sec kA	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9	57.2	71.5	90.1	114.5	143.1
	for 3.0 Sec kA	4.1	5.8	7.8	9.9	12.4	15.3	19.8	24.8	33.0	41.3	52.0	66.1	82.6
Approximate overall diameter	mm	14.2	16.2	18.3	20.2	22.4	24.7	27.7	30.6	34.2	38.0	42.9	47.8	53.0
Approximate Cable weight	kg/km	545.9	762.3	1003.3	1281.8	1573.2	1954.1	2536.8	3157.7	4013.8	5031.6	6551.6	8191.0	10262.4
Minimum bending radius	mm	85	97	110	121	134	148	166	184	205	228	257	287	318
Nominal Drum Length	m	1000	1000	1000	1000	1000	1000	1000	750	500	500	250	250	250
Size of the Drum		D - 1	D - 2	D - 2	D - 3	D - 3	D - 5	D - 5	D - 5	D - 5	D - 6	D - 6	D - 7	D - 7
Drum Weight	kg	60	138	138	145	145	225	225	225	225	230	230	245	245
Gross weight of the Cable Drum	kg	606	900	1141	1427	1718	2179	2762	2593	2232	2746	1868	2293	2811

TABLE - 9



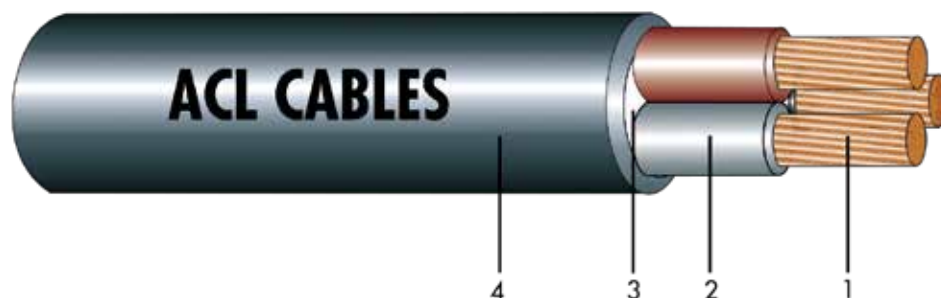
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Sheath

2 Core Unarmoured Cables - Cu/XLPE/PVC With Circular Conductors

600/1000V BS 5467:1989

ITEM CODE	UNIT	X-95	X-96	X-97
Nominal Area of Conductor	sq.mm	16	25	35
Nominal Thickness of insulation	mm	0.7	0.9	0.9
Thickness of oversheath	mm	1.8	1.8	1.8
Maximum resistance of Conductor	D.C. at 20° C ohm/km A.C. at 90° C ohm/km	1.15 1.46	0.727 0.927	0.524 0.668
Inductance	mH/km	0.251	0.252	0.246
Reactance at 50Hz	ohm/km	0.079	0.079	0.077
Impedance at 90°c	ohm/km	1.462	0.930	0.672
Maximum symmetrical short - circuit current ratings	for 0.2 Sec kA for 1.0 Sec kA for 3.0 Sec kA	5.1 2.3 1.3	8.0 3.6 2.1	11.2 5.0 2.9
Approximate overall diameter	mm	16.6	20.0	22.3
Approximate Cable weight	kg/km	450.4	670.8	880.9
Minimum bending radius	mm	100	120	134
Nominal Drum Length	m	1000	1000	1000
Size of the Drum		D - 2	D - 3	D - 3
Drum Weight	kg	138	145	145
Gross weight of the Cable Drum	kg	588	816	1026

TABLE - 10



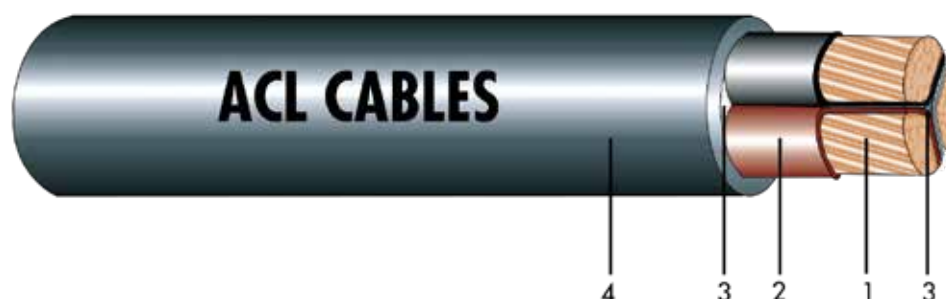
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Sheath

3 Core Unarmoured Cables - Cu/XLPE/PVC With Circular Conductors

600/1000V BS 5467:1989

ITEM CODE	UNIT	X-98	X-99	X-100
Nominal Area of Conductor	sq.mm	16	25	35
Nominal Thickness of insulation	mm	0.7	0.9	0.9
Thickness of oversheath	mm	1.8	1.8	1.8
Maximum resistance D.C. at 20° C	ohm/km	1.15	0.727	0.524
of Conductor A.C. at 90° C	ohm/km	1.460	0.927	0.668
Inductance	mH/km	0.251	0.252	0.246
Reactance at 50Hz	ohm/km	0.079	0.079	0.077
Impedance at 90°c	ohm/km	1.462	0.930	0.672
Maximum symmetrical for 0.2 Sec	kA	5.1	8.0	11.2
short - circuit for 1.0 Sec	kA	2.3	3.6	5.0
current ratings for 3.0 Sec	kA	1.3	2.1	2.9
Approximate overall diameter	mm	17.6	21.3	23.8
Approximate Cable weight	kg/km	621.8	940.1	1247.1
Minimum bending radius	mm	106	128	143
Nominal Drum Length	m	1000	500	500
Size of the Drum		D - 2	D - 2	D - 2
Drum Weight	kg	138	138	138
Gross weight of the Cable Drum	kg	760	608	762

TABLE - 11



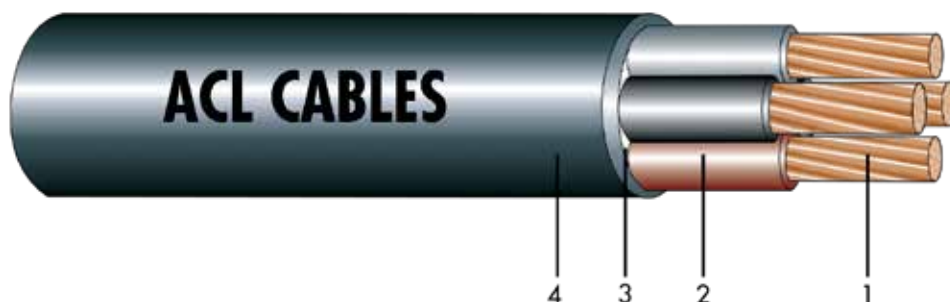
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Sheath

3 Core Unarmoured Cables - Cu/XLPE/PVC With Sector Shaped Conductors

600/1000V BS 5467:1989

ITEM CODE	UNIT	X-101	X-102	X-103	X-104	X-105	X-106	X-107	X-108	X-109	X-110	X-111
Nominal Area of Conductor	sq.mm	25	35	50	70	95	120	150	185	240	300	400
Nominal Thickness of insulation	mm	0.9	0.9	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8	2.0
Thickness of oversheath	mm	1.8	1.8	1.8	1.9	2.0	2.1	2.2	2.4	2.6	2.7	3.0
Maximum resistance of Conductor	D.C. at 20° C ohm/km A.C. at 90° C ohm/km	0.727 0.927	0.524 0.668	0.387 0.493	0.268 0.342	0.193 0.254	0.153 0.196	0.124 0.159	0.0991 0.128	0.0754 0.099	0.0601 0.080	0.0470 0.064
Inductance	mH/km	0.256	0.249	0.247	0.235	0.229	0.228	0.230	0.225	0.226	0.224	0.223
Reactance at 50Hz	ohm/km	0.081	0.078	0.078	0.074	0.072	0.072	0.072	0.071	0.071	0.070	0.070
Impedance at 90°c	ohm/km	0.930	0.673	0.499	0.350	0.264	0.209	0.175	0.146	0.122	0.106	0.095
Maximum symmetrical short - circuit current ratings	for 0.2 Sec kA for 1.0 Sec kA for 3.0 Sec kA	8.0 3.6 2.1	11.2 5.0 2.9	16.0 7.2 4.1	22.4 10.0 5.8	30.4 13.6 7.8	38.4 17.2 9.9	48.0 21.5 12.4	59.2 26.5 15.3	76.8 34.3 19.8	96.0 42.9 24.8	128.0 57.2 33.0
Approximate overall diameter	mm	18.6	20.3	24.8	28.3	31.6	34.9	39.0	44.8	49.9	53.8	61.2
Approximate Cable weight	kg/km	901.2	1188.0	1590.5	2242.5	3048.9	3763.7	4633.8	5808.6	7530.4	9334.7	11897.5
Minimum bending radius	mm	149	163	199	227	253	279	312	358	399	430	490
Nominal Drum Length	m	1000	1000	750	750	750	500	500	500	350	350	250
Size of the Drum		D - 2	D - 4	D - 4	D-5	D-5	D-7	D-8	D-12	D-12	D-12	D-12
Drum Weight	kg	138	150	150	225	225	245	255	510	510	510	510
Gross weight of the Cable Drum	kg	1039	1338	1343	1907	2512	2127	2572	3414	3146	3777	3484

TABLE - 12



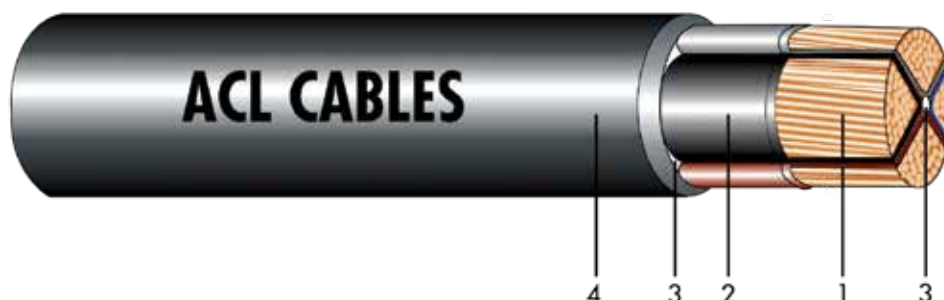
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Sheath

4 Core Unarmoured Cables - Cu/XLPE/PVC With Circular Conductors

600/1000V BS 5467:1989

ITEM CODE	UNIT	X-112	X-113	X-114
Nominal Area of Conductor	sq.mm	16	25	35
Nominal Thickness of insulation	mm	0.7	0.9	0.9
Thickness of oversheath	mm	1.8	1.8	1.8
Maximum resistance of Conductor	D.C. at 20° C ohm/km A.C. at 90° C ohm/km	1.15 1.460	0.727 0.927	0.524 0.668
Inductance	mH/km	0.251	0.252	0.246
Reactance at 50Hz	ohm/km	0.079	0.079	0.077
Impedance at 90°c	ohm/km	1.462	0.930	0.672
Maximum symmetrical short - circuit current ratings	for 0.2 Sec kA for 1.0 Sec kA for 3.0 Sec kA	5.1 2.3 1.3	8.0 3.6 2.1	11.2 5.0 2.9
Approximate overall diameter	mm	19.3	23.4	26.2
Approximate Cable weight	kg/km	862.2	1334.0	1782.3
Minimum bending radius	mm	116	141	157
Nominal Drum Length	m	1000	750	750
Size of the Drum		D - 3	D - 3	D - 3
Drum Weight	kg	145	145	145
Gross weight of the Cable Drum	kg	1007	1146	1482

TABLE - 13



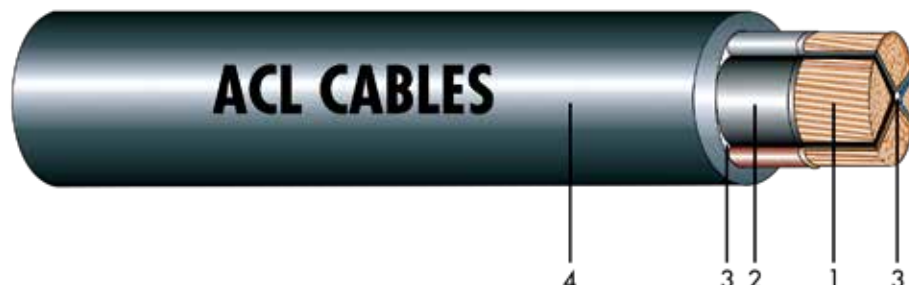
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Sheath

4 Core Unarmoured Cables - Cu/XLPE/PVC With Sector Shaped Conductors

600/1000V BS 5467:1989

ITEM CODE	UNIT	X-115	X-116	X-117	X-118	X-119	X-120	X-121	X-122	X-123	X-124	X-125
Nominal Area of Conductor	sq.mm	25	35	50	70	95	120	150	185	240	300	400
Nominal Thickness of insulation	mm	0.9	0.9	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8	2.0
Thickness of oversheath	mm	1.8	1.8	1.8	2.0	2.1	2.2	2.4	2.6	2.8	3.0	3.2
Maximum resistance of Conductor	D.C. at 20° C ohm/km A.C. at 90° C ohm/km	0.727 0.927	0.524 0.668	0.387 0.493	0.268 0.342	0.193 0.254	0.153 0.196	0.124 0.159	0.0991 0.128	0.0754 0.099	0.0601 0.080	0.0470 0.064
Inductance	mH/km	0.256	0.249	0.247	0.235	0.229	0.228	0.230	0.225	0.226	0.224	0.223
Reactance at 50Hz	ohm/km	0.081	0.078	0.078	0.074	0.072	0.072	0.072	0.071	0.071	0.070	0.070
Impedance at 90°c	ohm/km	0.930	0.673	0.499	0.350	0.264	0.209	0.175	0.146	0.122	0.106	0.095
Maximum symmetrical short - circuit current ratings	for 0.2 Sec kA for 1.0 Sec kA for 3.0 Sec kA	8.0 3.6 2.1	11.2 5.0 2.9	16.0 7.2 4.1	22.4 10.0 5.8	30.4 13.6 7.8	38.4 17.2 9.9	48.0 21.5 12.4	59.2 26.5 15.3	76.8 34.3 19.8	96.0 42.9 24.8	128.0 57.2 33.0
Approximate overall diameter	mm	22.4	24.8	28.3	32.7	36.5	40.4	45.3	50.2	56.2	61.9	70.4
Approximate Cable weight	kg/km	1186.9	1573.0	2108.4	2987.9	4034.3	4983.5	6156.6	7710.1	9969.4	12408.4	15790.1
Minimum bending radius	mm	179	198	227	261	292	323	362	402	449	495	563
Nominal Drum Length	m	500	500	500	500	500	500	350	350	250	-	-
Size of the Drum		D - 2	D - 2	D - 4	D-6	D-6	D-9	D-9	D-9	D-12	-	-
Drum Weight	kg	138	138	150	230	230	265	265	265	510	-	-
Gross weight of the Cable Drum	kg	731	925	1204	1724	2247	2757	2420	2964	3002	-	-

TABLE - 14



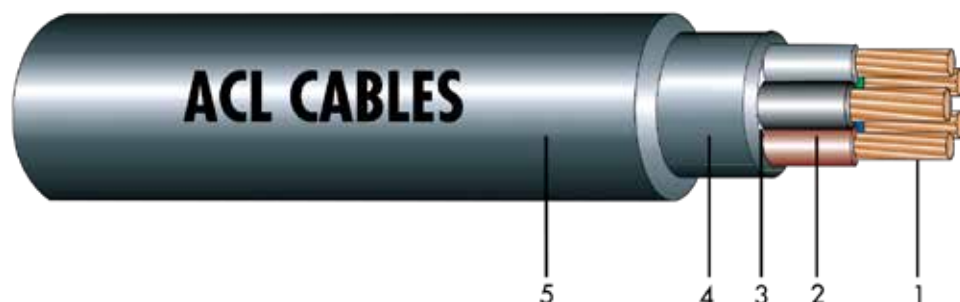
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Sheath

4 Core Unarmoured Cables - Cu/XLPE/PVC Reduced Neutral Conductor

600/1000V IEC 60502 -1:2004

ITEM CODE	UNIT	X-126 _{IEC}	X-127 _{IEC}	X-128 _{IEC}	X-129 _{IEC}	X-130 _{IEC}	X-131 _{IEC}	X-132 _{IEC}	X-133 _{IEC}	X-134 _{IEC}	X-135 _{IEC}	X-137 _{IEC}
Nominal Area of Conductor	sq.mm	25/16	35/16	50/25	70/35	95/50	120/70	150/70	185/95	240/120	300/150	400/185
Nominal Thickness of insulation	mm	0.9/0.7	0.9/0.7	1.0/0.9	1.1/0.9	1.1/1.0	1.2/1.1	1.4/1.1	1.6/1.1	1.7/1.2	1.8/1.4	2.0/1.6
Thickness of Extruded bedding	mm	-	-	1.0	1.2	1.2	1.2	1.4	1.4	1.6	1.6	1.6
Thickness of oversheath	mm	1.8	1.8	1.9	2.0	2.1	2.3	2.4	2.5	2.7	3.0	3.2
Maximum resistance D.C. at 20° C	ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470
of Phase Conductor A.C. at 90° C	ohm/km	0.927	0.668	0.493	0.342	0.254	0.196	0.159	0.128	0.099	0.080	0.064
Maximum resistance of Neutral Conductor D.C. at 20° C	ohm/km	1.15	1.15	0.727	0.524	0.387	0.268	0.268	0.193	0.153	0.124	0.0991
Inductance	mH/km	0.252	0.246	0.247	0.235	0.229	0.228	0.230	0.225	0.226	0.224	0.223
Reactance at 50Hz	ohm/km	0.079	0.077	0.078	0.074	0.072	0.072	0.072	0.071	0.071	0.070	0.070
Impedance at 90° C	ohm/km	0.930	0.672	0.499	0.350	0.264	0.209	0.175	0.146	0.122	0.107	0.095
Maximum symmetrical short - circuit current ratings for 0.2 Sec	kA	8.0	11.2	16.0	22.4	30.4	38.4	48.0	59.2	76.8	96.0	128.0
for 1.0 Sec	kA	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9	57.2
for 3.0 Sec	kA	2.1	2.9	4.1	5.8	7.8	9.9	12.4	15.3	19.8	24.8	33.0
Approximate overall diameter	mm	23.1	25.1	26.4	31.0	34.2	38.8	41.4	45.8	51.7	56.3	62.9
Approximate Cable weight	kg/km	1178.1	1482.8	1951.4	2762.5	3694.0	4679.8	5646.3	6978.3	9025.7	11173.2	14120.8
Minimum bending radius	mm	139	151	211	248	274	310	331	366	414	450	503
Nominal Drum Length	m	500	500	500	500	500	500	350	350	350		
Size of the Drum		D - 2	D - 2	D - 4	D - 5	D - 5	D - 5	D - 6	D - 8	D - 11		
Drum Weight	kg	138	138	150	225	225	225	230	255	495		
Gross weight of the Cable Drum	kg	727	879	1126	1606	2072	2565	2206	2697	3654		

TABLE - 15



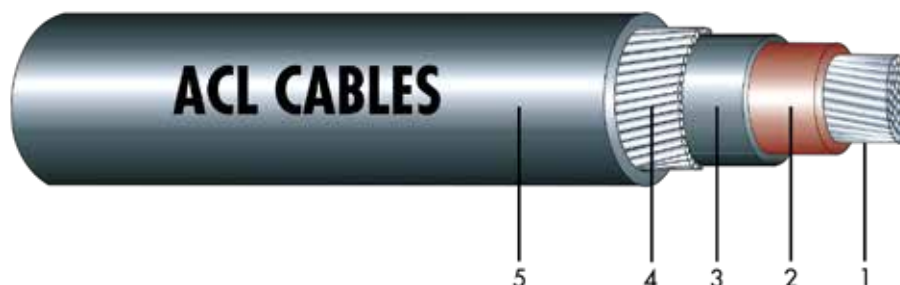
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Bedding
5. PVC Sheath

5 Core Unarmoured Cables - Cu/XLPE/PVC With Circular Conductors

600/1000V

ITEM CODE	UNIT	X-182	X-183	X-184	X-185	X-186	X-187	X-188	X-189	X-190	X-191
Nominal Area of Conductor	sq.mm	1.5	2.5	4.	6	10	16	25	35	50	70
Nominal Thickness of insulation	mm	0.6	0.7	0.7	0.7	0.7	0.7	0.9	0.9	1.0	1.1
Thickness of extruded Bedding	mm	0.8	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.2	1.2
Thickness of oversheath	mm	1.4	1.4	1.5	1.5	1.6	1.7	1.8	1.9	2.0	2.2
Maximum resistance of Conductor	D.C. at 20° C ohm/km A.C. at 90° C ohm/km	12.1 -	7.41 -	4.61 -	3.08 -	1.83 -	1.15 1.470	0.727 0.927	0.524 0.668	0.387 0.494	0.268 0.342
Inductance	mH/km	-	-	-	-	-	0.251	0.252	0.246	0.235	0.231
Reactance at 50Hz	ohm/km	-	-	-	-	-	0.079	0.079	0.077	0.074	0.073
Impedance at 90°c	ohm/km	-	-	-	-	-	1.462	0.930	0.672	0.499	0.350
Maximum symmetrical short - circuit current ratings	for 0.2 Sec kA for 1.0 Sec kA for 3.0 Sec kA	0.5 0.2 0.1	0.8 0.4 0.2	1.3 0.6 0.3	1.9 0.9 0.5	3.2 1.4 0.8	5.1 2.3 1.3	8.0 3.6 2.1	11.2 5.0 2.9	16.0 7.2 4.1	22.4 10.0 5.8
Approximate overall diameter	mm	11.9	13.6	15.3	16.8	19.5	23.0	27.8	31.1	35.8	41.6
Approximate Cable weight	kg/km	214.7	295.1	405.1	537.9	823.2	1216.5	1846.4	2433.3	3218.9	4518.8
Minimum bending radius	mm	72	82	92	101	117	138	167	186	215	250
Nominal Drum Length	m	1000	1000	1000	1000	1000	1000	500	500	500	500
Size of the Drum		D - 1	D - 1	D - 2	D-2	D-3	D-3	D-3	D-3	D-5	D-8
Drum Weight	kg	60	60	138	138	145	145	145	145	225	255
Gross weight of the Cable Drum	kg	275	355	543	676	968	1362	1068	1362	1834	2514

TABLE - 16



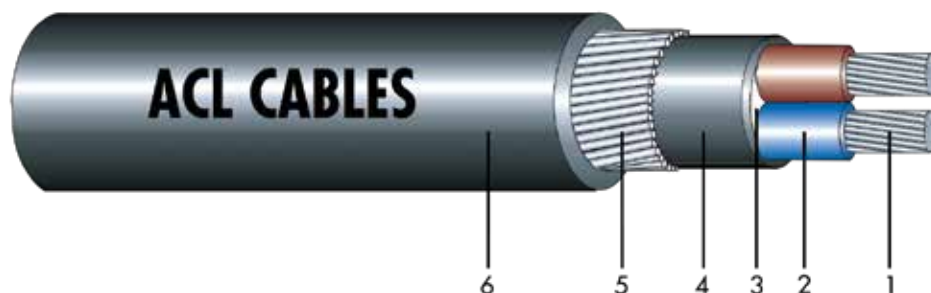
1. AI Conductor
2. XLPE Insulation
3. PVC Bedding
4. AI Wire Armour
5. PVC Sheath

1 Core Armoured Cables - AI/XLPE/AWA/PVC

600/1000V BS 5467 : 1997

ITEM CODE	UNIT	L-1 50	L-2 70	L-3 95	L-4 120	L-5 150	L-6 185	L-7 240	L-8 300	L-9 400	L-10 500	L-11 630	L-12 800	L-13 1000
Nominal Area of Conductor	sq.mm	50	70	95	120	150	185	240	300	400	500	630	800	1000
Nominal Thickness of insulation	mm	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8	2.0	2.2	2.4	2.6	2.8
Thickness of Extruded bedding	mm	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.0	1.2	1.2	1.2	1.4	1.4
Aluminium Armour wire diameter	mm	0.9	1.25	1.25	1.25	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.5	2.5
Thickness of oversheath	mm	1.5	1.5	1.6	1.6	1.7	1.8	1.8	1.9	2.0	2.1	2.2	2.3	2.5
Maximum armour resistance at 20°C	ohm/km	1.3	0.75	0.67	0.61	0.42	0.38	0.34	0.31	0.22	0.20	0.18	0.13	0.12
Gross armour wire area (min)	sq.mm	25	39	45	50	72	80	91	99	141	157	176	246	275
Maximum resistance D.C. at 20° C	ohm/km	0.641	0.443	0.32	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469	0.0367	0.0291
of Conductor A.C. at 90° C	ohm/km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.103	0.082	0.062	0.043	0.028
Inductance	mH/km	0.327	0.319	0.306	0.295	0.300	0.295	0.284	0.278	0.279	0.274	0.269	0.268	0.263
Reactance at 50Hz	ohm/km	0.103	0.100	0.096	0.093	0.094	0.093	0.089	0.087	0.088	0.086	0.085	0.084	0.083
Impedance at 90°c	ohm/km	0.828	0.577	0.422	0.338	0.281	0.230	0.185	0.157	0.135	0.119	0.105	0.094	0.087
Maximum symmetrical short - circuit current ratings	for 0.2 Sec kA	10.6	14.8	20.1	25.4	31.7	39.1	50.7	63.4	84.5	105.6	133.1	169.0	211.3
	for 1.0 Sec kA	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3	37.8	47.2	59.5	75.6	94.5
	for 3.0 Sec kA	2.7	3.8	5.2	6.5	8.2	10.1	13.1	16.4	21.8	27.3	34.4	43.6	54.6
Maximum earth - fault short - circuit current ratings	for 0.2 Sec kA	3.8	6.0	7.0	7.7	11.1	12.3	13.9	15.1	21.7	24.1	27.0	37.7	42.2
	for 1.0 Sec kA	1.7	2.7	3.1	3.5	5.0	5.5	6.2	6.8	9.7	10.8	12.1	16.8	18.9
	for 3.0 Sec kA	1.0	1.6	1.8	2.0	2.9	3.2	3.6	3.9	5.6	6.2	7.0	9.7	10.9
Approximate overall diameter	mm	17.3	20.0	22.1	23.9	27.2	29.6	32.5	35.3	40.1	43.8	48.4	54.9	60.0
Approximate Cable weight	kg/km	389.0	525.5	656.1	769.0	986.5	1178.9	1426.0	1695.4	2194.8	2640.0	3217.4	4146.6	5004.2
Minimum bending radius	mm	104	120	133	143	163	178	195	212	240	263	290	329	360
Nominal Drum Length	m	1000	1000	1000	1000	1000	750	750	500	500	500	250	250	250
Size of the Drum		D - 2	D - 3	D - 3	D - 5	D - 5	D - 5	D - 5	D - 5	D - 5	D - 8	D - 7	D - 9	D - 12
Drum Weight	kg	138	145	145	225	225	225	225	225	225	255	245	265	510
Gross weight of the Cable Drum	kg	527	671	801	994	1212	1109	1295	1073	1322.0	1575	1049	1302	1761

TABLE - 17



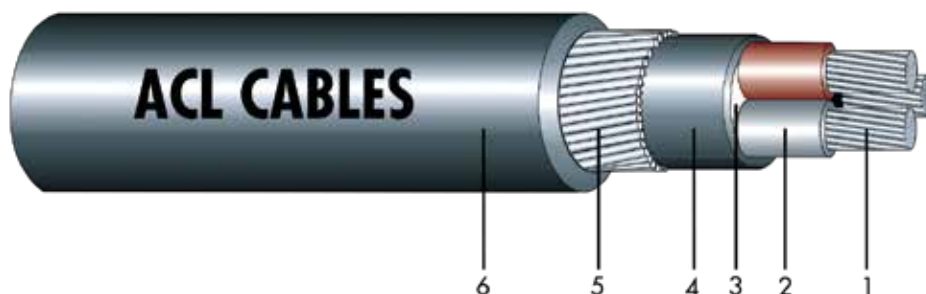
1. AI Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Bedding
5. Galvanized Steel Wire Armour
6. PVC Sheath

2 Core Armoured Cables - AI/XLPE/SWA/PVC With Circular Conductors

600/1000V BS 5467 : 1997

ITEM CODE	UNIT	L-14	L-15	L-16	L-17	L-18	L-19	L-20	L-21
Nominal Area of Conductor	sq.mm	1.5	2.5	4	6	10	16	25	35
Nominal Thickness of insulation	mm	0.6	0.7	0.7	0.7	0.7	0.7	0.9	0.9
Thickness of Extruded bedding	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	1.0
Steel Armour wire diameter	mm	0.9	0.9	0.9	0.9	0.9	1.25	1.25	1.6
Thickness of oversheath	mm	1.3	1.4	1.4	1.4	1.5	1.5	1.6	1.7
Maximum armour resistance at 20°C	ohm/km	10.2	8.8	7.9	7.0	6.0	3.7	3.7	2.6
Gross armour wire area (min)	sq.mm	14	17	18	21	25	41	49	72
Maximum resistance D.C. at 20° C	ohm/km	18.1	12.1	7.41	4.61	3.08	1.91	1.20	0.868
of Conductor A.C. at 90° C	ohm/km	-	-	-	-	-	2.420	1.540	1.110
Inductance	mH/km	0.315	0.309	0.290	0.277	0.262	0.251	0.252	0.246
Reactance at 50Hz	ohm/km	0.099	0.097	0.091	0.087	0.082	0.079	0.079	0.077
Impedance at 90°C	ohm/km	0.099	0.097	0.091	0.087	0.082	2.421	1.542	1.113
Maximum symmetrical for 0.2 Sec	kA	0.3	0.5	0.8	1.3	2.1	3.4	5.3	7.4
short - circuit for 1.0 Sec	kA	0.1	0.2	0.4	0.6	0.9	1.5	2.4	3.3
current ratings for 3.0 Sec	kA	0.1	0.1	0.2	0.3	0.5	0.9	1.4	1.9
Maximum earth - fault for 0.2 Sec	kA	1.2	1.4	1.6	1.8	2.1	3.4	4.1	6.1
short - circuit for 1.0 Sec	kA	0.5	0.6	0.7	0.8	0.9	1.5	1.8	2.7
current ratings for 3.0 Sec	kA	0.3	0.4	0.4	0.5	0.5	0.9	1.1	1.6
Approximate overall diameter	mm	11.6	13.0	14.1	15.2	17.3	20.1	23.7	27.3
Approximate Cable weight	kg/km	233.6	290.3	337.5	395.3	503.5	725.6	973.9	1338.0
Minimum bending radius	mm	69	78	85	91	104	121	142	164
Nominal Drum Length	m	1000	1000	1000	1000	1000	1000	750	500
Size of the Drum		D - 1	D - 1	D - 1	D - 2	D - 2	D - 4	D - 4	D - 4
Drum Weight	kg	60	60	60	138	138	150	150	150
Gross weight of the Cable Drum	kg	294	350	398	533	642	876	880	819

TABLE - 18



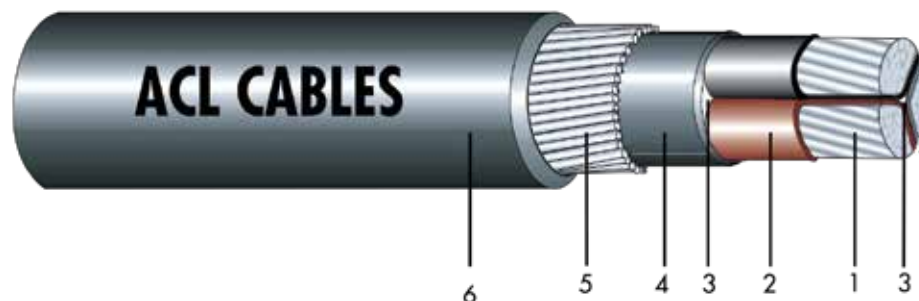
1. AI Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Bedding
5. Galvanized Steel Wire Armour
6. PVC Sheath

3 Core Armoured Cables - AI/XLPE/SWA/PVC With Circular Conductors

600/1000V BS 5467 : 1997

ITEM CODE	UNIT	L-22	L-23	L-24	L-25	L-26	L-27	L-28	L-29
Nominal Area of Conductor	sq.mm	1.5	2.5	4.0	6.0	10.0	16.0	25.0	35.0
Nominal Thickness of insulation	mm	0.6	0.7	0.7	0.7	0.7	0.7	0.9	0.9
Thickness of Extruded bedding	mm	0.8	0.8	0.8	0.8	0.8	0.8	1.0	1.0
Steel Armour wire diameter	mm	0.9	0.9	0.9	0.9	1.25	1.25	1.6	1.6
Thickness of oversheath	mm	1.3	1.4	1.4	1.4	1.5	1.6	1.7	1.8
Maximum armour resistance at 20°C	ohm/km	9.5	8.2	7.5	6.7	4.0	3.5	2.5	2.3
Gross armour wire area (min)	sq.mm	15	18	20	22	37	43	68	78
Maximum resistance D.C. at 20° C	ohm/km	18.1	12.1	7.41	4.61	3.08	1.91	1.20	0.868
of Conductor A.C. at 90° C	ohm/km	-	-	-	-	-	2.420	1.540	1.110
Inductance	mH/km	0.315	0.309	0.290	0.277	0.262	0.251	0.252	0.246
Reactance at 50Hz	ohm/km	0.099	0.097	0.091	0.087	0.082	0.079	0.079	0.077
Impedance at 90°c	ohm/km	0.099	0.097	0.091	0.087	0.082	2.421	1.542	1.113
Maximum symmetrical for 0.2 Sec	kA	0.3	0.5	0.8	1.3	2.1	3.4	5.3	7.4
short - circuit for 1.0 Sec	kA	0.1	0.2	0.4	0.6	0.9	1.5	2.4	3.3
current ratings for 3.0 Sec	kA	0.1	0.1	0.2	0.3	0.5	0.9	1.4	1.9
Maximum earth - fault for 0.2 Sec	kA	1.2	1.5	1.7	1.9	3.1	3.6	5.7	6.6
short - circuit for 1.0 Sec	kA	0.6	0.7	0.7	0.8	1.4	1.6	2.6	2.9
current ratings for 3.0 Sec	kA	0.3	0.4	0.4	0.5	0.8	0.9	1.5	1.7
Approximate overall diameter	mm	12.0	13.6	14.7	15.9	18.8	21.3	26.3	29.0
Approximate Cable weight	kg/km	247.4	313.0	364.9	428.9	639.0	806.3	1245.1	1506.0
Minimum bending radius	mm	72	81	88	96	113	128	158	174
Nominal Drum Length	m	1000	1000	1000	1000	1000	1000	500	500
Size of the Drum		D - 1	D - 1	D - 1	D - 2	D - 2	D - 3	D - 4	D - 4
Drum Weight	kg	60	60	60	138	138	145	150	150
Gross weight of the Cable Drum	kg	307	373	425	567	777	951	773	903

TABLE - 19



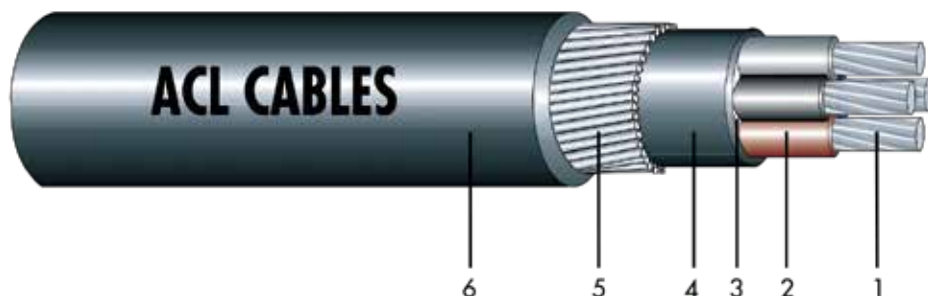
1. Al Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Bedding
5. Galvanized Steel Wire Armour
6. PVC Sheath

3 Core Armoured Cables - Al/XLPE/SWA/PVC With Sector Shaped Conductors

600/1000V BS 5467 : 1997

ITEM CODE	UNIT	L-30	L-31	L-32	L-33	L-34	L-35	L-36	L-37	L-38	L-39	L-40
Nominal Area of Conductor	sq.mm	25	35	50	70	95	120	150	185	240	300	400
Nominal Thickness of insulation	mm	0.9	0.9	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8	2.0
Thickness of Extruded bedding	mm	1.0	1.0	1.0	1.0	1.2	1.2	1.4	1.4	1.4	1.6	1.6
Steel Armour wire diameter	mm	1.6	1.6	1.6	1.6	2.0	2.0	2.5	2.5	2.5	2.5	2.5
Thickness of oversheath	mm	1.7	1.8	1.8	1.9	2.1	2.2	2.3	2.4	2.6	2.7	2.9
Maximum armour resistance at 20°C	ohm/km	2.5	2.3	2.0	1.8	1.3	1.2	0.78	0.71	0.63	0.58	0.52
Gross armour wire area (min)	sq.mm	60	66	82	93	132	145	206	236	260	285	324
Maximum resistance	D.C. at 20° C	ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.100	0.0778
of Conductor	A.C. at 90° C	ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.130	0.110
Inductance	mH/km	0.256	0.249	0.247	0.235	0.229	0.228	0.230	0.225	0.226	0.224	0.223
Reactance at 50Hz	ohm/km	0.081	0.078	0.078	0.074	0.072	0.072	0.072	0.071	0.071	0.070	0.070
Impedance at 90°C	ohm/km	1.542	1.113	0.826	0.573	0.417	0.333	0.275	0.223	0.177	0.148	0.130
Maximum symmetrical	for 0.2 Sec	kA	5.3	7.4	10.6	14.8	20.1	25.4	31.7	39.1	50.7	63.4
short - circuit	for 1.0 Sec	kA	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3
current ratings	for 3.0 Sec	kA	1.4	1.9	2.7	3.8	5.2	6.5	8.2	10.1	13.1	16.4
Maximum earth - fault	for 0.2 Sec	kA	5.1	5.6	6.9	7.8	11.1	12.1	17.3	19.8	21.9	23.9
short - circuit	for 1.0 Sec	kA	2.3	2.5	3.1	3.5	5.0	5.4	7.8	8.9	9.8	10.7
current ratings	for 3.0 Sec	kA	1.3	1.4	1.8	2.0	2.9	3.1	4.5	5.1	5.6	6.2
Approximate overall diameter	mm	23.6	25.5	30.0	33.5	38.2	41.5	47.0	52.6	57.7	62.0	69.2
Approximate Cable weight	kg/km	1008.5	1178.9	1496.4	1837.6	2519.2	2910.3	3824.0	4561.8	5427.0	6348.7	7660.2
Minimum bending radius	mm	189	204	240	268	305	332	376	421	462	496	554
Nominal Drum Length	m	500	500	500	500	500	500	500	350	250	250	250
Size of the Drum		D - 2	D - 4	D - 4	D - 6	D - 6	D - 11	D - 11	D - 12	D - 12	-	-
Drum Weight	kg	138	150	150	230	230	495	495	510	510	-	-
Gross weight of the Cable Drum	kg	642	739	898	1149	1490	1950	2407	2107	1867	-	-

TABLE - 20



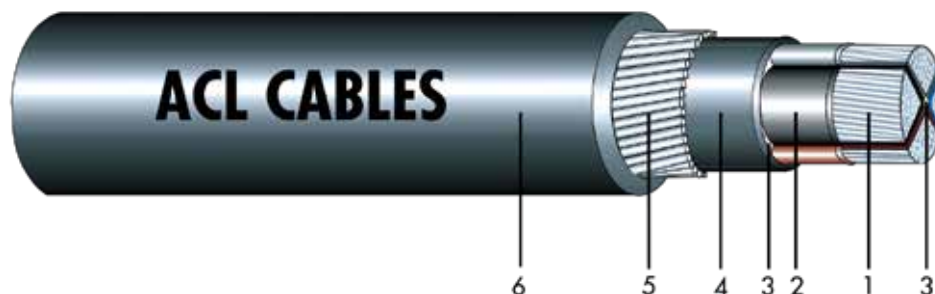
1. AI Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Bedding
5. Galvanized Steel Wire Armour
6. PVC Sheath

4 Core Armoured Cables - AI/XLPE/SWA/PVC With Circular Conductors

600/1000V BS 5467 : 1997

ITEM CODE	UNIT	L-41	L-42	L-43	L-44	L-45	L-46	L-47	L-48
Nominal Area of Conductor	sq.mm	1.5	2.5	4.0	6.0	10.0	16.0	25.0	35.0
Nominal Thickness of insulation	mm	0.6	0.7	0.7	0.7	0.7	0.7	0.9	0.9
Thickness of Extruded bedding	mm	0.8	0.8	0.8	0.8	0.8	0.8	1.0	1.0
Steel Armour wire diameter	mm	0.9	0.9	0.9	1.25	1.25	1.25	1.6	1.6
Thickness of oversheath	mm	1.3	1.4	1.4	1.5	1.5	1.6	1.7	1.8
Maximum armour resistance at 20°C	Ω/km	8.8	7.7	6.8	4.3	3.7	3.1	2.3	2.0
Gross armour wire area (min)	sq.mm	17	19	22	34	41	48	76	86
Maximum resistance D.C. at 20° C	Ω/km	18.1	12.1	7.41	4.61	3.08	1.91	1.20	0.868
of Conductor A.C. at 90° C	Ω/km	-	-	-	-	-	2.420	1.540	1.110
Inductance	mH/km	0.315	0.309	0.290	0.277	0.262	0.251	0.252	0.246
Reactance at 50Hz	Ω/km	0.099	0.097	0.091	0.087	0.082	0.079	0.079	0.077
Impedance at 90°c	Ω/km	0.099	0.097	0.091	0.087	0.082	2.421	1.542	1.113
Maximum symmetrical for 0.2 Sec	kA	0.3	0.5	0.8	1.3	2.1	3.4	5.3	7.4
short - circuit for 1.0 Sec	kA	0.1	0.2	0.4	0.6	0.9	1.5	2.4	3.3
current ratings for 3.0 Sec	kA	0.1	0.1	0.2	0.3	0.5	0.9	1.4	1.9
Maximum earth - fault for 0.2 Sec	kA	1.4	1.6	1.8	2.9	3.4	4.0	6.4	7.3
short - circuit for 1.0 Sec	kA	0.6	0.7	0.8	1.3	1.5	1.8	2.9	3.3
current ratings for 3.0 Sec	kA	0.4	0.4	0.5	0.7	0.9	1.0	1.7	1.9
Approximate overall diameter	mm	12.7	14.4	15.7	18.0	20.3	23.0	28.4	31.4
Approximate Cable weight	kg/km	280.7	348.8	414.1	581.0	731.5	934.8	1447.3	1750.7
Minimum bending radius	mm	76	87	94	108	122	138	171	188
Nominal Drum Length	m	1000	1000	1000	1000	1000	1000	1000	1000
Size of the Drum		D - 1	D - 1	D - 1	D - 1	D - 2	D - 2	D - 3	D - 3
Drum Weight	kg	60	60	60	60	138	138	145	145
Gross weight of the Cable Drum	kg	341	409	474	641	870	1073	1592	1896

TABLE - 21



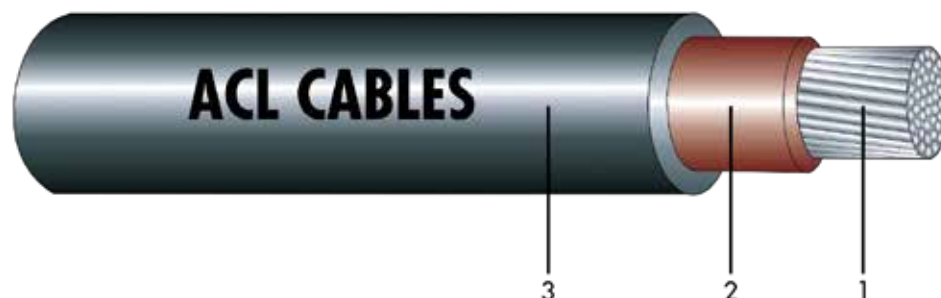
1. Al Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Bedding
5. Galvanized Steel Wire Armour
6. PVC Sheath

4 Core Armoured Cables - Al/XLPE/SWA/PVC With Sector Shaped Conductors

600/1000V BS 5467 : 1997

ITEM CODE	UNIT	L-49 25	L-50 35	L-51 50	L-52 70	L-53 95	L-54 120	L-55 150	L-56 185	L-57 240	L-58 300	L-59 400
Nominal Area of Conductor	sq.mm											
Nominal Thickness of insulation	mm	0.9	0.9	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8	2.0
Thickness of Extruded bedding	mm	1.0	1.0	1.0	1.2	1.2	1.4	1.4	1.4	1.6	1.6	1.8
Steel Armour wire diameter	mm	1.6	1.6	1.6	2.0	2.0	2.5	2.5	2.5	2.5	2.5	3.15
Thickness of oversheath	mm	1.7	1.8	1.9	2.1	2.2	2.3	2.4	2.6	2.7	2.9	3.2
Maximum armour resistance at 20°C	Ω/km	2.3	2.0	1.8	1.2	1.1	0.76	0.68	0.61	0.54	0.49	0.35
Gross armour wire area (min)	sq.mm	72	80	95	135	154	211	236	265	295	319	460
Maximum resistance	D.C. at 20° C	Ω/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.0778
of Conductor	A.C. at 90° C	Ω/km	1.54	1.110	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.110
Inductance	mH/km	0.256	0.249	0.247	0.235	0.229	0.228	0.230	0.225	0.226	0.224	0.223
Reactance at 50Hz	Ω/km	0.081	0.078	0.078	0.074	0.072	0.072	0.072	0.071	0.071	0.070	0.070
Impedance at 90°C	Ω/km	1.542	1.113	0.826	0.573	0.417	0.333	0.275	0.223	0.177	0.148	0.130
Maximum symmetrical	for 0.2 Sec	kA	5.3	7.4	10.6	14.8	20.1	25.4	31.7	39.1	50.7	84.5
short - circuit	for 1.0 Sec	kA	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7	37.8
current ratings	for 3.0 Sec	kA	1.4	1.9	2.7	3.8	5.2	6.5	8.2	10.1	13.1	21.8
Maximum earth - fault	for 0.2 Sec	kA	6.1	6.8	7.9	11.4	12.9	17.7	19.8	22.3	24.8	38.7
short - circuit	for 1.0 Sec	kA	2.7	3.0	3.6	5.1	5.8	7.9	8.9	10.0	11.1	17.3
current ratings	for 3.0 Sec	kA	1.6	1.7	2.1	2.9	3.3	4.6	5.1	5.8	6.4	10.0
Approximate overall diameter	mm	27.4	30.0	33.7	39.3	43.1	48.4	53.1	58.0	64.2	68.6	78.8
Approximate Cable weight	kg/km	1246.9	1476.4	1819.6	2543.3	3108.0	3994.3	4679.2	5553.3	6697.4	7797.2	10356.5
Minimum bending radius	mm	218.8	239.8	269.9	314.2	345.0	387.4	424.4	464.4	513.2	548.4	630.5
Nominal Drum Length	m	500	500	500	500	500	500	350	350	-	-	-
Size of the Drum		D - 4	D - 4	D - 6	D - 6	D - 11	D - 11	D - 12	D - 13	-	-	-
Weight of Drum	kg	150	150	230	230	495	495	510	565	-	-	-
Gross weight of the Cable Drum	kg	773	888	1140	1502	2049	2492	2148	2509	-	-	-

TABLE - 22



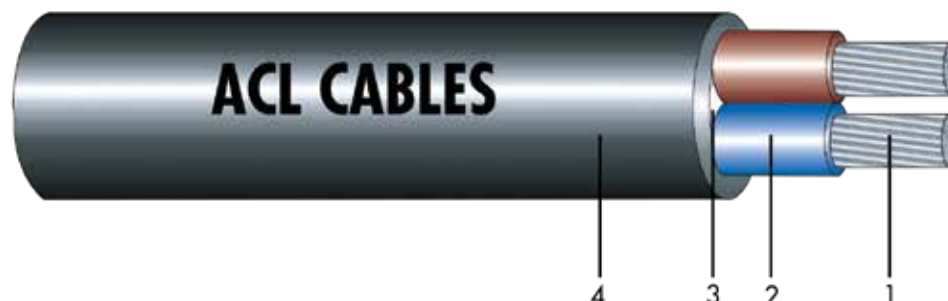
1. Al Conductor
2. XLPE Insulation
3. PVC Sheath

1 Core Unarmoured Cables - Al/XLPE/PVC

600/1000V BS 7889:1997

ITEM CODE	UNIT	L-60	L-61	L-62	L-63	L-64	L-65	L-66	L-67	L-68	L-69	L-70	L-71	L-72
Nominal Area of Conductor	sq.mm	50	70	95	120	150	185	240	300	400	500	630	800	1000
Nominal Thickness of insulation	mm	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8	2.0	2.2	2.4	2.6	2.8
Thickness of oversheath	mm	1.4	1.4	1.5	1.5	1.6	1.6	1.7	1.8	1.9	2.0	2.2	2.3	2.4
Maximum resistance	D.C. at 20° C	Ω/km	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469	0.0367
of Conductor	A.C. at 90° C	Ω/km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.103	0.082	0.062	0.043
Inductance	mH/km	0.280	0.271	0.262	0.256	0.256	0.253	0.248	0.245	0.243	0.241	0.241	0.237	0.235
Reactance at 50Hz	Ω/km	0.088	0.085	0.082	0.080	0.080	0.080	0.078	0.077	0.076	0.076	0.076	0.074	0.074
Impedance at 90°c	Ω/km	0.827	0.574	0.419	0.335	0.277	0.226	0.180	0.151	0.128	0.111	0.097	0.086	0.079
Maximum symmetrical	for 0.2 Sec	kA	10.6	14.8	20.1	25.4	31.7	39.1	50.7	63.4	84.5	105.6	133.1	169.0
short - circuit	for 1.0 Sec	kA	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3	37.8	47.2	59.5	75.6
current ratings	for 3.0 Sec	kA	2.7	3.8	5.2	6.5	8.2	10.1	13.1	16.4	21.8	27.3	34.4	43.6
Approximate overall diameter	mm	13.7	15.7	17.7	19.6	21.8	24.0	27.1	29.9	33.5	37.2	42.2	46.9	52.0
Approximate Cable weight	kg/km	247.3	330.8	422.5	526.5	645.2	790.1	1006.5	1238.1	1558.4	1936.1	2497.5	3078.1	3816.7
Minimum bending radius	mm	82	94	106	118	131	144	162	179	201	223	253	281	312
Nominal Drum Length	m	1000	1000	1000	1000	1000	1000	1000	750	500	500	250	250	250
Size of the Drum		D - 1	D - 2	D - 2	D - 3	D - 3	D - 5	D - 5	D - 5	D - 5	D - 6	D - 6	D - 7	D - 7
Weight of the Drum	kg	60	138	138	145	145	225	225	225	225	230	230	245	245
Gross weight of the Cable Drum	kg	307	469	561	672	790	1015	1232	1154	1004	1198	854	1015	1199

TABLE - 23



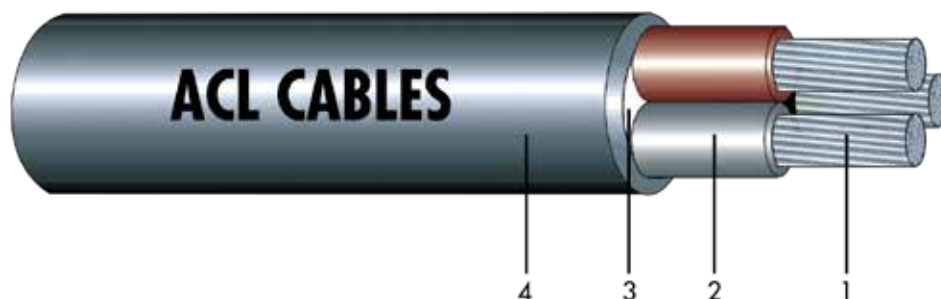
1. Al Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Sheath

2 Core Unarmoured Cables - Al/XLPE/PVC With Circular Conductors

600/1000V BS 5467:1989

ITEM CODE		UNIT	L-73 16	L-74 25	L-75 35
Nominal Area of Conductor		sq.mm			
Nominal Thickness of insulation		mm	0.7	0.9	0.9
Thickness of oversheath		mm	1.8	1.8	1.8
Maximum resistance of Conductor	D.C. at 20° C	ohm/km	1.91	1.20	0.868
	A.C. at 90° C	ohm/km	2.420	1.540	1.110
Inductance		mH/km	0.251	0.252	0.246
Reactance at 50Hz		ohm/km	0.079	0.079	0.077
Impedance at 90°C		ohm/km	2.421	1.542	1.113
Maximum symmetrical short - circuit current ratings	for 0.2 Sec	kA	3.4	5.3	7.4
	for 1.0 Sec	kA	1.5	2.4	3.3
	for 3.0 Sec	kA	0.9	1.4	1.9
Approximate overall diameter		mm	16.6	20.0	22.3
Approximate Cable weight		kg/km	245.6	346.2	430.8
Minimum bending radius		mm	100	120	134
Nominal Drum Length		m	1000	1000	1000
Size of the Drum			D - 2	D - 3	D - 3
Weight of the Drum		kg	138	145	145
Gross weight of the Cable Drum		kg	384	491	576

TABLE - 24



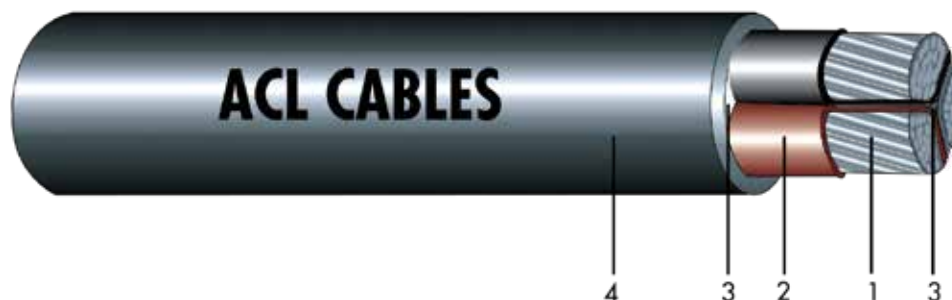
1. Al Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Sheath

3 Core Unarmoured Cables - Al /XLPE/PVC With Circular Conductors

600/1000V BS 5467:1989

ITEM CODE		UNIT	L-76	L-77	L-78
Nominal Area of Conductor		sq.mm	16.0	25.0	35.0
Nominal Thickness of insulation		mm	0.7	0.9	0.9
Thickness of oversheath		mm	1.8	1.8	1.8
Maximum resistance of Conductor	D.C. at 20° C	Ω/km	1.91	1.20	0.868
	A.C. at 90° C	Ω/km	2.420	1.54	1.11
Inductance		mH/km	0.251	0.252	0.246
Reactance at 50Hz		Ω/km	0.079	0.079	0.077
Impedance at 90°C		Ω/km	2.421	1.542	1.113
Maximum symmetrical short - circuit current ratings	for 0.2 Sec	kA	3.4	5.3	7.4
	for 1.0 Sec	kA	1.5	2.4	3.3
	for 3.0 Sec	kA	0.9	1.4	1.9
Approximate overall diameter		mm	17.6	21.3	23.8
Approximate Cable weight		kg/km	314.5	453.2	572.0
Minimum bending radius		mm	106	128	143
Nominal Drum Length		m	1000	500	500
Size of the Drum			D - 2	D - 2	D - 2
Weight of the Drum		kg	138	138	138
Gross weight of the Cable Drum		kg	453	365	424

TABLE - 25



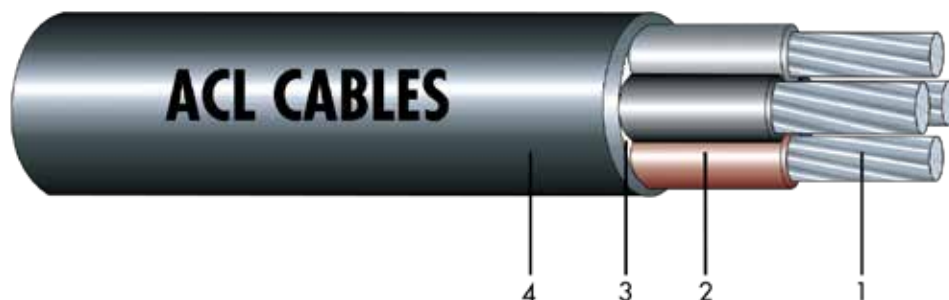
1. AI Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Sheath

3 Core Unarmoured Cables - AI/XLPE/PVC With Sector Shaped Conductors

600/1000V BS 5467:1989

ITEM CODE	UNIT	L-79 25	L-80 35	L-81 50	L-82 70	L-83 95	L-84 120	L-85 150	L-86 185	L-87 240	L-88 300	L-89 400
Nominal Area of Conductor	sq.mm											
Nominal Thickness of insulation	mm	0.9	0.9	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8	2.0
Thickness of oversheath	mm	1.8	1.8	1.8	1.9	2.0	2.1	2.2	2.4	2.6	2.7	2.9
Maximum resistance of Conductor	D.C. at 20° C Ω/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	0.0778
	A.C. at 90° C Ω/km	1.54	1.110	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.110
Inductance	mH/km	0.256	0.249	0.247	0.235	0.229	0.228	0.230	0.225	0.226	0.224	0.223
Reactance at 50Hz	Ω/km	0.081	0.078	0.078	0.074	0.072	0.072	0.072	0.071	0.071	0.070	0.070
Impedance at 90°C	Ω/km	1.542	1.113	0.826	0.573	0.417	0.333	0.275	0.223	0.177	0.148	0.130
Maximum symmetrical short - circuit current ratings	for 0.2 Sec kA	5.3	7.4	10.6	14.8	20.1	25.4	31.7	39.1	50.7	63.4	84.5
	for 1.0 Sec kA	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3	37.8
	for 3.0 Sec kA	1.4	1.9	2.7	3.8	5.2	6.5	8.2	10.1	13.1	16.4	21.8
Approximate overall diameter	mm	18.6	20.3	24.8	28.3	31.6	34.9	39.0	44.8	49.9	53.8	61.0
Approximate Cable weight	kg/km	428.1	532.2	702.7	947.7	1243.4	1514.0	1862.7	2348.1	2982.3	3628.8	4572.6
Minimum bending radius	mm	149	163	199	227	253	279	312	358	399	430	488
Nominal Drum Length	m	1000	1000	1000	1000	1000	500	500	500	350	350	250
Size of the Drum		D - 3	D - 4	D - 5	D-5	D-8	D-7	D-8	D-12	D-12	D-12	D-12
Weight of the Drum	kg	145	150	225	225	255	245	255	510	510	510	510
Gross weight of the Cable Drum	kg	573	682	928	1173	1498	1002	1186	1684	1554	1780	1653

TABLE - 26



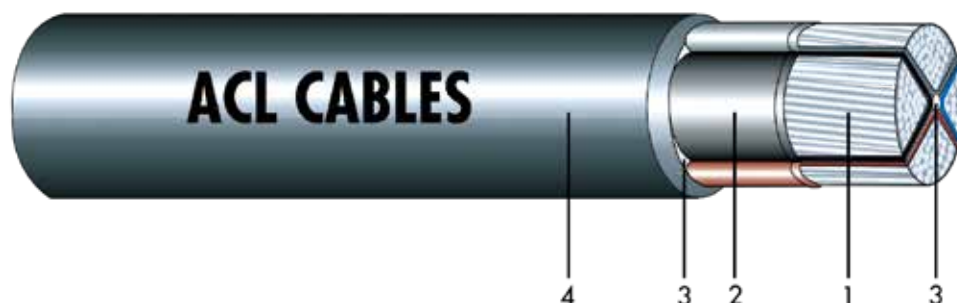
1. Al Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Sheath

4 Core Unarmoured Cables - Al/XLPE/PVC With Circular Conductors

600/1000V BS 5467:1989

ITEM CODE		UNIT	L-90 16	L-91 25	L-92 35
Nominal Area of Conductor		sq.mm			
Nominal Thickness of insulation		mm	0.7	0.9	0.9
Thickness of oversheath		mm	1.8	1.8	1.8
Maximum resistance of Conductor	D.C. at 20° C	Ω/km	1.91	1.20	0.868
	A.C. at 90° C	Ω/km	2.420	1.54	1.11
Inductance		mH/km	0.251	0.252	0.246
Reactance at 50Hz		Ω/km	0.079	0.079	0.077
Impedance at 90°C		Ω/km	2.421	1.542	1.113
Maximum symmetrical short - circuit current ratings	for 0.2 Sec	kA	3.4	5.3	7.4
	for 1.0 Sec	kA	1.5	2.4	3.3
	for 3.0 Sec	kA	0.9	1.4	1.9
Approximate overall diameter		mm	19.3	23.4	26.2
Approximate Cable weight		kg/km	452.5	684.8	882.1
Minimum bending radius		mm	116	140	157
Nominal Drum Length		m	1000	1000	1000
Size of the Drum			D - 3	D - 5	D - 5
Weight of the Drum		kg	145	225	225
Gross weight of the Cable Drum		kg	598	910	1107

TABLE - 27



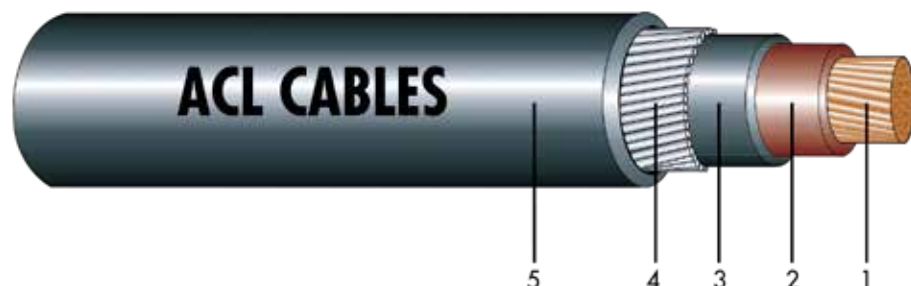
1. AI Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Sheath

4 Core Unarmoured Cables - AI/XLPE/PVC With Sector Shaped Conductors

600/1000V BS 5467:1989

ITEM CODE	UNIT	L-93	L-94	L-95	L-96	L-97	L-98	L-99	L-100	L-101	L-102	L-103
Nominal Area of Conductor	sq.mm	25	35	50	70	95	120	150	185	240	300	400
Nominal Thickness of insulation	mm	0.9	0.9	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8	2.0
Thickness of oversheath	mm	1.8	1.8	1.8	2.0	2.1	2.2	2.4	2.6	2.8	3.0	3.2
Maximum resistance of Conductor	D.C. at 20° C Ω/km A.C. at 90° C Ω/km	1.20 1.540	0.868 1.110	0.641 0.822	0.443 0.568	0.320 0.411	0.253 0.325	0.206 0.265	0.164 0.211	0.125 0.162	0.100 0.130	0.0778 0.110
Inductance	mH/km	0.256	0.249	0.247	0.235	0.229	0.228	0.230	0.225	0.226	0.224	0.223
Reactance at 50Hz	Ω/km	0.081	0.078	0.078	0.074	0.072	0.072	0.072	0.071	0.071	0.070	0.070
Impedance at 90°c	Ω/km	1.542	1.113	0.826	0.573	0.417	0.333	0.275	0.223	0.177	0.148	0.130
Maximum symmetrical short - circuit current ratings	for 0.2 Sec kA for 1.0 Sec kA for 3.0 Sec kA	5.3 2.4 1.4	7.4 3.3 1.9	10.6 4.7 2.7	14.8 6.6 3.8	20.1 9.0 5.2	25.4 11.3 6.5	31.7 14.2 8.2	39.1 17.5 10.1	50.7 22.7 13.1	63.4 28.3 16.4	84.5 37.8 21.8
Approximate overall diameter	mm	22.4	24.8	28.3	32.7	36.5	40.4	45.3	50.2	56.2	61.9	70.4
Approximate Cable weight	kg/km	547.3	688.6	913.0	1247.9	1611.6	1966.8	2442.5	3054.1	3881.2	4773.8	6031.2
Minimum bending radius	mm	179	198	227	261	292	323	362	402	449	495	563
Nominal Drum Length	m	500	500	500	500	500	500	350	350	250	-	-
Size of the Drum		D - 2	D - 2	D - 4	D-6	D-6	D-9	D-9	D-9	D-12	-	-
Weight of the Drum	kg	138	138	150	230	230	265	265	265	510	-	-
Gross weight of the Cable Drum	kg	412	482	607	854	1036	1248	1120	1334	1480	-	-

TABLE - 28



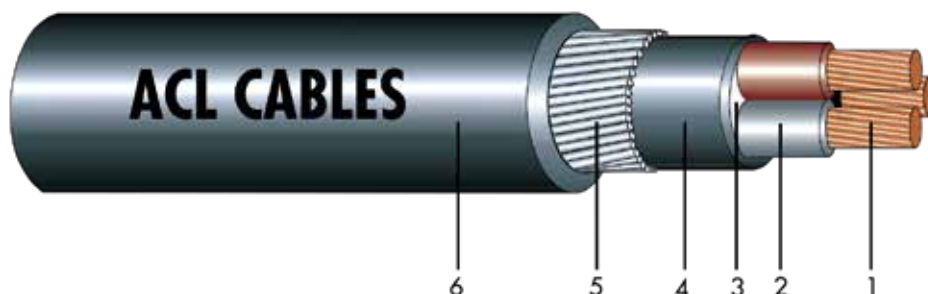
1. Cu Conductor
2. XLPE Insulation
3. PVC Bedding
4. Al Wire Armour
5. PVC Sheath

1 Core Armoured Cables - Cu/XLPE/AWA/PVC

1900/3300V BS 5467:1997

ITEM CODE	UNIT	X-156	X-157	X-158	X-159	X-160	X-161	X-162	X-163	X-164	X-165	X-166	X-167	X-168
Nominal Area of Conductor	sq.mm	50	70	95	120	150	185	240	300	400	500	630	800	1000
Nominal Thickness of insulation	mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.4	2.6	2.8
Thickness of Extruded bedding	mm	0.8	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.2	1.2	1.2	1.4	1.4
Aluminium Armour wire diameter	mm	1.25	1.25	1.25	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.5	2.5
Thickness of oversheath	mm	1.6	1.6	1.6	1.7	1.7	1.8	1.8	1.9	2.0	2.1	2.2	2.4	2.5
Maximum armour resistance at 20°C	Ω/km	0.75	0.67	0.61	0.42	0.39	0.37	0.34	0.31	0.22	0.20	0.18	0.13	0.12
Gross armour wire area	sq.mm	39	44	50	70	76	82	92	101	141	157	176	245	275
Maximum resistance of Conductor	D.C. at 20° C A.C. at 90° C	Ω/km Ω/km	0.387 0.493	0.268 0.341	0.193 0.246	0.153 0.196	0.124 0.159	0.0991 0.128	0.0754 0.098	0.0601 0.079	0.0470 0.063	0.0366 0.051	0.0283 0.042	0.0221 0.036
Inductance	mH/km	0.358	0.338	0.322	0.295	0.298	0.286	0.272	0.265	0.256	0.256	0.248	0.243	0.220
Reactance at 50Hz	Ω/km	0.113	0.106	0.101	0.093	0.094	0.090	0.085	0.083	0.080	0.080	0.078	0.076	0.069
Impedance at 90°C	Ω/km	0.506	0.357	0.266	0.217	0.185	0.156	0.130	0.115	0.102	0.095	0.089	0.085	0.076
Maximum symmetrical short - circuit	for 0.2 Sec for 1.0 Sec	kA kA	16.0 7.2	22.4 10.0	30.4 13.6	38.4 17.2	48.0 21.5	59.2 26.5	76.8 34.3	96.0 42.9	128.0 57.2	160.0 71.5	201.6 90.1	256.0 114.5
Current ratings	for 3.0 Sec	kA	4.1	5.8	7.8	9.9	12.4	15.3	19.8	24.8	33.0	41.3	52.0	66.1
Maximum earth - fault short - circuit	for 0.2 Sec for 1.0 Sec	kA kA	6.0 2.7	6.8 3.0	7.7 3.5	10.8 4.8	11.7 5.2	12.6 5.7	14.2 6.3	15.4 6.9	21.7 9.7	24.1 10.8	27.0 12.1	37.6 16.8
current ratings	for 3.0 Sec	kA	1.6	1.7	2.0	2.8	3.0	3.3	3.7	4.0	5.6	6.2	7.0	9.7
Approximate overall diameter	mm	20.6	22.4	24.3	27.2	28.8	30.8	33.5	36.1	40.5	44.2	48.8	55.4	60.6
Approximate Cable weight	kg/km	799.6	1038.3	1331.7	1680.4	1977.1	2386.9	2994.4	3645.7	4655.0	5741.1	7221.4	9267.5	11459.1
Minimum bending radius	mm	124	134	146	163	173	185	201	217	243	265	293	332	364
Nominal Drum Length	m	1000	1000	1000	1000	1000	750	750	500	500	500	250	250	250
Size of the Drum		D -3	D-3	D-3	D-5	D-5	D-5	D-5	D-5	D-5	D-8	D-7	D-9	D-12
Weight of the Drum	kg	145	145	145	225	225	225	225	225	225	255	245	265	510
Gross weight of the Cable Drum	kg	945	1183	1477	1905	2202	2015	2471	2048	2553	3126	2050	2582	3375

TABLE - 29



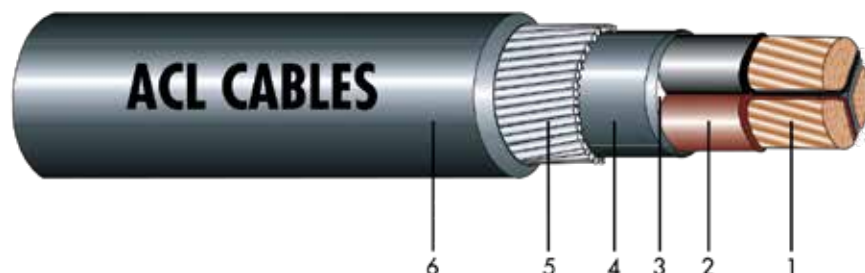
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Bedding
5. Galvanized Steel Wire Armour
6. PVC Sheath

3 Core Armoured Cables - Cu/XLPE/SWA/PVC With Circular Conductors

1900/3300V BS 5467:1997

ITEM CODE	UNIT	X-169	X-170	X-171
Nominal Area of Conductor	sq.mm	16	25	35
Nominal Thickness of insulation	mm	2.0	2.0	2.0
Thickness of Extruded bedding	mm	1.0	1.0	1.0
Galvanized Steel Armour wire diameter	mm	1.6	1.6	1.6
Thickness of oversheath	mm	1.8	1.8	1.9
Maximum armour resistance at 20°C	Ω/km	1.9	1.7	1.8
Gross armour wire area	sq.mm	76	86	94
Maximum resistance of Conductor	D.C. at 20° C A.C. at 90° C	1.15 1.460	0.727 0.927	0.524 0.668
Inductance	mH/km	0.319	0.300	0.288
Reactance at 50Hz	Ω/km	0.100	0.094	0.090
Impedance at 90°C	Ω/km	1.463	0.932	0.674
Maximum symmetrical short - circuit	for 0.2 Sec for 1.0 Sec	5.1 2.3	8.0 3.6	11.2 5.0
Current ratings	for 3.0 Sec	1.3	2.1	2.9
Maximum earth - fault short - circuit	for 0.2 Sec for 1.0 Sec	6.4 2.9	7.3 3.2	7.9 3.6
current ratings	for 3.0 Sec	1.7	1.9	2.1
Approximate overall diameter	mm	29.3	32.2	34.8
Approximate Cable weight	kg/km	1668.7	2124.0	2582.6
Minimum bending radius	mm	176	193	209
Nominal Drum Length	m	500	750	750
Size of the Drum		D - 4	D - 5	D - 5
Weight of the Drum	kg	150	225	225
Gross weight of the Cable Drum	kg	984	1818	2162

TABLE - 30



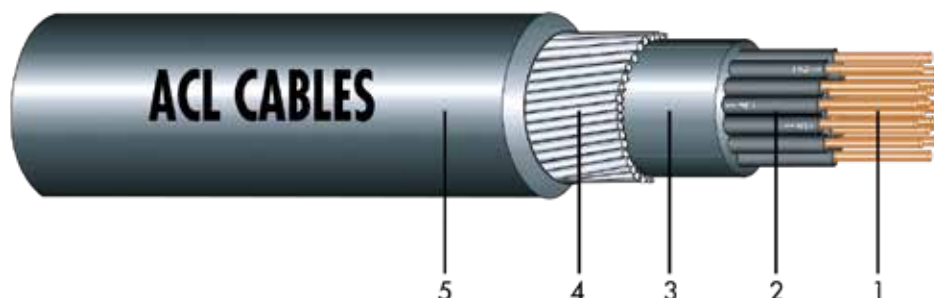
1. Cu Conductor
2. XLPE Insulation
3. Poly Propylene Fillers
4. PVC Bedding
5. Galvanized Steel Wire Armour
6. PVC Sheath

3 Core Armoured Cables - Cu/XLPE/SWA/PVC With Sector Shaped Conductors

1900/3300V BS 5467:1997

ITEM CODE	UNIT	X-172	X-173	X-174	X-175	X-176	X-177	X-178	X-179	X-180	X-181
Nominal Area of Conductor	sq.mm	35	50	70	95	120	150	185	240	300	400
Nominal Thickness of insulation	mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Thickness of Extruded bedding	mm	1.0	1.2	1.2	1.2	1.4	1.4	1.4	1.6	1.6	1.6
Galvanized Steel Armour wire diameter	mm	1.6	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Thickness of oversheath	mm	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.9
Maximum armour resistance at 20°C	Ω/km	1.8	1.3	1.2	1.1	0.76	0.71	0.65	0.59	0.55	0.50
Gross armour wire area	sq.mm	84	126	138	151	206	221	245	270	290	324
Maximum resistance of Conductor	D.C. at 20° C A.C. at 90° C	Ω/km Ω/km	0.524 0.668	0.387 0.493	0.268 0.342	0.193 0.254	0.153 0.196	0.124 0.159	0.0991 0.128	0.0754 0.099	0.0601 0.080
Inductance	mH/km	0.295	0.283	0.263	0.254	0.248	0.244	0.233	0.232	0.227	0.223
Reactance at 50Hz	Ω/km	0.093	0.089	0.083	0.080	0.078	0.077	0.073	0.073	0.071	0.070
Impedance at 90°C	Ω/km	0.674	0.501	0.352	0.266	0.211	0.176	0.147	0.123	0.107	0.095
Maximum symmetrical short - circuit ratings	for 0.2 Sec for 1.0 Sec for 3.0 Sec	kA kA kA	11.2 5.0 2.9	16.0 7.2 4.1	22.4 10.0 5.8	30.4 13.6 7.8	38.4 17.2 9.9	48.0 21.5 12.4	59.2 26.5 15.3	76.8 34.3 19.8	96.0 42.9 24.8
Maximum earth - fault short - circuit	for 0.2 Sec for 1.0 Sec	kA kA	7.1 3.2	10.6 4.7	11.6 5.2	12.7 5.7	17.3 7.7	18.6 8.3	20.6 9.2	22.7 10.1	24.3 10.9
Current ratings	for 3.0 Sec	kA	1.8	2.7	3.0	3.3	4.5	4.8	5.3	5.9	6.3
Approximate overall diameter	mm	31.1	34.7	38.0	41.4	45.7	48.5	51.9	56.9	61.2	66.6
Approximate Cable weight	kg/km	2162.4	2971.9	3743.2	4687.2	5905.1	6888.3	8248.2	10204.1	12165.6	14956.5
Minimum bending radius	mm	249	278	304	331	366	388	415	455	490	533
Nominal Drum Length	m	500	500	500	500	500	350	350	250	250	250
Size of the Drum		D -6	D-6	D-6	D-8	D-10	D-10	D-12	D-12	-	-
Drum Weight	kg	230	230	230	255	481	481	510	510	-	-
Gross weight of the Cable Drum	kg	1311	1716	2102	2599	3434	2892	3397	3061	-	-

TABLE - 31



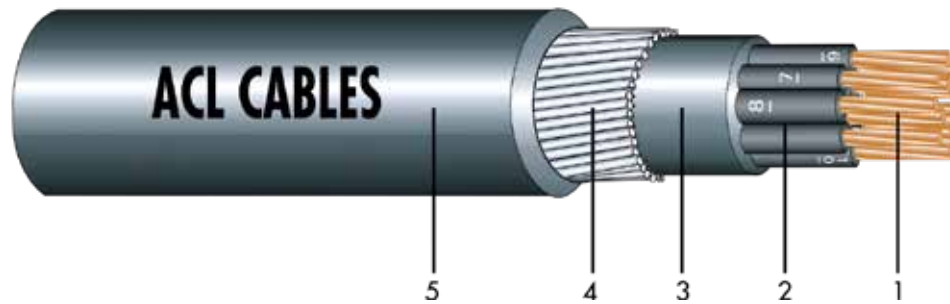
1. Cu Conductor
2. XLPE Insulation
3. PVC Bedding
4. Galvanized Steel Wire Armour
5. PVC Sheath

1.5 mm² Armoured Auxiliary Cables - Cu/XLPE/SWA/PVC

600/1000V BS 5467:1997

ITEM CODE	UNIT	X-138 _b	X-138	X-139 _c	X-139	X-140 _b	X-140 _d	X-140	X-141 _e	X-141	X-142 _c	X-142	X-143 _g	X-143
Number of Cores	Nos.	6	7	10	12	14	16	19	24	27	30	37	44	48
Nominal Area of Conductor	sq.mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Nominal Thickness of insulation	mm	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Thickness of Extruded bedding	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.0
Galvanized Steel Armour wire diameter	mm	0.9	0.9	1.25	1.25	1.25	1.25	1.25	1.6	1.6	1.6	1.6	1.6	1.6
Thickness of oversheath	mm	1.4	1.4	1.5	1.5	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.8	1.8
Maximum armour resistance at 20° C	Ω/km	7.5	7.5	7.5	4.0	4.0	4.0	3.5	3.5	2.3	2.3	2.0	2.0	1.8
Gross armour wire area	sq.mm	20	20	34	36	38	40	43	66	70	70	76	84	86
Maximum resistance of conductor D.C. at 20°C	Ω/km	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1
Approximate overall diameter	mm	14.6	14.6	18.3	18.7	19.7	20.4	21.3	25.3	26.5	26.5	28.1	31.1	31.5
Approximate Cable weight	kg/km	416.8	426.2	677.0	721.2	800.3	868.3	952.3	1355.5	1476.8	1504.8	1712.3	2029.9	2111.2
Minimum bending radius	mm	88	88	110	112	118	122	128	152	159	159	169	187	189
Nominal Drum Length	m	1000	1000	1000	1000	1000	1000	1000	750	750	750	500	500	500
Size of the Drum		D - 1	D - 1	D - 2	D - 2	D - 3	D - 3	D - 3	D - 3	D - 3	D - 3	D - 3	D - 3	D - 3
Drum Weight	kg	60	60	138	138	145	145	145	145	145	145	145	145	145
Gross weight of the Cable Drum	kg	477	486	815	859	945	1013	1097	1162	1253	1274	1001	1160	1201

TABLE - 32



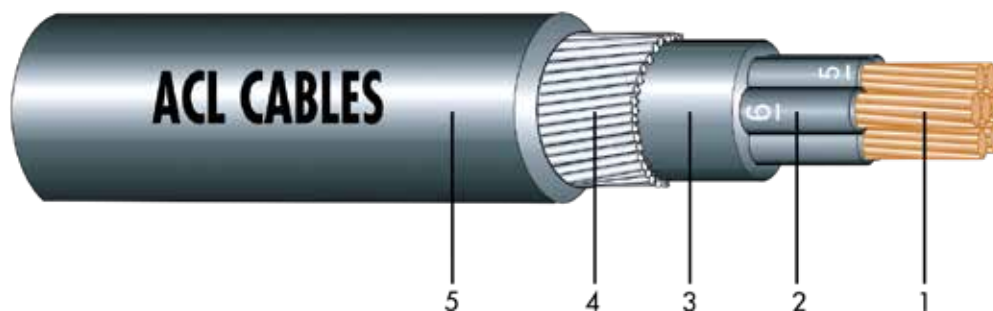
1. Cu Conductor
2. XLPE Insulation
3. PVC Bedding
4. Galvanized Steel Wire Armour
5. PVC Sheath

2.5 mm² Armoured Auxiliary Cables - Cu/XLPE/SWA/PVC

600/1000V BS 5467:1997

ITEM CODE	UNIT	X-144 _b	X-144	X-145 _c	X-145	X-146 _b	X-146 _d	X-146	X-147 _e	X-147	X-148 _c	X-148	X-149 _g	X-149
Number of Cores	Nos.	6	7	10	12	14	16	19	24	27	30	37	44	48
Nominal Area of Conductor	sq.mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Nominal Thickness of insulation	mm	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Thickness of Extruded bedding	mm	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.2	1.2
Galvanized Steel Armour wire diameter	mm	0.9	0.9	1.25	1.25	1.6	1.6	1.6	1.6	1.6	1.6	1.6	2.0	2.0
Thickness of oversheath	mm	1.4	1.4	1.6	1.6	1.7	1.7	1.7	1.8	1.8	1.8	1.8	2.0	2.0
Maximum armour resistance at 20° C	Ω/km	6.3	6.3	6.3	3.5	3.5	3.5	2.3	2.3	1.9	1.9	1.7	1.7	1.2
Gross armour wire area	sq.mm	24	24	42	43	60	62	66	78	84	84	90	129	132
Maximum resistance of conductor D.C. at 20°C	Ω/km	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41
Approximate overall diameter	mm	16.4	16.4	20.9	21.5	23.7	24.6	25.7	29.3	30.7	30.7	32.7	37.7	38.2
Approximate Cable weight	kg/km	543.0	558.3	904.4	967.2	1216.6	1307.4	1438.1	1819.1	2001.5	2047.3	2337.7	3074.1	3201.0
Minimum bending radius	mm	98	98	125	129	142	148	154	176	184	184	196	226	229
Nominal Drum Length	m	1000	1000	1000	1000	750	750	750	750	750	750	750	500	500
Size of the Drum		D - 2	D - 2	D - 3	D - 3	D - 3	D - 3	D - 3	D - 5	D - 5	D - 5	D - 5	D - 5	D - 5
Drum Weight	kg	138	138	145	145	145	145	145	225	225	225	225	225	225
Gross weight of the Cable Drum	kg	681	696	1049	1112	1057	1126	1224	1589	1726	1760	1978	1762	1826

TABLE - 33



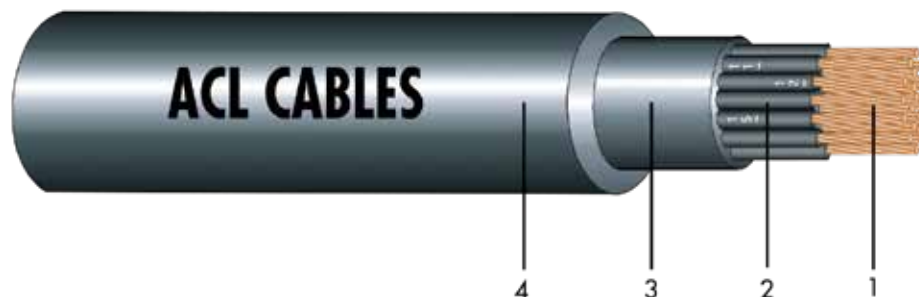
1. Cu Conductor
2. XLPE Insulation
3. PVC Bedding
4. Galvanized Steel Wire Armour
5. PVC Sheath

4.0 mm² Armoured Auxiliary Cables - Cu/XLPE/SWA/PVC

600/1000V BS 5467:1997

ITEM CODE	UNIT	X-150 _b	X-150	X-151 _c	X-151	X-152 _b	X-152 _d	X-152	X-153 _e	X-153	X-154 _c	X-154	X-155 _g	X-155
Number of Cores	Nos.	6	7	10	12	14	16	19	24	27	30	37	44	48
Nominal Area of Conductor	sq.mm	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Nominal Thickness of insulation	mm	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Thickness of Extruded bedding	mm	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.2	1.2	1.2	1.2
Galvanized Steel Armour wire diameter	mm	1.25	1.25	1.6	1.6	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.0
Thickness of oversheath	mm	1.5	1.5	1.6	1.6	1.7	1.7	1.7	1.9	1.9	2.0	2.0	2.1	2.1
Maximum armour resistance at 20° C	Ω/km	4.0	4.0	4.0	2.3	2.3	2.3	2.0	2.0	1.7	1.7	1.2	1.2	1.0
Gross armour wire area	sq.mm	37	37	62	64	68	72	76	90	97	123	132	151	151
Maximum resistance of conductor D.C. at 20°C	Ω/km	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61
Approximate overall diameter	mm	19.0	19.0	24.2	24.8	26.1	27.2	28.4	32.7	34.3	35.7	38.1	42.2	42.8
Approximate Cable weight	kg/km	785.2	811.2	1299.5	1397.2	1553.7	1694.7	1873.1	2399.0	2641.1	2978.9	3417.0	4105.4	4263.1
Minimum bending radius	mm	114	114	145	149	157	163	170	196	206	214	229	253	257
Nominal Drum Length	m	1000	1000	1000	1000	1000	1000	1000	750	500	500	500	500	500
Size of the Drum		D - 2	D - 2	D - 5	D - 5	D - 5	D - 5	D - 5	D - 6	D - 6	D - 6	D - 6	D - 8	D - 8
Drum Weight	kg	138	138	225	225	225	225	225	230	230	230	230	255	255
Gross weight of the Cable Drum	kg	923	949	1525	1622	1779	1920	2098	2029	1551	1719	1939	2308	2387

TABLE - 34



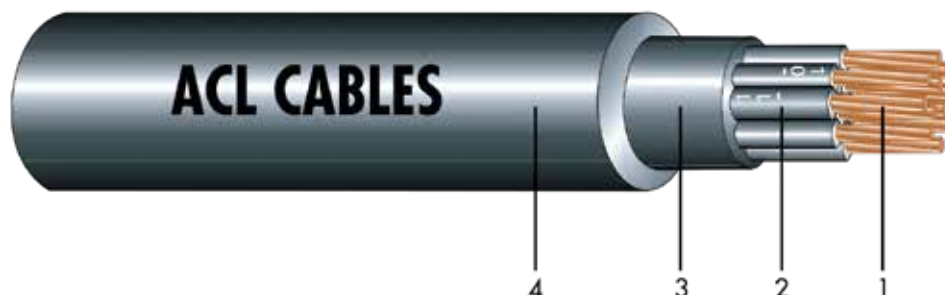
1. Cu Conductor
2. XLPE Insulation
3. PVC Bedding
4. PVC Sheath

1.5 mm² Unarmoured Auxiliary Cables - Cu/XLPE/PVC

600/1000V

ITEM CODE	UNIT	X-192 _b	X-192	X-193 _c	X-193	X-194 _b	X-194 _d	X-194	X-195 _e	X-195	X-196 _c	X-196	X-197 _g	X-197
Number of Cores	Nos.	6	7	10	12	14	16	19	24	27	30	37	44	48
Nominal Area of Conductor	sq.mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Nominal Thickness of insulation	mm	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Thickness of Extruded bedding	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.0
Thickness of oversheath	mm	1.4	1.4	1.5	1.5	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.8	1.8
Maximum resistance of conductor D.C. at 20°C	Ω/km	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1
Approximate overall diameter	mm	12.8	12.8	15.8	16.2	17.2	17.9	18.8	22.1	23.3	23.3	24.9	27.9	28.3
Approximate Cable weight	kg/km	248.5	257.9	386.8	421.2	479.7	528.3	592.8	803.5	892.9	920.9	1080.5	1332.8	1398.2
Minimum bending radius	mm	77	77	95	97	103	107	113	133	140	140	149	167	170
Nominal Drum Length	m	1000	1000	1000	1000	1000	1000	1000	750	750	750	750	500	500
Size of the Drum		D - 1	D - 1	D - 2	D - 2	D - 2	D - 2	D - 2	D - 3	D - 3	D - 3	D - 3	D - 4	D - 4
Drum Weight	kg	60	60	138	138	138	138	138	145	145	145	145	150	150
Gross weight of the Cable Drum	kg	309	318	525	559	618	666	731	748	815	836	955	816	849

TABLE - 35



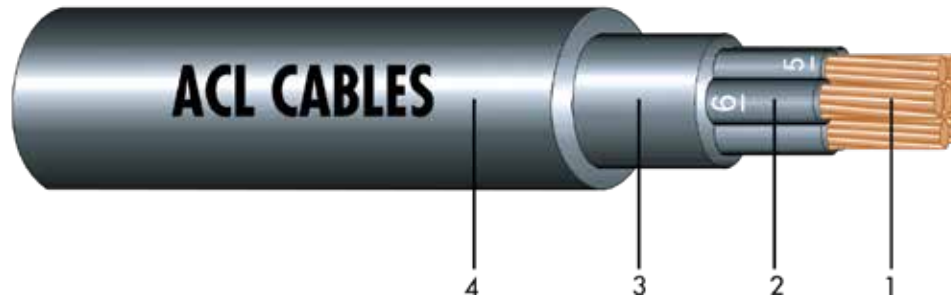
1. Cu Conductor
2. XLPE Insulation
3. PVC Bedding
4. PVC Sheath

2.5 mm² Unarmoured Auxiliary Cables - Cu/XLPE/PVC

600/1000V

ITEM CODE	UNIT	X-198 _b	X-198	X-199 _c	X-199	X-200 _b	X-200 _d	X-200	X-201 _e	X-201	X-202 _e	X-202	X-203 _g	X-203
Number of Cores	Nos.	6	7	10	12	14	16	19	24	27	30	37	44	48
Nominal Area of Conductor	sq.mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Nominal Thickness of insulation	mm	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Thickness of Extruded bedding	mm	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.2	1.2
Thickness of oversheath	mm	1.4	1.4	1.6	1.6	1.7	1.7	1.7	1.8	1.8	1.8	1.8	2.0	2.0
Maximum resistance of conductor D.C. at 20°C	Ω/km	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41
Approximate overall diameter	mm	14.6	14.6	18.4	19.0	20.5	21.4	22.5	26.1	27.5	27.5	29.5	33.7	34.2
Approximate Cable weight	kg/km	344.4	359.7	554.6	607.7	712.5	787.3	886.1	1169.9	1304.4	1350.3	1592.8	2014.5	2116.5
Minimum bending radius	mm	88	88	110	114	123	128	135	157	165	165	177	202	205
Nominal Drum Length	m	1000	1000	1000	1000	750	750	750	750	750	500	500	500	500
Size of the Drum		D - 1	D - 1	D - 2	D - 2	D - 2	D - 3	D - 3	D - 3	D - 3	D - 3	D - 4	D - 5	D - 5
Weight of the Drum	kg	60	60	138	138	138	145	145	145	145	145	150	225	225
Gross weight of the Cable Drum	kg	404	420	693	746	672	735	810	1022	1123	820	946	1232	1283

TABLE - 36



1. Cu Conductor
2. XLPE Insulation
3. PVC Bedding
4. PVC Sheath

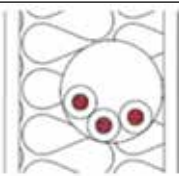

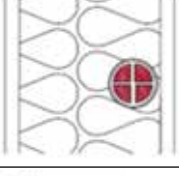
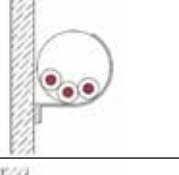
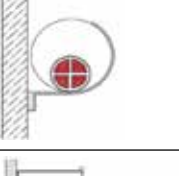
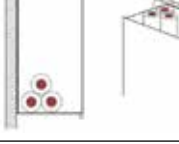
4.0 mm² Unarmoured Auxiliary Cables - Cu/XLPE/PVC

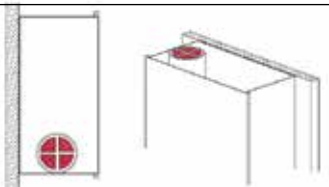
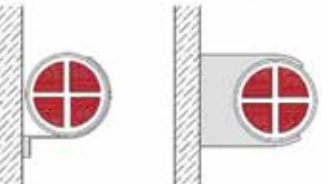

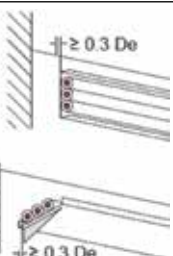
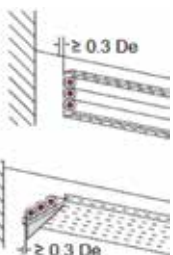
600/1000V

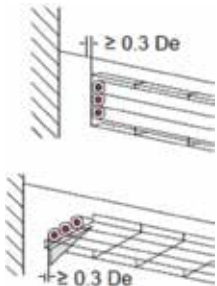

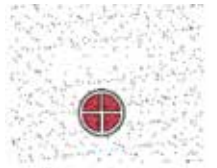

ITEM CODE	UNIT	X-204 _b	X-204	X-205 _c	X-205	X-206 _b	X-206 _d	X-206	X-207 _e	X-207	X-208 _c	X-208	X-209 _g	X-209
Number of Cores	Nos.	6	7	10	12	14	16	19	24	27	30	37	44	48
Nominal Area of Conductor	sq.mm	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Nominal Thickness of insulation	mm	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Thickness of Extruded bedding	mm	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.2	1.2	1.2	1.2
Thickness of oversheath	mm	1.5	1.5	1.6	1.6	1.7	1.7	1.7	1.9	1.9	2.0	2.0	2.1	2.1
Maximum resistance of conductor D.C. at 20°C	Ω/km	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61
Approximate overall diameter	mm	16.5	16.5	21.0	21.6	22.9	24.0	25.2	29.5	31.1	31.7	34.1	38.2	38.8
Approximate Cable weight	kg/km	475.5	501.5	781.0	862.7	985.7	1094.8	1241.4	1652.5	1846.8	1969.2	2332.5	2869.4	3027.1
Minimum bending radius	mm	99	99	126	130	137	144	151	177	187	190	205	229	233
Nominal Drum Length	m	1000	1000	750	750	750	750	750	500	500	500	500	500	500
Size of the Drum		D - 2	D - 2	D - 3	D - 3	D - 3	D - 3	D - 3	D - 4	D - 5	D - 5	D - 5	D - 5	D - 5
Drum Weight	kg	138	138	145	145	145	145	145	150	225	225	225	225	225
Gross weight of the Cable Drum	kg	614	640	731	792	884	966	1076	976	1148	1210	1391	1660	1739

TABLE - 37

Schedule of installation methods of cables for determining current carrying capacity

Installation Method		Reference method to be used to determine current carrying capacity
Examples	Description	
 1 Room Side	Non-sheathed cables in conduit In a thermally insulated wall with an inner skin having a thermal conductance of not less than 10 W/m ² K ^c	A
 2 Room Side	Multi core cables in conduit In a thermally insulated wall with an inner skin having a thermal conductance of not less than 10 W/m ² K ^c	A
 3 Room Side	Multi core cables direct in a thermally insulated wall with an inner skin having a thermal conductance of not less than 10 W/m ² K ^c	A
 4	Non-sheathed cables in conduit on a wooden or masonry wall ^c	B
 5	Multi core cable in conduit on a wooden or masonry wall ^c	B
 6	Non-sheathed cables in cable trunking on a wooden or masonry wall. run horizontally (left) ^b run vertically (Right) ^{b,c}	B

Installation Method		Reference method to be used to determine current carrying capacity
Examples	Description	
 7	Multi core cable in cable trunking on a wooden or masonry wall run horizontally (left) ^b run vertically (Right) ^{b,c}	B*
 8	Single core or multi core cables: Fixed on (clipped direct), or spaced less than 0.3 x cable diameter from a wooden or masonry wall. ^c	C
 9	Single-core or multi core cables: Fixed directly under a wooden or masonry ceiling.	C
 10	Single-core or multi core cables: on unperforated tray run horizontally or vertically ^c De = the external diameter of a cable. The space between wall and cable tray will be , 2.2x De ; When 3 single core cables are bound in trefoil , 3.0 x De ; When 3 single core cables are laid in flat .	C
 11	Single-core or multi core cables: On perforated tray Run horizontally or vertically ^c The space between wall and cable tray will be , 2.2x De ; When 3 single core cables are bound in trefoil , 3.0 x De ; When 3 single core cables are laid in flat formation.	D

Installation Method		Reference method to be used to determine current carrying capacity
Examples	Description	
	<p>Single core or multi core cables: on ladder bracket type tray or on a wire mesh tray run horizontally or vertically c</p> <p>The space between wall and cable tray will be , 2.2x De ; When 3 single core cables are bound in trefoil , 3.0 x De ; When 3 single core cables are laid in flat formation.</p>	D
	Multi core armoured cable in conduit or in cable ducting in the ground	E for multi core armoured cable only.
	Sheathed, armoured or multi core cables direct in the ground: without added mechanical protection.	E
	Sheathed, armoured or multi core cables direct in the ground: with added mechanical protection (e.g. Concrete cover)	E

- b –Values given for Installation Methods are for a single circuit. Where there is more than one circuit in the trunking the group rating factor given in Adjustment Table -7 is applicable, irrespective of the presence of an internal barrier or partition.
- c- Care is needed where the cable runs vertically and ventilation is restricted The ambient temperature at the top of the vertical section can be much higher.
- The inclusion of directly buried cables is satisfactory where the soil thermal resistivity is of the order of 2.5K.m/W. For lower soil resistivities, the current-carrying capacity for directly buried cables is appreciably higher than for cables in ducts.
- * Still under consideration in IEC.

Single core unarmoured Cu/XLPE Cables with or without sheath

CURRENT-CARRYING CAPACITY (amperes) & Voltage Drop (mV/A/m)

**Ambient temperature: 30°C
Conductor operating temperature: 90°C**

	Reference method & Current carrying capacity											Voltage Drop (per ampere per meter)
	A		B		C		D					
Conductor Cross sectional Area	Enclosed in conduit in thermally insulating wall		Enclosed in conduit on a wall or in trunking		clipped direct		in free air or on a perforated cable tray etc horizontal or vertical etc) Touching			in free air -Spaced by one cable diameter		
	2 cables. single-phase a.c or d.c.	3 or 4 cables. three-phase a.c	2 cables. single-phase a.c or d.c	3 or 4 cables. three-phase a.c	2 cables. single-phase a.c or d.c. flat and touching	3 or 4 cables. three-phase a.c flat and touching or trefoil	2 cables. single-phase a.c or d.c. flat	3 cables. three-phase a.c flat	3 cables. three-phase a.c trefoil	2 cables, single-phase a.c. or d.c.or 3 cables three-phase a.c flat		
										Horizontal	Vertical	
mm²	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	mV/A/m
50	158	141	198	175	228	209	242	216	207	275	246	0.87
70	200	179	253	222	293	268	310	279	268	353	318	0.62
95	241	216	306	269	355	326	377	342	328	430	389	0.46
120	278	249	354	312	413	379	437	400	383	500	454	0.38
150	318	285	393	342	476	436	504	464	444	577	527	0.32
185	362	324	449	384	545	500	575	533	510	661	605	0.28
240	424	380	528	450	644	590	679	634	607	781	719	0.24
300	486	435	603	514	743	681	783	736	703	902	833	0.21
400	-	-	683	584	868	793	940	868	823	1085	1008	0.195
500	-	-	783	666	990	904	1083	998	946	1253	1169	0.18
630	-	-	900	764	1130	1033	1254	1151	1088	1454	1362	0.17
800	-	-	-	-	1288	1179	1358	1275	1214	1581	1485	0.165
1000	-	-	-	-	1443	1323	1520	1436	1349	1775	1671	0.165

TABLE - 38

Multicore unarmoured Cu/XLPE & PVC Sheathed Cables

Ambient temperature: 30°C
Conductor operating temperature: 90°C

CURRENT-CARRYING CAPACITY (A) & Voltage Drop (mV/A/m)

Conductor Cross sectional Area	Reference method & Current carrying capacity								Voltage Drop (per ampere per meter)
	A		B		C		D		
	Enclosed in conduit in thermally insulating wall		enclosed in conduit on a wall or in trunking		clipped direct		free air or on a perforated cable tray etc, horizontal or vertical		
	1 two-core cable,single- phase a.c. or d.c.	1 three- or four-core cable. three- phase a.c.	1 two-core cable, single- phase a.c. or d.c.	1 three- or four-core cable, three- phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable. three- phase a.c.	1 two-core cable,single- phase a.c. or d.c.	1 three- or four-core cable, three- phase a.c.	three- or four-core cable
									three-phase a.c.
mm²	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	mV/A/m
1	14.5	13	17	15	19	17	21	18	40
1.5	18.5	16.5	22	19.5	24	22	26	23	27
2.5	25	22	30	26	33	30	36	32	16
4	33	30	40	35	45	40	49	42	10
6	42	38	51	44	58	52	63	54	6.8
10	57	51	69	60	80	71	86	75	4
16	76	68	91	80	107	96	115	100	2.5
25	99	89	119	105	138	119	149	127	1.65
35	121	109	146	128	171	147	185	158	1.15
50	145	130	175	154	209	179	225	192	0.87
70	183	164	221	194	269	229	289	246	0.6
95	220	197	265	233	328	278	352	298	0.45
120	253	227	305	268	382	322	410	346	0.37
150	290	259	334	300	441	371	473	399	0.3
185	329	295	384	340	506	424	542	456	0.26
240	386	346	459	398	599	500	641	538	0.21
300	442	396	532	455	693	576	741	621	0.185
400	-	-	625	536	803	667	865	741	0.165

TABLE - 39

Single core armoured Cu/XLPE insulated Cables (non magnetic armour)

CURRENT-CARRYING CAPACITY (A) & Voltage Drop (mV/A/m)

**Ambient temperature: 30°C
Conductor operating temperature: 90°C**

Conductor Cross sectional Area	Reference method & Current carrying capacity											Voltage Drop (per ampere per meter)	
	C		D										
	clipped direct		in free air or , on a perforated cable tray, horizontal or vertical										
	Touching		Touching			Spaced by one cable diameter						clipped direct or on tray	
	2 cables, single phase a.c. or d.c. flat	3 or 4 cables, three-phase a.c. flat	2 cables, single phase a.c. or d.c. flat	3 cables. three-phase a.c. flat	3 cables. three-phase a.c. trefoil	2 cables, d.c.		2 cables, single-phase a.c.		3 or 4 cables, three-phase a.c.		3 or 4 cables, three- phase a.c.	
Horizontal						Vertical	Horizontal	Vertical	Horizontal	Vertical	flat and touching		
mm ²	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	mV/A/m	
50	237	220	253	232	222	284	270	282	266	288	266	0.88	
70	303	277	322	293	285	356	349	357	337	358	331	0.65	
95	367	333	389	352	346	446	426	436	412	425	393	0.52	
120	425	383	449	405	402	519	497	504	477	485	449	0.44	
150	488	437	516	462	463	600	575	566	539	549	510	0.39	
185	557	496	587	524	529	688	660	643	614	618	574	0.34	
240	656	579	689	612	625	815	782	749	714	715	666	0.3	
300	755	662	792	700	720	943	906	842	805	810	755	0.28	
400	853	717	899	767	815	1137	1094	929	889	848	797	0.27	
500	962	791	1016	851	918	1314	1266	1032	989	923	871	0.25	
630	1082	861	1146	935	1027	1528	1474	1139	1092	992	940	0.24	
800	1170	904	1246	987	1119	1809	1744	1204	1155	1042	978	0.23	
1000	1261	961	1345	1055	1214	2100	2026	1289	1238	1110	1041	0.21	

TABLE - 40

Multicore armoured Cu/XLPE & PVC Sheathed Cables

Ambient temperature: 30°C
Ground Ambient temperature: 20°C
Conductor operating temperature: 90°C

CURRENT-CARRYING CAPACITY (A) & Voltage Drop (mV/A/m)

Conductor Cross sectional Area	Reference method & Current carrying capacity						Voltage Drop
	C		D		E		
	clipped direct		in free air or on a perforated cable tray etc, horizontal or vertical		direct in ground or in ducting in ground in or around buildings		
	1 two-core cable. single-phase a.c. or d.c.	1 three- or 1 four-core cable. three-phase a.c.	1 two-core cable. single-phase a.c. or d.c.	1 three- or 1 four-core cable. three-phase a.c.	1 two-core cable. single-phase a.c. or d.c.	1 three- or 1 four- core cable. three- phase a.c.	three- or four-core cable
							three-phase a.c.
mm ²	(A)	(A)	(A)	(A)	(A)	(A)	mV/A/m
1.5	27	23	29	25	25	21	27
2.5	36	31	39	33	33	28	16
4	49	42	52	44	43	36	10
6	62	53	66	56	53	44	6.8
10	85	73	90	78	71	58	4
16	110	94	115	99	91	75	2.5
25	146	124	152	131	116	96	1.65
35	180	154	188	162	139	115	1.15
50	219	187	228	197	164	135	0.87
70	279	238	291	251	203	167	0.6
95	338	289	354	304	239	197	0.45
120	392	335	410	353	271	223	0.37
150	451	386	472	406	306	251	0.3
185	515	441	539	463	343	281	0.26
240	607	520	636	546	395	324	0.21
300	698	599	732	628	446	365	0.185
400	787	673	847	728	-	-	0.165

TABLE - 41

Single core unarmoured Al/XLPE Cables with or without sheath

CURRENT-CARRYING CAPACITY (amperes) & Voltage Drop (mV/A/m) **Ambient temperature: 30°C**
Conductor operating temperature: 90°C

Conductor Cross sectional Area	Reference method & Current carrying capacity											Voltage Drop	
	A		B		C		D						
	Enclosed in conduit in thermally insulating wall		enclosed in conduit on a wall or in trunking		clipped direct		in free air or on a perforated cable tray , horizontal or vertical etc) Touching			in free air -Spaced by one cable diameter		clipped direct, on tray or in free air	
	2 cables. single-phase a.c. or d.c.	3 or 4 cables. three-phase a.c.	2 cables. single-phase a.c. or d.c.	3 or 4 cables. three-phase a.c.	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, 3ph a.c. flat and touching or trefoil	2 cables. single-phase a.c. or d.c. flat	3 cables .three-phase a.c. flat	3 cables. three-phase a.c trefoil	2 cables, single-phase a.c. or d.c.or 3 cables three-phase a.c flat			3 or 4 cables. 3-ph. a.c. touching Flat
										Horizontal	Vertical		
mm²	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	mV/A/m	
50	125	113	157	140	154	136	184	165	159	210	188	1.46	
70	158	142	200	179	198	174	237	215	206	271	244	1.00	
95	191	171	242	217	241	211	289	264	253	332	300	0.75	
120	220	197	281	251	280	245	337	308	296	387	351	0.61	
150	253	226	307	267	324	283	389	358	343	448	408	0.50	
185	288	256	351	300	371	323	447	413	395	515	470	0.43	
240	338	300	412	351	439	382	530	492	471	611	561	0.35	
300	387	344	471	402	508	440	613	571	544	708	652	0.31	
380	-	-	-	-	658	594	679	628	638	798	742	0.28	
480	-	-	-	-	765	692	786	728	743	927	865	0.27	
600	-	-	-	-	871	791	903	836	849	1058	990	0.25	
740	-	-	-	-	1001	911	1025	951	979	1218	1143	0.23	
960	-	-	-	-	1176	1072	1191	1108	1151	1440	1355	0.23	
1200	-	-	-	-	1333	1217	1341	1249	1307	1643	1550	0.22	

TABLE - 42

Multicore unarmoured Al/XLPE & PVC sheathed Cables

CURRENT-CARRYING CAPACITY (amperes) & Voltage Drop (mV/A/m) **Ambient temperature: 30°C**
Conductor operating temperature: 90°C

Conductor Cross sectional Area	Reference method & Current carrying capacity								Voltage Drop
	A		B		C		D		
	Enclosed in conduit in thermally insulating wall		enclosed in conduit on a wall or in trunking		clipped direct		in free air or on a perforated cable tray etc, horizontal or vertical		three- or four-core cable
	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable .three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	l three- or four-core cable, three-phase a.c.	three-phase a.c.
mm²	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	mV/A/m
16	60	55	72	64	84	76	91	77	4.2
25	78	71	94	84	101	90	108	97	2.7
35	96	87	115	103	126	112	135	120	1.95
50	115	104	138	124	154	136	164	146	1.45
70	145	131	175	156	198	174	211	187	0.97
95	175	157	210	188	241	211	257	227	0.72
120	-	180	-	216	-	245	-	263	0.58
150	-	206	-	240	-	283	-	304	0.47
185	-	233	-	272	-	323	-	347	0.39
240	-	273	-	318	-	382	-	409	0.31
300	-	313	-	364	-	440	-	471	0.26

TABLE - 43

Single core armoured Al/XLPE insulated Cables (non magnetic armour)

CURRENT-CARRYING CAPACITY (amperes) & Voltage Drop (mV/A/m)

Ambient temperature: 30°C
Conductor operating temperature: 90°C

Conductor Cross sectional Area	Reference method & Current carrying capacity											Voltage Drop
	A		B									
	clipped direct		in free air or , on a perforated cable tray, horizontal or vertical									
	Touching		Touching			Spaced by one cable diameter						clipped direct, on tray or in free air
	2 cables, single phase a.c. or d.c. flat	3 or 4 cables, three-phase a.c. flat	2 cables, single phase a.c. or d.c. flat	3 cables. three-phase a.c. flat	3 cables. three-phase a.c. trefoil	2 cables, d.c.		2 cables, single-phase a.c.		3 or 4 cables, three-phase a.c.		3 or 4 cables, three-phase a.c.
Horizontal						Vertical	Horizontal	Vertical	Horizontal	Vertical	flat and touching	
mm ²	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	mV/A/m
50	179	165	192	176	162	216	197	212	199	215	192	1.40
70	228	209	244	222	207	275	253	269	254	270	244	1.00
95	276	252	294	267	252	332	307	328	310	324	296	0.78
120	320	291	340	308	292	384	357	378	358	372	343	0.64
150	368	333	390	352	337	441	411	429	409	424	394	0.54
185	419	378	444	400	391	511	480	490	467	477	447	0.47
240	494	443	521	468	465	605	572	576	549	554	523	0.39
300	568	508	597	536	540	701	666	654	624	626	595	0.34
380	655	573	688	608	625	812	780	735	704	693	649	0.32
480	747	642	786	685	714	942	906	825	790	765	717	0.29
600	836	706	880	757	801	1076	1036	909	872	832	780	0.27
740	934	764	988	824	897	1250	1205	989	950	890	835	0.26
960	1056	838	1121	911	1014	1488	1435	1094	1052	970	911	0.24
1200	1163	903	1236	990	1118	1715	1658	1187	1141	1043	980	0.22

TABLE -44

Multicore armoured Al/XLPE & PVC sheathed Cables

Ambient temperature: 30°C
Ground Ambient temperature: 20°C
Conductor operating temperature: 90°C

CURRENT-CARRYING CAPACITY (A) & Voltage Drop (mV/A/m)

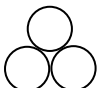


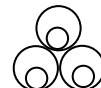

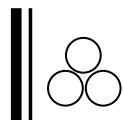
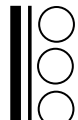

Conductor Cross sectional Area	Reference method & Current carrying capacity						Voltage Drop
	C		D		E		
	clipped direct		in free air or on a perforated cable tray etc, horizontal or vertical		direct in ground or in ducting in ground in or around buildings		
	1 two-core cable. single-phase a.c. or d.c.	1 three- or 1 four-core cable. three-phase a.c.	1 two-core cable. single-phase a.c. or d.c.	1 three- or 1 four-core cable. three-phase a.c.	1 two-core cable. single-phase a.c. or d.c.	1 three- or 1 four- core cable. three- phase a.c.	three- or four-core cable
							three-phase a.c.
mm2	(A)	(A)	(A)	(A)	(A)	(A)	mV/A/m
16	82	71	85	74	71	59	4.2
25	108	92	112	98	90	75	2.7
35	132	113	138	120	108	90	1.95
50	159	137	166	145	128	106	1.45
70	201	174	211	185	158	130	0.97
95	242	214	254	224	186	154	0.72
120	-	249	-	264	-	174	0.58
150	-	284	-	305	-	197	0.47
185	-	328	-	350	-	220	0.39
240	-	386	-	418	-	253	0.31
300	-	441	-	488	-	286	0.26

TABLE - 45

**SUSTAINED CURRENT
RATING (Amperes)**

**Ambient temperature: 25°C
Conductor operating temperature: 90°C**

SINGLE CORE ARMoured CABLES WITH Cu CONDUCTORS (1900/3300V)

Conductor cross sectional area	3 Single Core Cables							
	DIRECT IN GROUND			DUCT		AIR		
	Trefoil	Touching	Spaced	Trefoil	Flat	Trefoil	Vertical Spaced	Horizontal Spaced
								
	ARMoured			ARMoured		ARMoured		
mm ²	a.c.	a.c.	a.c.	a.c.	a.c.	a.c.	a.c.	a.c.
50	222	221	230	219	220	240	277	299
70	271	269	279	264	265	300	345	372
95	324	321	331	310	311	368	420	452
120	366	361	369	342	342	428	478	513
150	409	402	409	376	376	487	536	576
185	460	449	454	414	414	556	604	648
240	528	513	512	464	463	656	695	745
300	589	568	560	506	504	747	771	826
400	651	619	595	535	532	851	829	887
500	720	677	641	579	574	963	906	968
630	789	733	684	624	618	1084	983	1049
800	831	763	703	650	644	1178	1030	1098
1000	880	802	735	689	682	1278	1096	1168

Cables shall only be continuously operated at their tabulated rating if the minimum current at which circuit protection is designed to operate does not exceed 1.45 times (in case of cables in air or ducts) or 1.3 times (in the case of cables laid direct in the ground) the values give above

TABLE - 46

**SUSTAINED CURRENT
RATING (Amperes)**

Ambient temperature: 25°C

Conductor operating temperature: 90°C

THREE CORE ARMoured COPPER CABLES (1900/3300V)			
Conductor cross sectional area	One 3 Core Cables		
	DIRECT IN GROUND	DUCT	AIR
	ARMoured	ARMoured	ARMoured
mm²	a.c.	a.c	a.c
16	114	96	112
25	147	124	149
35	175	147	177
50	207	174	213
70	254	214	268
95	304	257	328
120	345	293	380
150	387	328	432
185	436	371	496
240	502	428	583
300	563	480	667
400	633	549	765

Cables shall only be continuously operated at their tabulated rating if the minimum current at which circuit protection is designed to operate does not exceed 1.45 times (in case of cables in air or ducts) or 1.3 times (in the case of cables laid direct in the ground) the values give above

TABLE - 47

VARIATION IN AMBIENT TEMPERATURE

ADJUSTMENT TABLE 1

Correction factors for ambient temperature where protection is against short -circuit

Type of Insulation	Operating Temperature	AMBIENT TEMPERATURE (°C)											
		25	30	35	40	45	50	55	60	65	70	75	80
		1.02	1	0.96	0.91	0.87	0.82	0.76	0.71	0.65	0.58	0.5	0.41
Thermosetting (XLPE)	90°C												

VARIATION IN GROUND TEMPERATURE

ADJUSTMENT TABLE 2

Insulation & Conductor Temperature (°C)	GROUND TEMPERATURE (°C)														
	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
XLPE - 90	1.07	1.04	1	0.96	0.93	0.89	0.85	0.8	0.76	0.71	0.65	0.6	0.53	0.46	0.38

VARIATION IN SOIL THERMAL RESISTIVITY

ADJUSTMENT TABLE 3

Rating factors for cables buried direct in the ground or in an underground conduit system to BS EN 50086-2-4 for soil thermal resistivities other than 2.5K.m/W to be applied to the current carrying capacities for reference method E

Thermal resistivity, K.m/W	0.5	0.8	1	1.2	1.5	2	2.5	3
Rating factor for cables in buried ducts	1.28	1.2	1.18	1.13	1.1	1.05	1	0.96
Rating factor for direct buried cables	1.88	1.62	1.5	1.4	1.28	1.12	1	0.9

NOTE 1: The rating factors given have been averaged over the range of conductor sizes and types of installation included in the relevant tables in this appendix. The overall accuracy of rating factors is within $\pm 5\%$.

NOTE 2: Where more precise values are required they may be calculated by methods given in BS7769 (BS IEC 60287)

NOTE 3: The rating factors are applicable to ducts buried at depths of up to 0.8 m.

ADJUSTMENT TABLE 4

Rating factors of depth of burial for depths of laying other than 0.7 m for direct buried cables and cables in buried ducts

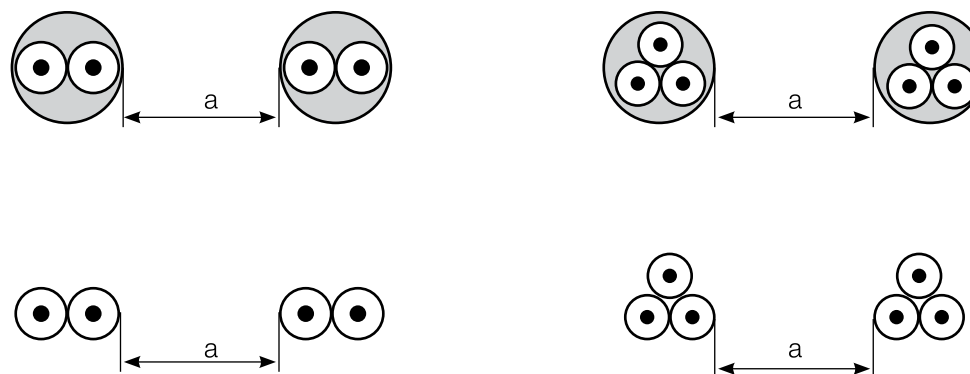
Depth of laying, m	Buried direct	In buried ducts
0.50	1.03	1.02
0.70	1.00	1
1	0.97	0.98
1.25	0.95	0.96
1.50	0.94	0.95
1.75	0.93	0.94
2	0.92	0.93
2.5	0.90	0.92
3	0.89	0.91

Rating factors for more than one circuit, cables buried directly in the ground

ADJUSTMENT TABLE 5

Number of circuits	Cable-to-cable clearance (a)				
	Nil (cables touching)	One cable diameter	0.125 m	0.25 m	0.5 m
2	0.75	0.8	0.85	0.9	0.9
3	0.65	0.7	0.75	0.8	0.85
4	0.6	0.6	0.7	0.75	0.8
5	0.55	0.55	0.65	0.7	0.8
6	0.5	0.55	0.6	0.7	0.8

Multicore Cables



NOTE 1: Values given apply to an installation depth of 0.7 m and a soil thermal resistivity of 2.5 K.m/W.

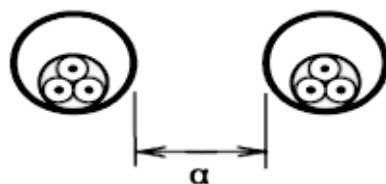
NOTE 2: In case of a thermal resistivity lower than 2.5 K.m/W the rating factors can, in general be increased and can be calculated by the methods given in BS 7769 (BS IEC 60287).

Rating factors for more than one circuit, cables in ducts buried in the ground

ADJUSTMENT TABLE 6

Number of cables	Duct-to-duct clearance (a)			
	Nil (ducts touching)	0.25 m	0.5 m	1.0 m
2	0.85	0.9	0.95	0.95
3	0.75	0.85	0.9	0.95
4	0.7	0.8	0.85	0.9
5	0.65	0.8	0.85	0.9
6	0.6	0.8	0.8	0.9

Multicore Cables



NOTE 1: Values given apply to an installation depth of 0.7 m and a soil thermal resistivity of 2.5 K.m/W.

NOTE 2: In case of a thermal resistivity lower than 2.5 K.m/W the rating factors can, in general, be increased and can be calculated by the methods given in BS 7769 (BS IEC 60287).

Rating factors for one circuit or one multicore cable or for a group of circuits, or a group of multicore cables

ADJUSTMENT TABLE 7

Arrangement (cables touching)	Number of circuits or multicore cables											
	1	2	3	4	5	6	7	8	9	12	16	20
Bunched in air, on a surface, embedded or enclosed	1	0.8	0.7	0.65	0.6	0.57	0.54	0.52	0.5	0.45	0.41	0.38
Single layer on wall or floor	1	0.85	0.79	0.75	0.73	0.72	0.72	0.71	0.7	0.7	0.7	0.7
Single layer multicore on a perforated horizontal or vertical cable tray system	1	0.88	0.82	0.77	0.75	0.73	0.73	0.72	0.72	0.72	0.72	0.72
Single layer multi core on cable ladder system or cleats etc..	1	0.87	0.82	0.8	0.8	0.79	0.79	0.78	0.78	0.78	0.78	0.78

INSTALLATION OF POWER-X CABLES

ACL XLPE power/control cables are suitable for installation in ground or air. It is easier to handle and install. Being lighter and of smaller dimensions compared to other power cables of the same ampacity, this cable requires lesser number of supports, clamps, cleats etc., when installed in air. These cables can be installed in vertical runs of unlimited difference in level.

Installation radii should be as large as possible. However, the minimum bending radii during set have been included in the data tables.



Installing Power-X Cable

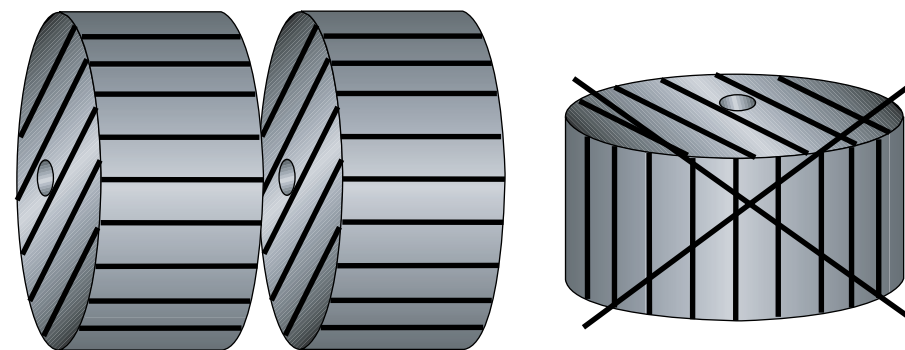
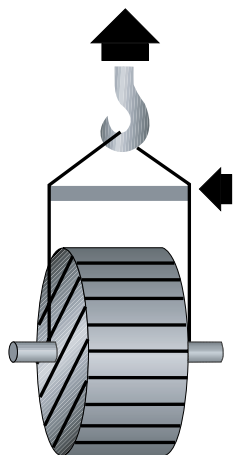
Safe Pulling Force

During Laying of power cables following safe pulling forces can be used especially when laying is done by machine

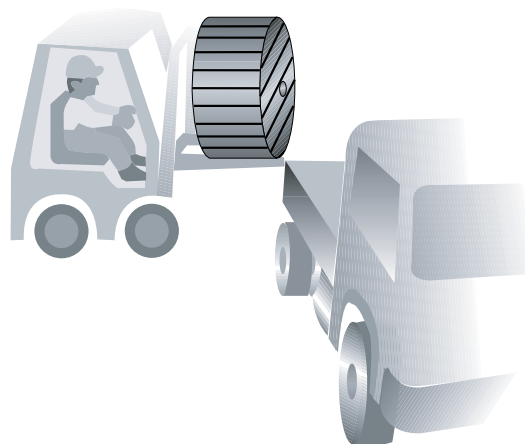
Pulling Method	Cable Type	Safe Pulling force (N)
Using a pulling eye	Cu conductor (Armoured or Unarmoured)	50 x area x No. of cores
	Al conductor (Armoured or unarmoured)	30 x area x No. of cores
Using a cable stocking	Cu conductor(Unarmoured)	50 x Area x No. of cores
	Al conductor (Unarmoured)	30 x Area x No. of cores
	Cu or Al with Flat Wire Armour	$9 \times D^2$
	Cu or Al with Round Wire Armour	$12 \times D^2$
	Control cables (Armoured or Unarmoured)	$5 \times D^2$

D - Overall Diameter of the cable

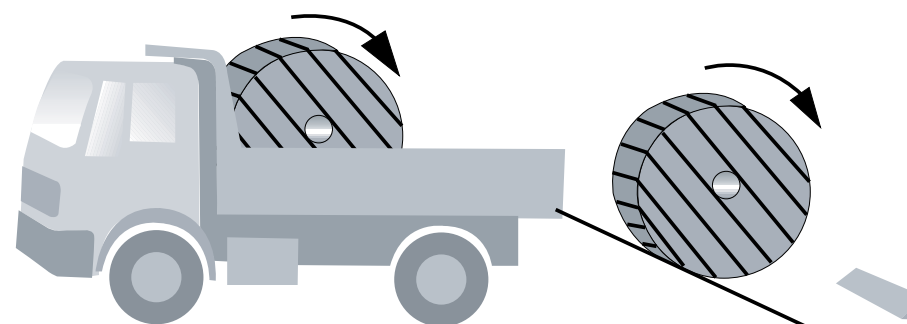
HANDLING INSTRUCTIONS FOR ACL CABLES DRUMS



Storage Position



Move by Crane or Fork Lift



Transport direction Do not drop

ALLOWABLE CABLE LENGTHS ON DRUMS

APPROX.CABLE OD (mm)	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
10.0	1588													
11.0	1313													
12.0	1103													
13.0	940	1749												
14.0	810	1508												
15.0	706	1314												
16.0	620	1155												
17.0	550	1023												
18.0	490	912	1493	1241										
19.0	440	819	1340	1114										
20.0	397	739	1209	1005										
21.0	360	670	1097	912										
22.0	328	611	999	831										
23.0	300	559	914	760	1503	1401	1117							
24.0	276	513	840	698	1380	1287	1026							
25.0	254	473	774	643	1272	1186	945							
26.0	235	437	716	595	1176	1097	874							
27.0	218	405	664	552	1091	1017	810							
28.0	203	377	617	513	1014	946	754	1191						
29.0	189	351	575	478	945	881	702	1111						
30.0	176	328	537	447	883	824	656	1038						
31.0	165	308	503	418	827	771	615	972						
32.0	155	289	472	393	776	724	577	912						
33.0	146	271	444	369	730	681	542	858						
34.0	137	256	418	348	688	641	511	808						
35.0	130	241	395	328	649	605	482	763						
36.0	123	228	373	310	613	572	456	721						
37.0	116	216	353	294	581	542	432	682	572					
38.0	110	205	335	279	551	513	409	647	543					
39.0	104	194	318	264	523	487	388	614	515					
40.0	99	185	302	251	497	463	369	584	490					
41.0	94	176	288	239	473	441	351	556	466					
42.0	90	168	274	228	451	420	335	530	444					
43.0	-	-	-	218	430	401	319	505	424					
44.0	-	-	-	208	411	383	305	482	405	646				
45.0	-	-	-	199	393	366	292	461	387	618				

Note : Highlighted figures can be used only for cables which are having circular conductors.
All other figures can be used for cables which are having circular or sector shaped conductors.

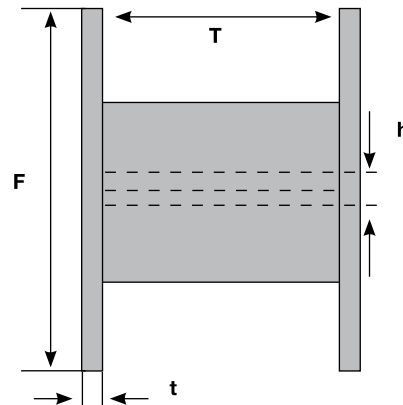
ALLOWABLE CABLE LENGTHS ON DRUMS

APPROX.CABLE OD (mm)	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
46.0	-	-	-	190	376	350	279	441						
47.0	-	-	-	182	360	336	267	423						
48.0	-	-	-	175	345	322	256	405	340	543	478			
49.0	-	-	-	168	331	309	246	389	326	521	458			
50.0	-	-	-	161	318	297	236	374	313	500	440			
51.0	-	-	-	-	306	285	227	359	301	481	423			
52.0	-	-	-	-	294	274	218	345	290	463	407			
53.0	-	-	-	-	283	264	210	333	279	445	392			
54.0	-	-	-	-	273	254	203	320	269	429	377			
55.0	-	-	-	-	263	245	195	309	259	414	364			
56.0	-	-	-	-	254	236	188	298	250	399	351	295		
57.0	-	-	-	-	245	228	182	287	241	385	339	285		
58.0	-	-	-	-	236	220	176	278	233	372	327	275		
59.0	-	-	-	-	228	213	170	268	225	359	316	266		
60.0	-	-	-	-	-	206	164	259	218	347	306	257	355	
61.0	-	-	-	-	-	199	159	251	211	336	296	249	343	
62.0	-	-	-	-	-	193	154	243	204	325	286	241	332	
63.0	-	-	-	-	-	187	149	235	197	315	277	233	322	
64.0	-	-	-	-	-	-	144	-	191	-	269	226	312	138
65.0	-	-	-	-	-	-	140	-	185	-	260	219	302	134
66.0	-	-	-	-	-	-	136	-	180	-	253	213	293	130
67.0	-	-	-	-	-	-	132	-	175	-	245	206	284	126
68.0	-	-	-	-	-	-	128	-	169	-	238	200	276	122
69.0	-	-	-	-	-	-	124	-	165	-	231	195	268	119
70.0	-	-	-	-	-	-	121	-	160	-	225	189	261	115
71.0	-	-	-	-	-	-	117	-	155	-	218	184	253	112
72.0	-	-	-	-	-	-	114	-	151	-	212	179	246	109
73.0	-	-	-	-	-	-	111	-	147	-	206	174	240	106
74.0	-	-	-	-	-	-	108	-	143	-	201	169	233	103
75.0	-	-	-	-	-	-	-	-	-	-	-	165	227	100
76.0	-	-	-	-	-	-	-	-	-	-	-	160	221	98
77.0	-	-	-	-	-	-	-	-	-	-	-	156	215	95
78.0	-	-	-	-	-	-	-	-	-	-	-	152	210	93
79.0	-	-	-	-	-	-	-	-	-	-	-	148	205	91
80.0	-	-	-	-	-	-	-	-	-	-	-	145	200	88

Note : Highlighted figures can be used only for cables which are having circular conductors.
All other figures can be used for cables which are having circular or sector shaped conductors.

DRUMS DIMENSIONS

DRUM NO	DRUM SIZES IN					DRUM SIZES IN				
	inches					mm				
	(F	X	B	X	T)	(F	X	B	X	T)
D1	37	X	20	X	22	940	X	508	X	559
D2	44	X	20	X	22	1118	X	508	X	559
D3	44	X	20	X	36	1118	X	508	X	914
D4	44	X	24	X	36	1118	X	610	X	914
D5	56	X	28	X	36	1422	X	711	X	914
D6	56	X	30	X	36	1422	X	762	X	914
D7	56	X	35	X	36	1422	X	889	X	914
D8	60	X	30	X	36	1524	X	762	X	914
D9	60	X	35	X	36	1524	X	889	X	914
D10	66	X	30	X	36	1676	X	762	X	914
D11	66	X	35	X	36	1676	X	889	X	914
D12	66	X	40	X	36	1676	X	1016	X	914
D13	72	X	40	X	36	1829	X	1016	X	914
D14	72	X	56	X	36	1829	X	1422.4	X	914



- F - Flange Diameter
- B - Barrel Diameter
- T - Inner Traverse
- t - Thickness of Flange
- h - Spindle Hole Diameter

Note : t = 76.2 mm & h = 95 mm for all above drums except for D 1 which t= 51 mm. H= 90mm..