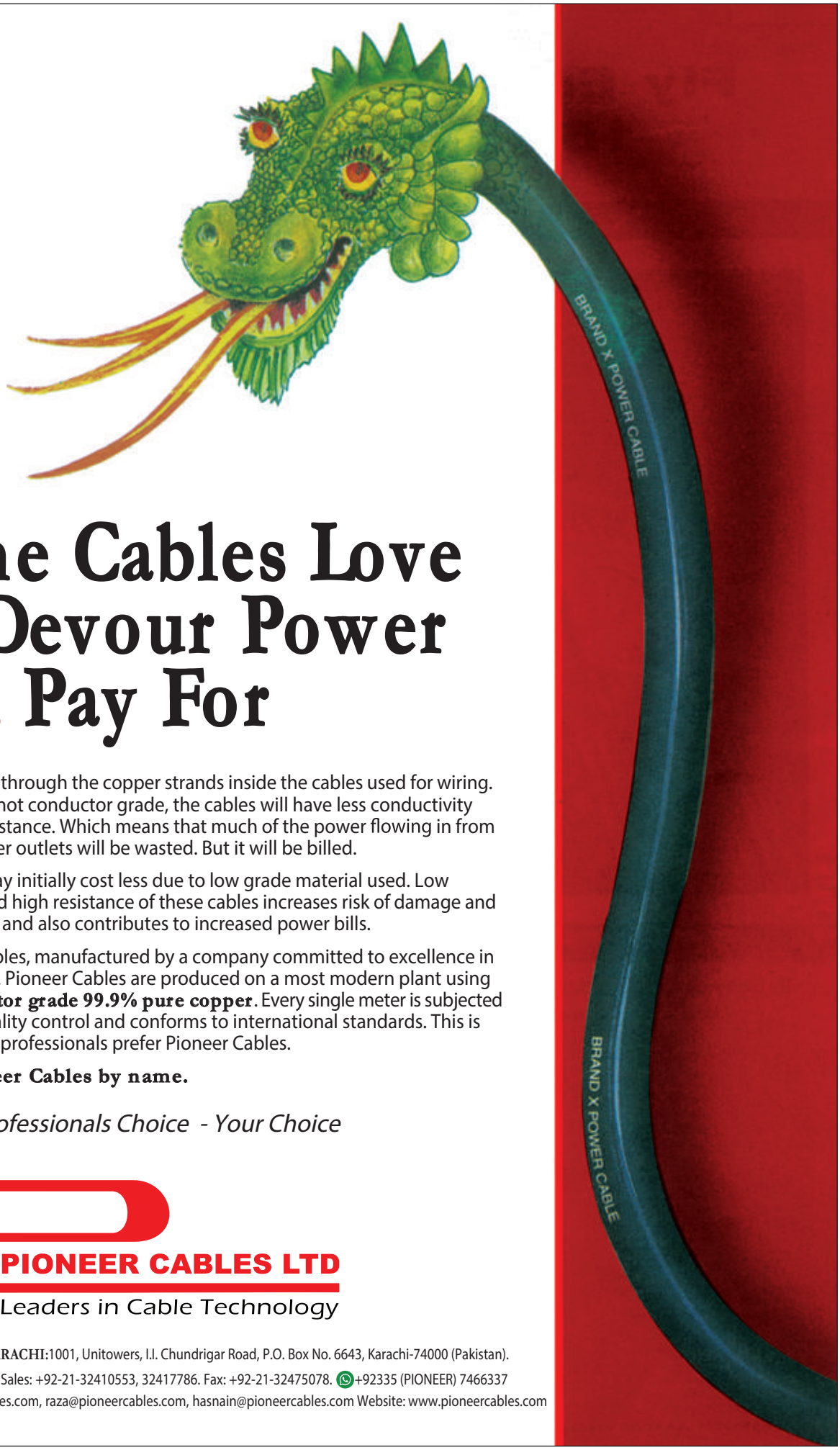
PIONEER CABLES LTD

Leaders in Cable Technology

HIGH & LOW TENSION
XLPE POWER CABLES

OVER 35 YEARS OF SUCCESS

PIONEER BY NAME.
PIONEER BY DEED.



Some Cables Love To Devour Power You Pay For

Electricity flows through the copper strands inside the cables used for wiring. If the copper is not conductor grade, the cables will have less conductivity and greater resistance. Which means that much of the power flowing in from the mains to user outlets will be wasted. But it will be billed.

Some cables may initially cost less due to low grade material used. Low conductivity and high resistance of these cables increases risk of damage and current leakage and also contributes to increased power bills.

Use Pioneer Cables, manufactured by a company committed to excellence in product quality. Pioneer Cables are produced on a most modern plant using **prime conductor grade 99.9% pure copper**. Every single meter is subjected to stringent quality control and conforms to international standards. This is the reason why professionals prefer Pioneer Cables.

Ask for Pioneer Cables by name.

Make The Professionals Choice - Your Choice

PIONEER CABLES LTD

Leaders in Cable Technology

HEAD/SALES OFFICE KARACHI:1001, Unitowers, I.I. Chundrigar Road, P.O. Box No. 6643, Karachi-74000 (Pakistan).
Phone: +92-21-32416511-14. Sales: +92-21-32410553, 32417786. Fax: +92-21-32475078. +92335 (PIONEER) 7466337
E-mail: enquiry@pioneercables.com, raza@pioneercables.com, hasnain@pioneercables.com Website: www.pioneercables.com

THANER

OVER 35 YEARS OF SUCCESS

Introducing
Triple Extruded XLPE Power Cables

By the Grace of Allah,
we celebrate our Silver Jubilee
with yet another milestone
achievement.

Being the first and only
Pakistani manufacturer to successfully
Test and produce

Triple Extruded XLPE Power Cables

the latest in Cable Technology.

Type test approved by the
prestigious HV & SC testing
laboratory, PEPCO Rawat and
Faisalabad Campus.

300 mm sq 3 Core AL/XLPE/PVC /
SWA /PVC 8.7/15 kV Cables are
made under the latest IEC 60502
and KESC Spec-123.

Leaders in Cable Technology
Paving the way for future generations

PIONEER CABLES LTD
Leaders in Cable Technology

THANER

HEAD/SALES OFFICE KARACHI: 1001, Unitowers, I.I. Chundrigar Road, P.O. Box No. 6643, Karachi-74000 (Pakistan).
Phone: +92-21-32416511-14. Sales: +92-21-32410553, 32417786. Fax: +92-21-32475078. +92335 (PIONEER) 7466337
E-mail: enquiry@pioneercables.com, raza@pioneercables.com, hasnain@pioneercables.com Website: www.pioneercables.com

uality Assurance at its most powerful

Certificate of Registration

This certificate has been awarded to

Pioneer Cables Limited

1001 Unitower, I.I. Chundrigar Road, P.O. Box 6643, Karachi, Pakistan

in recognition of the organization's Quality Management System which complies with

ISO 9001:2008

The scope of activities covered by this certificate is defined below

Manufacturer of Copper / Aluminium Conductors and PVC / XLPE Low, Medium and High Voltage Cables (Up to 33 KV)

Certificate Number:	Date of Issue: (Original)	Date of Issue:
1595/A/0002/UK/En	05 June 1998	30 April 2013
Issue No:	**Expiry Date:**	
9	29 April 2016	

Issued by: *On behalf of the Schemes Manager*

The only Pakistani manufacturer to be awarded ISO 9001-2008 Certification for the manufacture of upto 33 kV High Voltage Cables

Buy genuine. Buy direct.

In line with our Total Customer Satisfaction, Pioneer Cables is the first cable manufacturer to have our cable successfully Type Tested at the prestigious HV & SC Testing Laboratory, NTDC Rawat.

Pioneer Cables: Leaders in cable technology, Paving the way for future generations

PIONEER CABLES LTD

Leaders in Cable Technology

HEAD/SALES OFFICE KARACHI: 1001, Unitowers, I.I. Chundrigar Road, P.O. Box No. 6643, Karachi-74000 (Pakistan).
Phone: +92-21-32416511-14. Sales: +92-21-32410553, 32417786. Fax: +92-21-32475078. +92335 (PIONEER) 7466337
E-mail: enquiry@pioneercables.com, raza@pioneercables.com, hasnain@pioneercables.com Website: www.pioneercables.com

Pioneer Siolinx* Power Cables

* Siolinx is the Registered Trade Name of Pioneer Cables Ltd. denoting cables having cross-linked polyethylene insulation.

CONTENTS

PIONEER CABLES LTD
Leaders in Cable Technology

A Brief Profile

Pioneer Cables, established in 1980, is an ISO 9001:2008 certified company engaged in the manufacturing of H.T. /L.T. Power Cables, Conductors & General Wiring Cables according to international standards.

Pioneer Cables is the flag ship company of Bawany Group, a well-known and trusted name in Pakistan with a rich history of success and good business ethics that goes back 100+ years. Our sister concern, Bawany Metals Limited is the FIRST in Pakistan to manufacture 99.9% Copper Rods conforming to ASTM B-49. It also produces 99.5% Aluminium Rods conforming to ASTM B-233.

Our manufacturing facilities are based at Hub Chowki, Balochistan about 30 KM from Karachi and occupy 52,600 sq. meters of prime manufacturing space with associated management and design offices, laboratories, quality control and other departments.

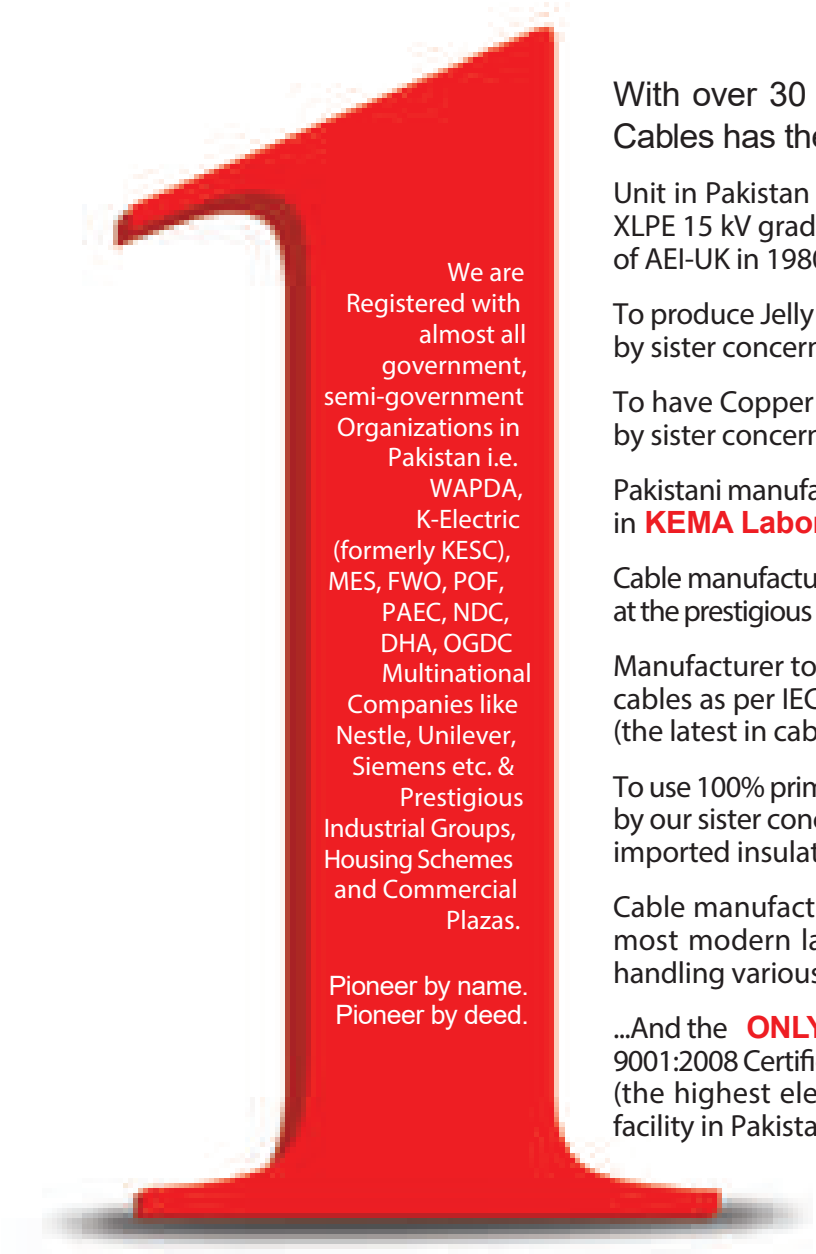
Pioneer Cables is committed to the production of the best product quality utilizing cutting edge European technology in production processes, material applications and logistics procedures. We have the capability to provide a versatile product range to serve individual home consumers as well as the construction, electric utilities, distribution and industrial sectors.

The Company is managed by qualified professionals specializing in different fields. Most of the heads of technical and manufacturing departments have been trained at the plant of AEI Cables Ltd, Gravesend, U.K. Improvements in facilities and upgrading of equipment is a continuing process at our plant.

The scope of this catalogue is to provide an in depth view of the technical information of our high & low tension XLPE power cables specification of siolinx cables from 600/1000 volts to 19/33 kV.

PIONEER CABLES LTD
Leaders in Cable Technology

We are the Pioneers



With over 30 years of cable manufacturing Pioneer Cables has the honour to be the **1st:**

Unit in Pakistan to bring the technology of manufacturing XLPE 15 kV grade cables with the technical collaboration of AEI-UK in 1980.

To produce Jelly Filled Telephone Cables up to 1200 pairs by sister concern Pakistan Telephone Cable in 1983.

To have Copper / Aluminium Rod manufacturing industry by sister concern Bawany Metals Limited in 1983.

Pakistani manufacturer having the privilege of cable testing in **KEMA Laboratories, Holland in 1984.**

Cable manufacturer to have cables successfully type tested at the prestigious HV & SC Testing Laboratories, NTDC Rawat.

Manufacturer to produce Triple Extruded H.T XLPE 15 kV cables as per IEC-60502-2 and KESC specifications-123 (the latest in cable technology) in 2008.

To use 100% prime quality Copper / Aluminium Rods (made by our sister concern Bawany Metals Limited) and genuine imported insulating material.

Cable manufacturer with in-house testing facilities in the most modern laboratory in Pakistan for all its products handling various types of tests.

...And the **ONLY** Pakistani manufacturer to be awarded ISO 9001:2008 Certification for making up to 33 kV grade cables (the highest electrical rating manufacturing and testing facility in Pakistan).

Foreword

To help conserve the country's foreign exchange resources and keeping in view such innovation and future requirements arising out of technological development in the field of Power Cables, the Pioneer Cables Limited was established at Hub Chowki in the District of Lasbella, Balochistan in Technical Collaboration with AEI of U.K. (a subsidiary of GEC) to manufacture all sorts of Power Cables including cross linked polyethylene insulated Low Tension/High Tension Cables for the first time in Pakistan in order to meet the demand and to power the progress of the country.

Pioneer Cables Limited manufactures low and medium voltage PVC insulated armoured & unarmoured Power Cables, besides, XLPE low and medium voltage cables alongside the XLPE HV Cables.

The Cable Plant is the most modern and automated and is fully equipped with adequate testing facilities. It is managed by skilled, highly qualified and experienced personnel trained abroad.

MANAGEMENT OF COMPANY

The Company is managed by professional Managers in different fields. Almost all heads of technical/manufacturing departments have been trained in AEI Cables Ltd., plant at Gravesend U.K.

Quality Policy

The Quality Policy of PCL is to produce and supply cables and conductors according to international standards, adhering strictly to specifications to suit customer's requirement.

In order to achieve the objective, the company ensures that suitable plant / machinery and testing facilities are provided and that it is manned by proper trained and qualified staff who can effectively provide quality production.

It is our policy that quality control checks take place at all stages of production right from the start i.e. the selection and receipt of raw material to the finish i.e. completion of Cables / Conductors and its final testing, in order to ensure that it conforms to international standards in respect to quality.

According to the Quality Policy of PCL, if a cable / conductor is found deviating from standards at any stage of production it is not allowed to move further unless remedial action is taken as suggested by the Quality Control Department and if that is not possible it is scrapped altogether.

We firmly believe in producing quality product using the best of materials available and the right production technique so that it is comparable in quality with cables / conductors of international repute and satisfies our customers now and in future and are not prepared to compromise on this point under any circumstances.

We stand by "PRACTICE WHAT YOU PREACH"

CERTIFICATE

AEI CABLES
AEI Cables Limited
Gravesend Kent DA11 9AF
Telephone - Gravesend (STD 0474) 64466
International + 44 474 64466
Telex - 25829
Telegrams - Assocelect Gravesend

Your ref | Our ref | Tel ext.

To whom it may concern

Dear Sirs,

This letter serves to confirm that an agreement was drawn up between Associated Electrical Industries Ltd. whose registered office is 1 Stanhope Gate, London WIA IEH, England, and Pioneer Cable Company Ltd. of Uni Tower Building, I.I. Chundrigar Road, Karachi, Pakistan, on the 26th day of November 1980 whereby AEI, who had developed certain technological expertise in the manufacture and know-how of production of elastomeric type power cables in the range up to 35000 volts, would provide technical collaboration with Pioneer Cable Company for the latter to develop cables in the same range. Additionally, AEI has agreed to make available particular insulating materials to enable Pioneer Cables to manufacture cross-linked polyethylene cables in the range quoted above. Within the terms of the agreement, AEI will afford instruction to Pioneer Cables engineers at its Gravesend Factory and that at any reasonable time an AEI engineer, on request, will be available to visit Pioneer Cables factory site to provide immediate assistance.

The duration of technical collaboration agreement is ten years from November 26, 1980. Provisions, however, are made whereby in the event of default either party may terminate the agreement at six months notice.

Yours faithfully

R. H. Simpson
Manager - Group Services

Registered at London No. 163690. Registered Office: Crete Hall Road, North Fleet, Kent DA11 9AF
(Holding Co. The General Electric Co. p.l.c. of England)

Certificates

Certificate of Registration

This certificate has been awarded to

Pioneer Cables Limited

27/31, Mouza Bairut, Main RCD Highway, Hub Chowki, District Lasbella, Balochistan, Pakistan

in recognition of the organization's Quality Management System which complies with

ISO 9001:2008

The scope of activities covered by this certificate is defined below

Manufacturer of Copper / Aluminium Conductors and PVC / XLPE Low, Medium and High Voltage Cables (Up to 33 KV)

Certificate Number:	Date of Issue: (Original)	Date of Issue:
1595/A/0001/UK/En	05 June 1998	30 April 2013
Issue No:	Expiry Date:	
9	29 April 2016	

Issued by: On behalf of the Scheme Manager

Form No. HV&SC Lab/HV-037

PEPCO HIGH VOLTAGE AND SHORT CIRCUIT LABORATORY, PEPCO, RAWAT, ISLAMABAD.

No./HV/SC/Lab/HV/TR/**365-66** Dated **20.12.2011**

TEST REPORT

TYPE TESTING OF 15 kV XLPE POWER CABLE

1. Client : M/S Pioneer Cables Ltd., Karachi
2. Specimen identification
   - Type : 500/1C/A1/XLPE/PVC/AWA/PVC-8.7/15 kV
   - Make : M/S Pioneer Cables Ltd., Karachi
   - Rating : 15 kV
   - Serial No. : Prototype
   - Purchaser : M/S IESCO, Islamabad
   - Purchase orderidate : ADB-IESCO/TR-IIMCB-02/PMU-23/2011 dated 24.11.2011
   - Supplied by (other than manufacturer) : N/A
   - Repaired by (other than manufacturer) : N/A
3. Relevant test standard(s)/spec. : P-29:2010 & IEC-60502-2
4. Test(s) performed on : December 08-20 2011
5. Test outcome : Given in Table 1 below:

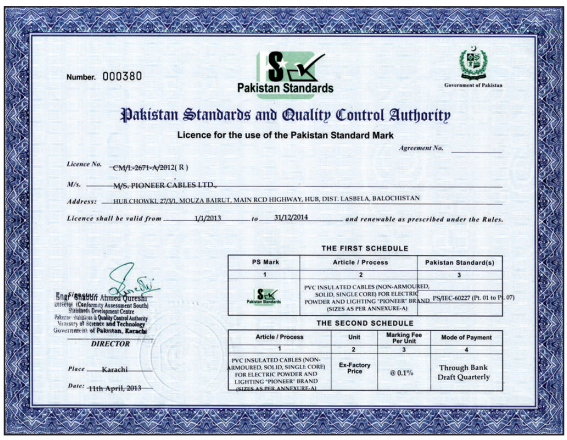
Table 1. Various tests performed and the results.

S #	Tests performed	Result	Remarks
1	Bending test + partial discharge test at 15 kV	0.4 pC	Within specified limit
2	tan δ measurement as a function of temperature at 2 kV.	18×10^{-4}	Within specified limit
3	Twenty heating cycles + partial discharge test at 15 kV.	0.4 pC	Within specified limit
4	Lightning impulse voltage withstand test at 95 kV.	Withstood	Qualified
5	Power frequency voltage test at 30.5 kV (15 min).	Withstood	Qualified
6	Power frequency voltage test at 35 kV (4 Hrs).	Withstood	Qualified

Test(s) supervised by:
1. Engr. Muhammad Akram Raja — Director High Voltage Division, Rawat Lab.

Test(s) witnessed by:
1. Engr. Mazhar Ali Khan — Deputy Manager (D & S) NTDC, Lahore
2. Engr. Muhammad Ashraf Hamza — Technical Manager M/S Pioneer Cables Ltd., Karachi

General Manager
HV & SC Lab. PEPCO
Rawat, Islamabad



Number: 000380

Pakistan Standards

Government of Pakistan

Pakistan Standards and Quality Control Authority

Licence for the use of the Pakistan Standard Mark

Agreement No. _____

Licence No. CM/L-2671-A/2012(R)

M/s. M/S. PIONEER CABLES LTD.,

Address: HUB CHOWKI, 27/31, MOUZA BAIRUT, MAIN RCD HIGHWAY, HUB, DIST: LASBELA, BALOCHISTAN

Licence shall be valid from 1/1/2013 to 31/12/2014 and renewable as prescribed under the Rules.

THE FIRST SCHEDULE

PS Mark	Article / Process	Pakistan Standard(s)
1	2	3
	PVC INSULATED CABLES (NON-ARMOURED, SOLID, SINGLE CORE) FOR ELECTRIC POWDER AND LIGHTING 'PIONEER' BRAND (SIZES AS PER ANNEXURE-A)	PS/IEC-60227 (Pt. 01 to Pt. 07)

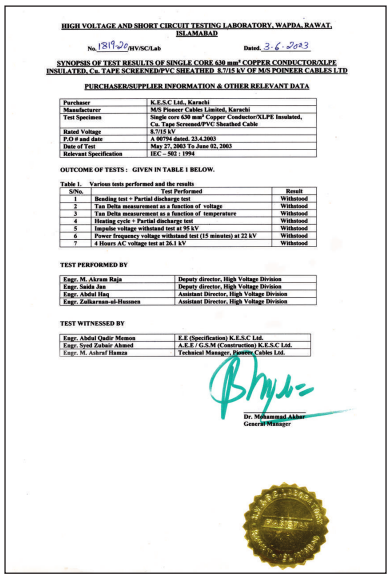
THE SECOND SCHEDULE

Article / Process	Unit	Marking Fee Per Unit	Mode of Payment
1	2	3	4
PVC INSULATED CABLES (NON-ARMOURED, SOLID, SINGLE CORE) FOR ELECTRIC POWDER AND LIGHTING 'PIONEER' BRAND (SIZES AS PER ANNEXURE-A)	Ex-Factory Price	@ 0.1%	Through Bank Draft Quarterly

Engr. Abdul Ahmed Qureshi
DIRECTOR

Place Karachi

Date: 11th April, 2013



HIGH VOLTAGE AND SHORT CIRCUIT TESTING LABORATORY, WAPDA, RAWAT, ISLAMABAD

No. 1819-25/HV/SC/Lab Dated 3-6-2003

SYNOPSIS OF TEST RESULTS OF SINGLE CORE 630 mm² COPPER CONDUCTOR/XLPE INSULATED, Cu. TAPE SCREENED/PVC SHEATHED 8.7/15 kV OF M/S POINEER CABLES LTD

PURCHASER/SUPPLIER INFORMATION & OTHER RELEVANT DATA

Purchaser	K.E.S.C Ltd., Karachi
Manufacturer	M/S Pioneer Cables Limited, Karachi
Test Specimen	Single core 630 mm² Copper Conductor/XLPE Insulated, Cu. Tape Screened/PVC Sheathed Cable
Rated Voltage	8.7/15 kV
P.O # and date	A 00794 dated. 23.4.2003
Date of Test	May 27, 2003 To June 02, 2003
Relevant Specification	IEC – 502 : 1994

OUTCOME OF TESTS : GIVEN IN TABLE 1 BELOW.

Table 1. Various tests performed and the results

S/No.	Test Performed	Result
1	Bending test + Partial discharge test	Withstood
2	Tan Delta measurement as a function of voltage	Withstood
3	Tan Delta measurement as a function of temperature	Withstood
4	Heating cycle + Partial discharge test	Withstood
5	Impulse voltage withstand test at 95 kV	Withstood
6	Power frequency voltage withstand test (15 minutes) at 22 kV	Withstood
7	4 Hours AC voltage test at 26.1 kV	Withstood

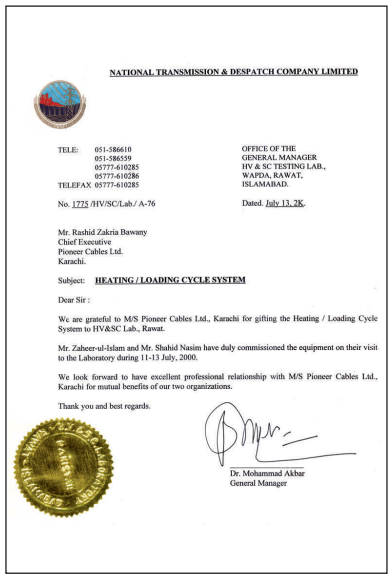
TEST PERFORMED BY

Engr. M. Akram Raja	Deputy director, High Voltage Division
Engr. Saida Jan	Deputy director, High Voltage Division
Engr. Abdul Haq	Assistant Director, High Voltage Division
Engr. Zulharnen-ul-Hussnen	Assistant Director, High Voltage Division

TEST WITNESSED BY

Engr. Abdul Qadir Memon	E.E (Specification) K.E.S.C Ltd.
Engr. Syed Zubair Ahmed	A.E.E / G.S.M (Construction) K.E.S.C Ltd.
Engr. M. Ashraf Hamza	Technical Manager, Pioneer Cables Ltd.

Dr. Mohammad Akbar
General Manager



NATIONAL TRANSMISSION & DESPATCH COMPANY LIMITED

TELE: 051-586610
051-586559
05777-610285
05777-610286
TELEFAX 05777-610285

OFFICE OF THE
GENERAL MANAGER
HV & SC TESTING LAB.,
WAPDA, RAWAT,
ISLAMABAD.

No. 1775 /HV/SC/Lab./ A-76

Dated. July 13, 2K.

Mr. Rashid Zakria Bawany
Chief Executive
Pioneer Cables Ltd.
Karachi.

Subject: **HEATING / LOADING CYCLE SYSTEM**

Dear Sir :

We are grateful to M/S Pioneer Cables Ltd., Karachi for gifting the Heating / Loading Cycle System to HV&SC Lab., Rawat.

Mr. Zaheer-ul-Islam and Mr. Shahid Nasim have duly commissioned the equipment on their visit to the Laboratory during 11-13 July, 2000.

We look forward to have excellent professional relationship with M/S Pioneer Cables Ltd., Karachi for mutual benefits of our two organizations.

Thank you and best regards.

Dr. Mohammad Akbar
General Manager

Certificate of Registration

This certificate has been awarded to

Pioneer Cables Limited

1001 Unitower, I.I. Chundrigar Road, P.O. Box 6643, Karachi, Pakistan

in recognition of the organization's Quality Management System which complies with

ISO 9001:2008

The scope of activities covered by this certificate is defined below

Manufacturer of Copper / Aluminium Conductors and PVC / XLPE Low, Medium and High Voltage Cables (Up to 33 KV)

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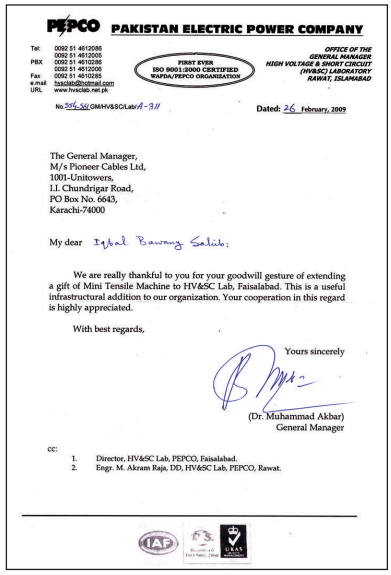
9	29 April 2016	

Issued by: On behalf of the Scheme Manager



PEPCO PAKISTAN ELECTRIC POWER COMPANY

Tel: 0092 51 4612086
0092 51 4612005
PBX 0092 51 4610286
0092 51 4612006
Fax: 0092 51 4610285
e-mail hvsclab@hotmail.com
URL www.hvsclab.net.pk

FIRST EVER ISO 9001:2000 CERTIFIED WAPDA/PEPCO ORGANIZATION

OFFICE OF THE GENERAL MANAGER HIGH VOLTAGE & SHORT CIRCUIT (HV&SC) LABORATORY RAWAT, ISLAMABAD

No. 595-SV/GM/HV&SC/Lab/6-3// Dated: 26 February, 2009

The General Manager,
M/s Pioneer Cables Ltd,
1001-Unitowers,
I.I. Chundrigar Road,
PO Box No. 6643,
Karachi-74000

My dear Iqbal Bawany Sahib:

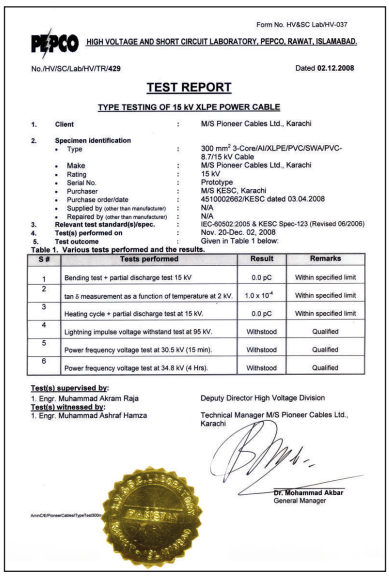
We are really thankful to you for your goodwill gesture of extending a gift of Mini Tensile Machine to HV&SC Lab, Faisalabad. This is a useful infrastructural addition to our organization. Your cooperation in this regard is highly appreciated.

With best regards,

Yours sincerely

(Dr. Muhammad Akbar)
General Manager

cc:
1. Director, HV&SC Lab, PEPCO, Faisalabad.
2. Engr. M. Akram Raja, DD, HV&SC Lab, PEPCO, Rawat.



Form No. HV&SC Lab/HV-037

PEPCO HIGH VOLTAGE AND SHORT CIRCUIT LABORATORY, PEPCO, RAWAT, ISLAMABAD.

No./HV/SC/Lab/HV/TR/**429** Dated **02.12.2008**

TEST REPORT

TYPE TESTING OF 15 kV XLPE POWER CABLE

1. **Client** : M/S Pioneer Cables Ltd., Karachi
2. **Specimen identification**
   - Type : 300 mm² 3-Core/Al/XLPE/PVC/SWA/PVC-8.7/15 kV Cable
   - Make : M/S Pioneer Cables Ltd., Karachi
   - Rating : 15 kV
   - Serial No. : Prototype
   - Purchaser : M/S KESC, Karachi
   - Purchase order/date : 4510002662/KESC dated 03.04.2008
   - Supplied by (other than manufacturer) : N/A
   - Repaired by (other than manufacturer) : N/A
3. **Relevant test standard(s)spec.** : IEC-60502:2005 & KESC Spec-123 (Revised 06/2006)
4. **Test(s) performed on** : Nov. 20-Dec. 02, 2008
5. **Test outcome** : Given in Table 1 below:

Table 1. Various tests performed and the results.

S #	Tests performed	Result	Remarks
1	Bending test + partial discharge test 15 kV	0.0 pC	Within specified limit
2	tan δ measurement as a function of temperature at 2 kV.	1.0×10^{-4}	Within specified limit
3	Heating cycle + partial discharge test at 15 kV.	0.0 pC	Within specified limit
4	Lightning impulse voltage withstand test at 95 kV.	Withstood	Qualified
5	Power frequency voltage test at 30.5 kV (15 min).	Withstood	Qualified
6	Power frequency voltage test at 34.8 kV (4 Hrs).	Withstood	Qualified

Test(s) supervised by:
1. Engr. Muhammad Akram Raja — Deputy Director High Voltage Division

Test(s) witnessed by:
1. Engr. Muhammad Ashraf Hamza — Technical Manager M/S Pioneer Cables Ltd., Karachi

Dr. Muhammad Akbar
General Manager

CNC Conformity 'n Compliance SERVICES

CERTIFICATE OF ASSESSMENT – EC

This is to certify, that the hereunder described items of Low Voltage Directive 2006/95/EC have proving their conformity to the safety and health requirements

Products submitted are:

ELECTRICAL WIRE AND CABLES

1. Copper / Aluminium & ACSR overhead conductors
2. Electric power, lighting and internal wiring cables upto 600/1000 V
3. Electric power cables upto 19/33 kV.

Manufactured By

PIONEER CABLES LIMITED
1001 – Unitowers, I.I. Chundrigar Road,
P.O. Box 6643
Karachi-74000 Pakistan

Manufacturer complies with the applicable requirement of BS 215, BS 7884, BS 6004, BS 6346, BS 6500, IEC 60502-1 & IEC 60502-2 with all relevant specifications.

The manufacturer's technical documentation of the above LVD has been reviewed and found to comply with requirements of the Council Directive 2006/95/EC for Annex. IV Module A products, referred to as the Low Voltage Directive. When examined the test reports of above product(s), satisfied the requirements of the Low Voltage Council Directive.

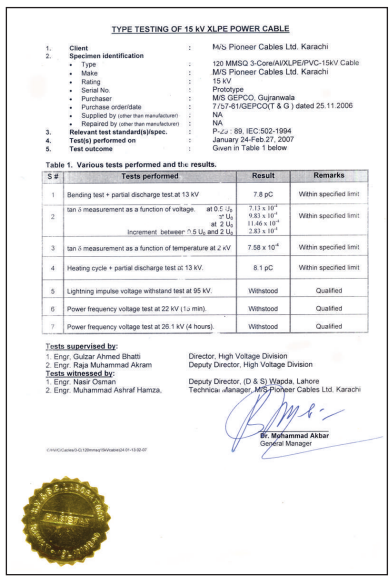
With drawn up an EC declaration of product conformity according to Annex III of the Directive, you are therefore licensed to CE mark the product(s) listed above in accordance with Low Voltage Directive 2006/95/EC.

For CNC Services — Project Engineer

Date of Issue: 18th June, 2013
Date of Expiry: 17th June, 2018
Certificate Number: *CNC/EEC/4206/13*

This certificate is valid until the date specified, valid only if embossed with CNC conformity and compliance stamp

CNC Services, Grosse Garten Str. 5, 48529 Nordhorn, Germany, www.cncservices.net



TYPE TESTING OF 15 kV XLPE POWER CABLE

1. **Client** : M/s Pioneer Cables Ltd. Karachi
2. **Specimen identification**
   - Type : 120 MMSQ 3-Core/Al/XLPE/PVC-15kV Cable
   - Make : M/S Pioneer Cables Ltd. Karachi
   - Rating : 15 kV
   - Serial No. : Prototype
   - Purchaser : M/S GEPCO, Gujranwala
   - Purchase order/date : 7/57-61/GEPCO(T & G) dated 25.11.2006
   - Supplied by (other than manufacturer) : NA
   - Repaired by (other than manufacturer) : NA
3. **Relevant test standard(s)spec.** : P.O./: 89, IEC:502-1994
4. **Test(s) performed on** : January 24-Feb.27, 2007
5. **Test outcome** : Given in Table 1 below

Table 1. Various tests performed and the results.

S #	Tests performed	Result	Remarks
1	Bending test + partial discharge test at 13 kV	7.8 pC	Within specified limit
2	tan δ measurement as a function of voltage. at 0.5 U_0 / at U_0 / at 2 U_0 / Increment between 0.5 U_0 and 2 U_0	7.13×10^{-4} / 9.83×10^{-4} / 11.46×10^{-4} / 3.83×10^{-4}	Within specified limit
3	tan δ measurement as a function of temperature at 2 kV	7.58×10^{-4}	Within specified limit
4	Heating cycle + partial discharge test at 13 kV.	8.1 pC	Within specified limit
5	Lightning impulse voltage withstand test at 95 kV.	Withstood	Qualified
6	Power frequency voltage test at 22 kV (1.0 min).	Withstood	Qualified
7	Power frequency voltage test at 26.1 kV (4 hours).	Withstood	Qualified

Tests supervised by:
1. Engr. Gulzar Ahmed Bhatti — Director, High Voltage Division
2. Engr. Raja Muhammad Akram — Deputy Director, High Voltage Division

Tests witnessed by:
1. Engr. Nasir Osman — Deputy Director, (D & S) Wapda, Lahore
2. Engr. Muhammad Ashraf Hamza, — Technical Manager, M/S Pioneer Cables Ltd. Karachi

Dr. Muhammad Akbar
General Manager

KEMA	Ref : 41535-1762	HSL

Summary of test performed on both 185 mm sq and 300 mm sq cables

Client	:	Pioneer Cables Limited Pakistan
Reference	:	Irrevocable letter of credit No. 51617/b
Dates and place of testing	:	September-November 1984 in the High Voltage Laboratory and Chemical Laboratory of the N.V. Kema, Arnhem, The Netherlands.
Persons present during the tests	:	The tests were witnessed by - Mr. Jamil Gul (K.E.S.C. Limited) - Mr. T.G. Marsh (A.E.I. U.K.) - Mr. W. Smith (A.E.I. U.K.)
Material Examined	:	Tests on two types of XLPE cable carried out simultaneously viz (1) ht cable 11-15 kV 3 core XLPE insulated aluminium conductor 185mm sq PVC sheathed and (2) ht cable 11-15 kV 3 core XLPE insulated aluminium conductor 300 mm sq PVC sheathed.
Test Programme	:	Type test in accordance with IEC 502, 1983 as per our proforma invoice No. ivk/JVK/NVI dtd May 23, 1984.
Summary of the results obtained	:	The material submitted for tests withstood the electrical and non electrical tests and gave no rise to any remarks.

N.V. KEMA

Th.V. Rosskopf

Advantages of XLPE Cables

Why Cross-Linked Polyethylene

Cross-linked polyethylene insulated cables are durable. Economical and the properties of the insulation offer considerable advantage over paper, polyethylene and PVC, especially where current ratings and short circuit ratings are the primary objects.

What Is Cross-Linked Polyethylene

Polyethylene and PVC as cable insulants have a number of advantages over impregnated paper and this had led to their widespread adoption for power cable insulation. Polyethylene has high electric strength combined with low loss characteristics, which together with mechanical strength and non-hygroscopic nature gives it a superior insulation performance for both above-ground and under-ground installation. Like PVC, however, polyethylene is a thermoplastic material with a relatively low melting point and will soften at sufficiently high temperature thus setting limitations on full load and short-circuit ratings. PVC has a tendency to become brittle at temperatures below 0 °C. Cross-linked polyethylene is a thermosetting material achieved by a processing to the vulcanization of polyethylene, yet retaining all the desirable properties of the original material, polyethylene. It allows greater current carrying capacity and higher overload and short-circuit performance, and where voltage drop is not a problem, a smaller size cable by comparison with PVC may be used with a resulting cost-saving. The material has not true melting point and extensive tests with the Siolinx cable range have shown that the cross-linked polyethylene insulation remains elastic at high temperature consequently guaranteeing long and trouble-free life. The cables described in this publication have a PVC sheath and are not suitable for installation in temperature below 0°C. Cross-linked polyethylene insulated cables however, can be finished with other sheathing

materials, e.g. polyethylene, to produce cables which can be handled and installed at temperature as low as 40°C.

The designs which Pioneer Cables Ltd. employ for the Siolinx range of power cables are based on BS 5467: and the latest IEC recommendations. The agreed insulation thickness for cross-linked polyethylene cable which have been adopted are those established by the IEC.

Jointing & Terminating

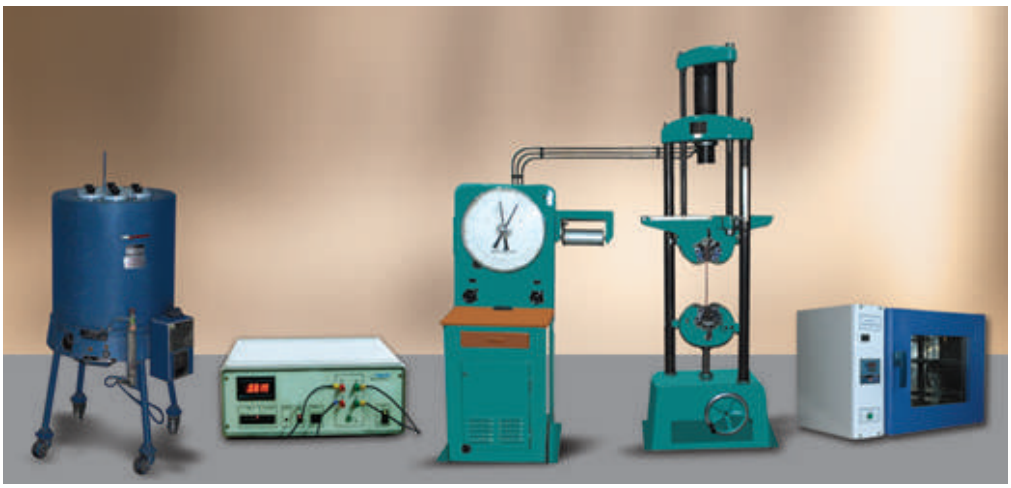
The techniques employed in the installation of low voltage Siolinx cables do not differ materially from those used for PVC insulated cables. For terminations, com-pression lugs and armour glands are interchangeable with those for PVC insulated cables to BS 6346, simplified joints employing mechanical conductor fittings in a cold pouring compound filled plastic protection box are widely available and are well suited to Siolinx cable constructions. Where soldering or hot pouring compounds are employed, the heat resisting properties of the insulation eliminate problems of distortion associated with PVC insulated cables.

The ruggedness and lightness of 11 kV Siolinx cable allows easy installation utilizing many of the techniques common to low voltage Siolinx and PVC cables. Air insulated terminal boxes offering rapid cable disconnecting facilities can be used to advantage, and because of the simplified systems of stress control available, are little more difficult to install than low tension terminations. In addition to traditional joint designs which use hand applied self amalgamating tapes as the primary insulation, a system employing preformed rubber mouldings is available when maximum speed and simplicity of installation are of prime importance.

Different options for stress relieving such as:-

1) Taped stress control method
2) Slipon rubber moulded stress control method
3) Heat shrink tube stress control method

Details of various manufacturers dealing with jointing and terminating accessories could be given on request.



Specification 600 / 1000 V & 1.9 / 3.3 kV Siolinx Cables

CONDUCTORS are plain annealed copper or aluminium complying with BS 6360.

INSULATION consists of cross-linked polyethylene which is applied by extrusion to form a compact homogeneous layer.

BEDDING consists of extruded layer of black PVC compound copying to BS 7655.

ARMOUR for multi-core cables consists of a single layer of galvanised steel wires complying with BS 1442.

SERVING The outer sheath is an extruded layer of black PVC complying with the requirements of Type 9 to BS 7655.

CORE IDENTIFICATION is provided by colours.

BENDING RADIUS During installation, Siolinx cables should not be bent to a radius smaller than that given in the appropriate table.

DIMENSIONS AND WEIGHTS given in the tables on pages 13-25 are approximate.

OTHER CONSTRUCTIONS It is possible to supply cable with minor difference in construction if sufficient quantity is required.

In this connection it should be noted that armoured cable to this specification aligns with the British Standard 5467: for 600/1000 volt and 1900/3300 Volt Cross Linked polyethylene insulated cable. Cable in accordance with IEC 60502 can be specially manufactured, the main differences being:

1. Armour wire diameter may be one size smaller than IEC 60502 in isolated instances.
2. The PVC sheath thickness over armour is thinner than that required by IEC 60502 on all cables.

SUSTAINED CURRENT RATINGS (50 Hz A.C.)

The current ratings given in the tables are suitable for close protection as defined in the IEE Wiring Regulations. Values are given for the three customary methods of installation: laid direct in ground, in ducts or in air.

Generally, the current rating will be reduced if there is a variation from the Standard conditions. The rating for most conditions can be calculated by multiplying the sustained current rating by the Factory(s) given in the appropriate adjustment table(s) on pages 42-45.

STANDARD CONDITIONS

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

Thermal resistivity of soil (g) *	= 1.2^{O}C m/W
Standard ground temperature	= 15^{O}C
Ambient air temperature	= 25^{O}C
Maximum conductor temperature	= 90^{O}C

Depth of burial, from ground surface to centre of cable, centre of duct or to centre of trefoil group of cables or ducts:

600/1000 V Cables	= 0.5 m
1.9/3.3 kV Cables	= 0.8 m

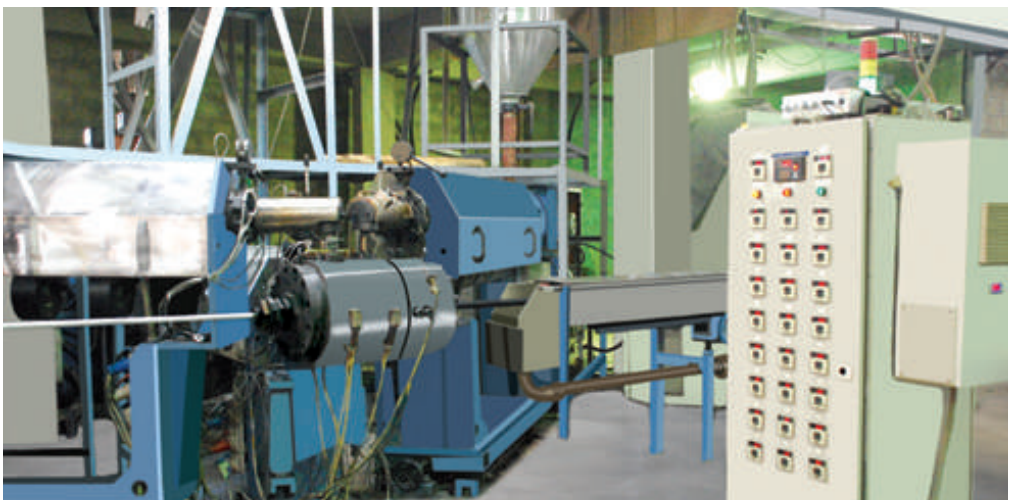
OVERLOAD CONDITIONS

Cross-linked polyethylene cables can, without undue detriment, safety operate at an increased conductor temperature of 130^{O}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 factory given in the appropriate adjustment table on pages 42-45.

SHORT-CIRCUIT CURRENT RATINGS

In addition to the normal sustained current ratings, consideration must also be given to short-circuit ratings when selecting cable sizes. Ratings for given durations are listed in the tables on pages 14-26.



VOLTAGE DROP (Vd)

This is mainly applicable to low voltage cables and can be calculated approximately using the following formula:

$$V_d = \frac{mv \times I \times L}{1000}$$

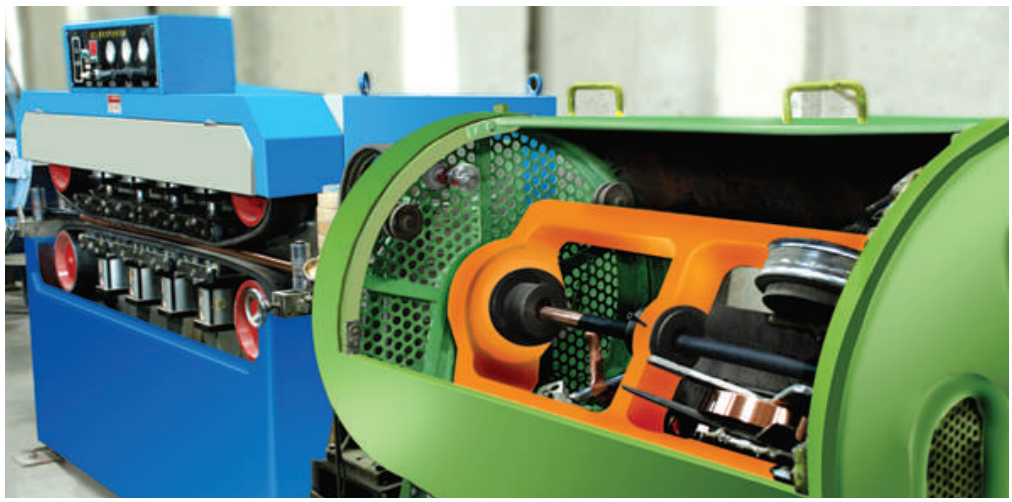
where:

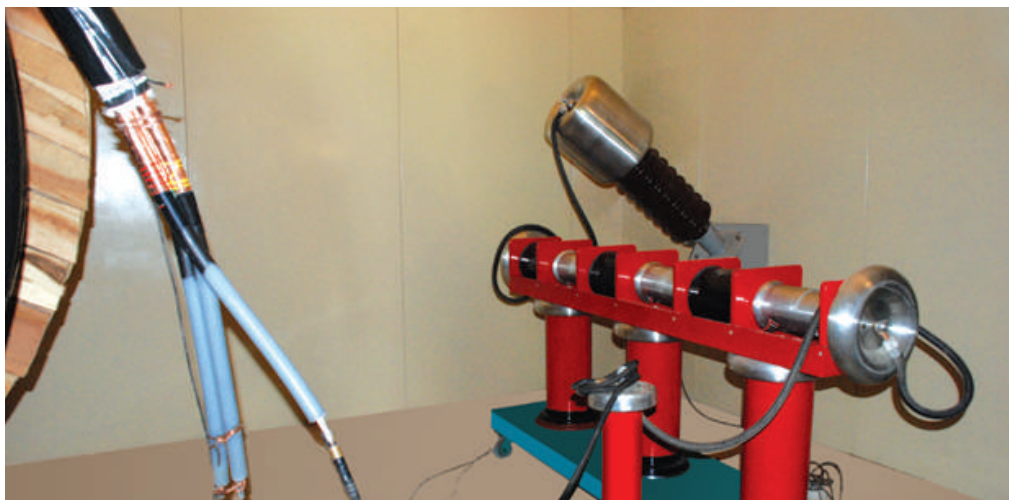
- I = Current carried per conductor in amperes
- L = Route Length in meters
- mv = approximate voltage drop/ampere/meter

Note: The maximum allowable voltage drop is normally 2.5%

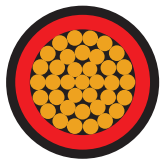
Under the IEE assessment of New Techniques Scheme the ANTS Committee has accepted 600/1000 V XLPE cables as suitable for use in and around buildings subject to a maximum conductor temperature 85 ^{O}C in the line with IEC recommendations. The current ratings in the catalogue are based on a maximum conductor temperature of 90 ^{O}C and the derating factors applicable to 85 ^{O}C are to be found in the appropriate adjustment tables.

* If cables are buried in the ground and loaded continuously, consideration should be given to the possibility of local increase in soil thermal resistivity due to moisture migration, making it desirable to reduce the maximum conductor operating temperature to 80 ^{O}C. A conductor operating temperature of 90^{O}C is only recommended if the thermal resistivity of the soil in the dry conduction is known and is used in the calculation of the current rating.

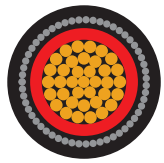




SINGLE-CORE 600 / 1000 V
XLPE Insulated Cables
Stranded Copper Conductor



Unarmoured



Armoured

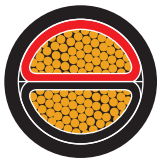
Nominal Area of Conductor Thickness of Insulation			sq.mm mm	50 1.0	70 1.1	95 1.1	120 1.2	150 1.4	185 1.6	240 1.7	300 1.8	400 2.0	500 2.2	630 2.4
Unarmoured Cable	Thickness of Overheath		mm	1.4	1.4	1.5	1.5	1.6	1.6	1.7	1.8	1.9	2.0	2.0
	Approximate Overall Diameter		mm	15	17	19	21	23	25	28	31	35	38	45
	Approximate cable weight		kg/km	600	800	1050	1300	1600	2000	2600	3200	4050	5050	6500
	Minimum bending radius		mm	125	150	175	175	200	200	250	250	300	350	400
Armoured Cable	Thickness of bedding	Extruded	mm	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.0	1.2	1.2	1.2
		Lapped	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	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
	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
	Approx. overall diameter	Extruded bedding	mm	18	21	23	24	28	30	33	36	40	44	51
		Lapped bedding	mm	18	21	23	24	27	30	32	35	40	43	50
	Approximate cable weight		kg/km	700	1000	1250	1550	1900	2350	2950	3600	4600	5700	7250
	Minimum bending radius		mm	150	175	200	200	250	250	300	300	350	400	450
	Maximum armour resistance at 20°C		ohm/km	1.3	0.77	0.69	0.64	0.44	0.40	0.37	0.33	0.23	0.21	0.18
Unarmoured or Armoured Cable	Maximum resistance of conductor	D.C at 20°C	ohm/km	0.387	0.268	0.193	0.153	0.124	.0991	.0754	.0601	.0470	.0366	.0283
		*A.C at 90°C	ohm/km	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.079	0.063	0.050	.0405
Unarmoured Cable	* Inductance		mH/km	0.291	0.280	0.272	0.264	0.264	0.261	0.256	0.253	0.251	0.248	0.246
	* Reactance at 50 Hz		ohm/km	0.092	0.088	0.086	0.083	0.083	0.082	0.081	0.080	0.079	0.078	0.078
	Impedance at 90°C		ohm/km	0.493	0.347	0.257	0.210	0.178	0.150	0.172	0.112	0.101	0.094	0.089
Armoured Cable	* Inductance		mH/km	0.331	0.323	0.310	0.298	0.300	0.296	0.286	0.280	0.280	0.274	0.268
	* Reactance at 50 Hz		ohm/km	0.104	0.102	0.098	0.094	0.095	0.093	0.090	0.088	0.088	0.087	0.085
	Impedance at 90°C		ohm/km	0.495	0.350	0.261	0.214	0.184	0.157	0.132	0.118	0.108	0.101	0.095
Unarmoured Cable	ø Sustained current rating (based on the standard conditions on Page 12)	laid direct	amp	230	285	330	380	430	480	560	640	710	810	910
		in single way ducts	amp	230	285	335	385	430	485	560	640	710	810	920
		in air	amp	220	280	345	405	470	550	650	750	880	1020	1160
[1] Armoured Cable		laid direct	amp	235	290	345	390	435	490	560	630	700	770	840
		in single-way ducts	amp	235	280	330	370	405	440	500	550	580	620	670
		in air	amp	235	300	365	425	485	560	660	750	860	960	1080
[2] Unarmoured or Armoured Cable	Maximum symmetrical short-circuit current rating	for 0.2 sec	kA	15.2	21.9	30.4	38.5	47.3	59.3	>60	>60	>60	>60	>60
		for 1.0 sec	kA	6.8	9.8	13.6	17.2	21.1	26.5	34.9	43.7	55.9	>60	>60
		for 3.0 sec	kA	3.9	5.6	7.8	9.9	12.2	15.3	20.1	25.2	32.2	40.7	52.6
[2] Armoured Cable	Maximum earth fault short-circuit current rating	for 0.2 sec	kA	4.0	6.4	7.1	7.9	11.4	12.6	14.1	15.3	21.6	24.0	26.8
		for 1.0 sec	kA	1.7	2.8	3.2	3.5	5.1	5.6	6.3	6.8	9.6	10.7	12.0
		for 3.0 sec	kA	1.0	1.6	1.8	2.0	2.9	3.2	3.6	3.9	5.5	6.2	6.9

* Cables in touching trefoil arrangement.
ø Cables in touching trefoil or trefoil ducts.

Note 1: Ratings for armoured cables assume armour is bonded at both ends of route.
Note 2: Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

PIONEER CABLES LTD
Leaders in Cable Technology

TWIN-CORE 600 / 1000 V
XLPE Insulated Cables
Stranded Copper Conductor


Unarmoured


Armoured

Nominal Area of Conductor			sq.mm	*16	25	35	50	70	95	120	150	185	240	300
Thickness of Insulation			mm	0.7	0.9	0.9	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8
Unarmoured Cable	Thickness of Overheath		mm	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.2	2.3	2.5	2.6
	Approximate Overall Diameter		mm	19	22	24	22	25	28	31	34	38	43	47
	Approximate cable weight		kg/km	450	700	900	1150	1600	2150	2650	3250	4050	5250	6500
	Minimum bending radius		mm	175	200	200	200	200	250	250	300	350	350	400
Armoured Cable	Thickness of bedding	Extruded	mm	0.8	0.8	1.0	1.0	1.0	1.2	1.2	1.2	1.4	1.4	1.6
		Lapped	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	Armour wire diameter		mm	1.25	1.25	1.6	1.6	1.6	2.0	2.0	2.0	2.5	2.5	2.5
	Thickness of oversheath		mm	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.4	2.5	2.6
	Approx. overall diameter	Extruded bedding	mm	21	25	28	26	29	33	36	39	45	49	53
		Lapped bedding	mm	21	25	28	25	29	33	35	38	43	48	52
	Approximate cable weight		kg/km	750	1050	1400	1750	2300	3150	3750	4450	5750	7150	8550
	Minimum bending radius		mm	175	200	250	250	250	300	300	350	400	400	450
	Maximum armour resistance at 20 °C		ohm/km	3.7	3.1	2.1	2.4	2.1	1.4	1.3	1.2	0.84	0.76	0.69
Unarmoured or Armoured Cable	Maximum resistance of conductor	D.C at 20 °C	ohm/km	1.15	0.727	0.524	0.387	0.268	0.193	0.153	0.124	.0991	.0754	.0601
		*A.C at 90 °C	ohm/km	1.47	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.079
	Inductance		mH/km	0.260	0.251	0.246	0.244	0.241	0.232	0.231	0.233	0.233	0.231	0.288
	Reactance at 50 Hz		ohm/km	0.082	0.079	0.078	0.077	0.076	0.073	0.073	0.074	0.074	0.073	0.072
	Impedance at 90 °C		ohm/km	1.46	0.931	0.674	0.500	0.351	0.264	0.210	0.176	0.148	0.123	0.108
Unarmoured Cable	Sustained current rating (based on the standard conditions on page 12).	laid direct	amp	120	160	195	230	290	335	395	445	510	590	670
		in single way ducts	amp	105	135	160	195	240	290	335	380	425	490	570
		in air	amp	105	140	175	210	265	335	385	435	500	600	690
Armoured Cable		laid direct	amp	140	180	215	255	315	380	430	480	540	630	700
		in single way ducts	amp	115	145	175	210	260	310	355	400	455	520	590
		in air	amp	120	160	200	240	300	375	430	490	570	670	770
[1] Unarmoured or Armoured Cable	Maximum symmetrical short-circuit current rating	for 0.2 sec	kA	5.1	8.1	11.2	15.2	21.9	30.4	38.5	47.3	59.3	>60	>60
		for 1.0 sec	kA	2.2	3.6	5.0	6.8	9.8	13.6	17.2	21.1	26.5	34.9	43.7
		for 3.0 sec	kA	1.3	2.0	2.9	3.9	5.6	7.8	9.9	12.2	15.3	20.1	25.2
[1] Armoured Cable	Maximum earth fault short-circuit current rating	for 0.2 sec	kA	3.6	4.3	6.2	5.4	6.2	9.2	10.0	11.0	15.6	17.3	18.9
		for 1.0 sec	kA	1.6	1.9	2.7	2.4	2.7	4.1	4.4	4.9	7.0	7.7	8.4
		for 3.0 sec	kA	0.9	1.1	1.6	1.3	1.6	2.3	2.5	2.8	4.0	4.4	4.9

* Circular conductors

Note 1: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

THREE-CORE 600 / 1000 V
XLPE Insulated Cables
Stranded Copper Conductor

Unarmoured

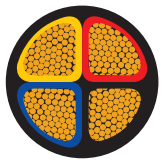
Armoured

Nominal Area of Conductor			sq.mm	*16	25	35	50	70	95	120	150	185	240	300
Thickness of Insulation			mm	0.7	0.9	0.9	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8
Unarmoured Cable	Thickness of Overheath		mm	1.8	1.8	1.8	1.8	1.9	2.0	2.1	2.2	2.4	2.6	2.7
	Approximate Overall diameter		mm	18	20	22	25	29	33	37	40	45	51	55
	Approximate cable weight		kg/km	650	1000	1250	1650	2300	3100	3900	4750	5950	7750	9600
	Minimum bending radius		mm	175	200	250	200	250	300	300	350	400	450	450
Armoured Cable	Thickness of bedding	Extruded	mm	0.8	1.0	1.0	1.0	1.0	1.2	1.2	1.4	1.4	1.4	1.6
		Lapped	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	Armour wire diameter		mm	1.25	1.6	1.6	1.6	1.6	2.0	2.0	2.5	2.5	2.5	2.5
	Thickness of oversheath		mm	1.6	1.7	1.8	1.8	1.9	2.1	2.2	2.3	2.4	2.6	2.7
	Approx. overall diameter	Extruded bedding	mm	22	24	26	29	33	38	42	47	54	57	62
		Lapped bedding	mm	22	24	26	29	33	33	41	46	50	56	60
	Approximate cable weight		kg/km	1000	1550	1900	2350	3150	4300	5200	6600	7950	10000	12050
	Minimum bending radius		mm	200	250	250	250	300	350	350	400	450	500	500
	Maximum armour resistance at 20°C		ohm/km	3.5	2.2	2.0	2.0	1.8	1.3	1.1	0.78	0.71	0.63	0.58
Unarmoured or Armoured Cable	Maximum resistance of conductor	D.C at 20°C	ohm/km	1.15	0.727	0.524	0.387	0.268	0.193	0.153	0.124	.0991	.0754	.0601
		*A.C at 90°C	ohm/km	1.47	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.079
	Inductance		mH/km	0.260	0.251	0.246	0.244	0.241	0.232	0.231	0.233	0.233	0.231	0.288
	Reactance at 50 Hz		ohm/km	0.082	0.079	0.078	0.077	0.076	0.073	0.073	0.074	0.074	0.073	0.072
	Impedance at 90°C		ohm/km	1.46	0.931	0.674	0.500	0.351	0.264	0.210	0.176	0.148	0.123	0.108
Unarmoured Cable	Sustained current rating (based on the standard conditions on page 12).	laid direct	amp	110	145	175	210	260	305	355	400	450	430	590
		in single way ducts	amp	90	120	145	170	210	255	295	325	375	435	500
		in air	amp	100	130	160	195	250	305	355	415	470	560	650
Armoured Cable		laid direct	amp	115	150	180	215	265	315	360	405	460	530	590
		in single way ducts	amp	94	125	150	175	215	260	300	335	380	440	495
		in air	amp	105	140	170	205	260	320	370	430	490	580	660
[1] Unarmoured or Armoured Cable	Maximum symmetrical short-circuit current rating	for 0.2 sec	kA	5.1	8.1	11.2	15.2	21.9	30.4	38.5	47.3	59.3	>60	>60
		for 1.0 sec	kA	2.2	3.6	5.0	6.8	9.8	13.6	17.2	21.1	26.5	34.9	43.7
		for 3.0 sec	kA	1.3	2.0	2.9	3.9	5.6	7.8	9.9	12.2	15.3	20.1	25.2
[1] Armoured Cable	Maximum earth fault short-circuit current rating	for 0.2 sec	kA	3.8	6.0	6.7	6.5	7.6	10.8	11.8	16.9	18.5	21.0	23.1
		for 1.0 sec	kA	1.7	2.7	3.0	2.9	3.4	4.8	5.3	7.5	8.3	9.4	10.3
		for 3.0 sec	kA	0.9	1.5	1.7	1.7	1.9	2.7	3.0	4.3	4.7	5.4	5.9

* Circular conductors

Note 1: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

FOUR-CORE 600 / 1000 V
XLPE Insulated Cables
Stranded Copper Conductor


Unarmoured


Armoured

Nominal Area of Conductor			sq.mm	*16	25	35	50	70	95	120	150	185	240	300
Thickness of Insulation			mm	0.7	0.9	0.9	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8
Unarmoured Cable	Thickness of Overheath		mm	1.8	1.8	1.8	1.8	2.0	2.1	2.2	2.4	2.6	2.9	3.0
	Approximate Overall diameter		mm	18	24	26	29	33	38	42	47	52	59	64
	Approximate cable weight		kg/km	850	1250	1650	2150	3050	4100	5150	6300	7900	10300	12800
	Minimum bending radius		mm	175	250	250	250	300	350	350	400	450	500	550
Armoured Cable	Thickness of bedding	Extruded	mm	0.8	1.0	1.0	1.0	1.2	1.2	1.4	1.4	1.4	1.6	1.6
		Lapped	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	Armour wire diameter		mm	1.25	1.6	1.6	1.6	2.0	2.0	2.5	2.5	2.5	2.5	2.5
	Thickness of oversheath		mm	1.6	1.7	1.8	1.9	21	2.2	2.3	2.4	2.6	2.7	2.9
	Approx. overall diameter	Extruded bedding	mm	24	30	32	33	39	43	49	53	58	65	71
		Lapped bedding	mm	24	29	32	33	38	42	47	52	57	63	69
	Approximate cable weight		kg/km	1250	1900	2350	3000	4250	5450	7050	8400	10200	12850	15600
	Minimum bending radius		mm	200	250	300	300	350	350	400	450	500	550	600
	Maximum armour resistance at 20 °C		ohm/km	3.1	2.0	1.8	1.8	1.2	1.1	0.76	0.68	0.61	0.54	0.49
Unarmoured or Armoured Cable	Maximum resistance of conductor	D.C at 20 °C	ohm/km	1.15	0.727	0.524	0.387	0.268	0.193	0.153	0.124	.0991	.0754	.0601
		*A.C at 90 °C	ohm/km	1.47	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.079
	Inductance		mH/km	0.260	0.251	0.246	0.244	0.241	0.232	0.231	0.233	0.233	0.231	0.288
	Reactance at 50 Hz		ohm/km	0.082	0.079	0.078	0.077	0.076	0.073	0.073	0.074	0.074	0.073	0.072
	Impedance at 90 °C		ohm/km	1.46	0.931	0.674	0.500	0.351	0.264	0.210	0.176	0.148	0.123	0.108
Unarmoured Cable	Sustained current rating (based on the standard conditions on page 12).	laid direct	amp	110	145	175	210	260	305	355	400	450	430	590
		in single way ducts	amp	90	120	145	170	210	255	295	325	375	435	500
		in air	amp	100	130	160	195	250	305	355	415	470	560	650
[1] Armoured Cable		laid direct	amp	115	150	180	215	265	315	360	405	460	530	590
		in single way ducts	amp	94	125	150	175	215	260	300	335	380	440	495
		in air	amp	105	140	170	205	260	320	370	430	490	580	660
[1] Unarmoured or Armoured Cable	Maximum symmetrical short-circuit current rating	for 0.2 sec	kA	5.1	8.1	11.2	15.2	21.9	30.4	38.5	47.3	59.3	>60	>60
		for 1.0 sec	kA	2.2	3.6	5.0	6.8	9.8	13.6	17.2	21.1	26.5	34.9	43.7
		for 3.0 sec	kA	1.3	2.0	2.9	3.9	5.6	7.8	9.9	12.2	15.3	20.1	25.2
[1] Armoured Cable	Maximum earth fault short-circuit current rating	for 0.2 sec	kA	4.2	6.5	7.4	7.6	11.0	12.4	17.3	19.3	21.4	24.7	27.2
		for 1.0 sec	kA	1.8	2.9	3.3	3.4	4.9	5.5	7.7	8.6	9.5	11.0	12.1
		for 3.0 sec	kA	1.0	1.7	1.9	1.9	2.8	3.2	4.4	5.0	5.5	6.3	7.0

* Circular conductors

Note 1: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

FOUR-CORE 600 / 1000 V
XLPE Insulated Cables
Stranded Copper Conductor
(3 Phase + Reduced Neutral)


Unarmoured

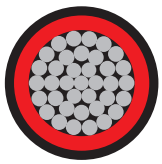

Armoured

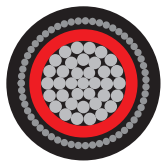
Nominal Area of Conductor			Phase sq.mm Neutral sq.mm	*25 16	35 16	50 25	70 35	95 50	120 70	150 70	185 95	240 120	300 150	400 185
Unarmoured Cable	Thickness of Insulation	Phase	mm	0.9	0.9	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8	1.8
		Neutral	mm	0.7	0.7	0.9	0.9	1.0	1.1	1.1	1.1	1.2	1.4	1.6
	Thickness of Overheath		mm	1.8	1.8	1.8	1.9	2.0	2.2	2.3	2.4	2.6	2.8	2.9
	Approximate Overall diameter		mm	25	27	28	32	36	41	44	49	56	61	63
	Approximate cable weight		kg/km	1200	1450	1950	2750	3650	4700	5550	6700	9100	11250	11700
	Minimum bending radius		mm	200	250	250	300	300	350	400	400	450	500	550
Armoured Cable	Thickness of bedding	Extruded	mm	1.0	1.0	1.0	1.2	1.2	1.2	1.4	1.4	1.6	1.6	1.6
		Lapped	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	Armour wire diameter		mm	1.6	1.6	1.6	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5
	Thickness of oversheath		mm	1.7	1.8	1.9	2.0	2.1	2.2	2.4	2.5	2.6	2.8	2.8
	Approx. overall diameter	Extruded bedding	mm	29	31	32	37	41	46	51	56	62	68	69
		Lapped bedding	mm	28	31	32	37	41	45	50	55	61	66	67
	Approximate cable weight		kg/km	1800	2150	2750	3850	4950	6150	7550	9200	11550	14000	14450
	Minimum bending radius		mm	250	250	300	300	350	400	400	450	500	550	550
	Maximum armour resistance at 20°C		ohm/km	2.1	1.9	1.8	1.3	1.1	0.98	0.71	0.64	0.57	0.52	0.50
Unarmoured or Armoured Cable	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	.0991	.0754	.0601	.0470
		*A.C at 90°C	ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.079	0.063
	Inductance		mH/km	0.251	0.246	0.244	0.241	0.232	0.231	0.233	0.233	0.231	0.228	0.228
	Reactance at 50 Hz		ohm/km	0.079	0.078	0.077	0.076	0.073	0.073	0.074	0.074	0.073	0.072	0.072
	Impedance at 90°C		ohm/km	0.931	0.674	0.500	0.351	0.264	0.210	0.176	0.148	0.123	0.108	0.108
Unarmoured Cable	Sustained current rating (based on the standard conditions on page 12).	laid direct	amp	145	175	210	260	305	355	400	450	430	590	590
		in single way ducts	amp	120	145	170	210	255	295	325	375	435	500	500
		in air	amp	130	160	195	250	305	355	415	470	560	650	650
[1] Armoured Cable		laid direct	amp	150	180	215	265	315	360	405	460	530	590	590
		in single way ducts	amp	125	150	175	215	260	300	335	380	440	495	495
		in air	amp	140	170	205	260	320	370	430	490	580	660	660
[1] Unarmoured or Armoured Cable	Maximum symmetrical short-circuit current rating	for 0.2 sec	kA	8.1	11.2	15.2	21.9	30.4	38.5	47.3	59.3	>60	>60	>60
		for 1.0 sec	kA	3.6	5.0	6.8	9.8	13.6	17.2	21.1	26.5	34.9	43.7	43.7
		for 3.0 sec	kA	2.0	2.9	3.9	5.6	7.8	9.9	12.2	15.3	20.1	25.2	25.2
[1] Armoured Cable	Maximum earth fault short-circuit current rating	for 0.2 sec	kA	6.4	7.1	7.2	10.5	11.8	13.4	18.5	20.6	23.1	25.5	26.0
		for 1.0 sec	kA	2.8	3.1	3.2	4.7	5.3	6.6	8.3	9.2	10.3	11.4	11.6
		for 3.0 sec	kA	1.6	1.8	1.8	2.7	3.0	3.4	4.7	5.3	5.9	6.6	6.7

* Circular conductors

Note 1: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

SINGLE-CORE 600 / 1000 V
XLPE Insulated Cables
Stranded Aluminium Conductors


Unarmoured

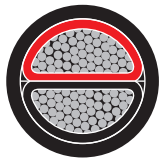

Armoured

Nominal Area of Conductor			sq.mm	50	70	95	120	150	185	240	300
Thickness of Insulation			mm	1.1	1.1	1.1	1.2	1.4	1.6	1.7	1.8
Unarmoured Cable	Thickness of Overheath		mm	1.4	1.4	1.5	1.5	1.6	1.6	1.7	1.8
	Approximate Overall diameter		mm	14	16	18	19	22	24	26	29
	Approximate cable weight		kg/km	250	350	450	500	650	650	950	1200
	Minimum bending radius		mm	215	150	150	175	200	200	250	250
Armoured Cable	Thickness of bedding	Extruded	mm	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.0
		Lapped	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	Armour wire diameter		mm	0.9	1.25	1.25	1.25	1.6	1.6	1.6	1.6
	Armour strip	thickness	mm	0.6	0.6	0.6	0.6	0.6	0.6	1.0	1.0
		width	mm	2.4	2.4	2.4	2.4	2.4	2.4	3.6	3.6
	Thickness of oversheath		mm	1.5	1.5	1.6	1.6	1.7	1.8	1.8	1.9
	Approx. overall diameter	Extruded bedding	mm	17	20	21	23	26	28	31	34
	(Wire)	Lapped bedding	mm	17	20	21	23	26	28	31	33
	Approximate cable weight		kg/km	350	500	600	700	900	1100	1300	1550
	Approximate overall diameter		mm	16	18	20	22	24	26	30	32
	(Strip)		mm	16	18	20	22	24	26	29	32
	Approximate cable weight		kg/km	350	450	550	650	750	950	1200	1450
	Minimum bending radius		mm	150	175	175	200	250	250	250	300
	Maximum resistance armour	aluminium wire	ohm/km	1.4	0.84	0.76	0.68	0.48	0.43	0.39	0.36
	at 20 °C	aluminium strip	ohm/km	1.8	1.6	1.4	1.3	1.1	0.99	0.52	0.46
Unarmoured or Armoured Cable	Maximum resistance of conductor	D.C at 20 °C	ohm/km	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100
		*A.C at 90 °C	ohm/km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130
Unarmoured Cable	*Inductance		mH/km	0.295	0.284	0.274	0.269	0.269	0.267	0.261	0.258
	*Reactance at 50 Hz		ohm/km	0.093	0.090	0.087	0.085	0.085	0.084	0.082	0.082
	Impedance at 90 °C		ohm/km	0.811	0.566	0.412	0.330	0.274	0.224	0.179	0.152
Armoured Cable	*Inductance		mH/km	0.399	0.331	0.317	0.308	0.310	0.305	0.295	0.289
	*Reactance at 50 Hz		ohm/km	0.107	0.104	0.100	0.097	0.098	0.096	0.093	0.091
	Impedance at 90 °C		ohm/km	0.813	0.568	0.415	0.334	0.278	0.229	0.184	0.157
Unarmoured Cable	ø Sustained current rating (based on the standard conditions on page 12).	laid direct	amp	175	215	260	295	330	370	430	490
		in single way ducts	amp	180	220	260	295	325	370	435	495
		in air	amp	165	215	265	310	360	420	495	580
[1] Armoured Cable		laid direct	amp	175	220	260	295	330	375	435	490
		in single way ducts	amp	180	220	260	295	330	365	410	455
		in air	amp	170	215	265	310	355	410	495	570
[1] Unarmoured or Armoured Cable	Maximum symmetrical short-circuit current rating	for 0.2 sec	kA	9.4	13.7	19.0	24.0	29.5	37.0	48.7	>60
		for 1.0 sec	kA	4.2	6.1	8.5	10.7	13.2	16.5	21.7	27.3
		for 3.0 sec	kA	2.4	3.5	4.9	6.2	7.6	9.5	12.5	15.7
[1] Armoured Cable	Maximum earth fault short-circuit current rating for 1.0 sec.	aluminium wire	kA	1.5	2.5	2.8	3.2	4.5	4.9	5.5	6.0
		aluminium wire	kA	1.3	1.4	1.6	1.8	2.0	2.2	4.2	4.7

* Cable in touching trefoil arrangement.
ø Cable in touching trefoil or trefoil ducts.

Note 1: Ratings for armoured cables assume armour is bonded at both ends of route.
Note 2: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

TWIN-CORE 600 / 1000 V
XLPE Insulated Cables
Stranded Aluminium Conductors



Unarmoured

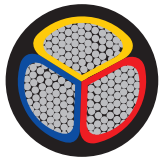
Armoured

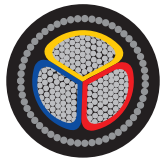
Nominal Area of Conductor Thickness of Insulation			sq.mm mm	*16 0.7	25 0.9	35 0.9	50 1.0	70 1.1	95 1.1
Unarmoured Cable	Thickness of Overheath		mm	1.8	1.8	1.8	1.8	1.8	1.9
	Approximate Overall diameter		mm	18	21	23	20	23	26
	Approximate cable weight		kg/km	250	350	400	500	700	850
	Minimum bending radius		mm	150	175	200	175	200	250
Armoured Cable	Thickness of bedding	Extruded	mm	0.8	0.8	1.0	1.0	1.0	1.2
		Lapped	mm	0.8	0.8	0.8	0.8	0.8	0.8
	Armour wire diameter		mm	1.25	1.25	1.6	1.6	1.6	2.0
	Armour strip	thickness	mm	0.6	0.6	0.6	0.6	1.0	1.0
		width	mm	2.4	2.4	2.4	2.4	3.6	3.6
	Thickness of oversheath		mm	1.5	1.6	1.7	1.8	1.9	2.0
	Approx. overall diameter	Extruded bedding	mm	20	23	27	24	27	31
	(Wire)	Lapped bedding	mm	20	23	26	24	27	30
	Approximate cable weight		kg/km	550	700	900	1100	1350	1800
	Approximate overall diameter	Extruded bedding	mm	19	22	25	22	26	29
	(Strip)	Lapped bedding	mm	19	22	24	22	26	28
	Approximate cable weight		kg/km	300	400	500	600	850	1100
	Minimum bending radius		mm	175	200	250	200	250	250
	Maximum resistance armour	aluminium wire	ohm/km	4.0	3.3	2.3	2.6	2.3	1.6
	at 20°C	aluminium strip	ohm/km	1.5	1.2	1.1	1.3	0.62	0.54
Unarmoured or Armoured Cable	Maximum resistance of conductor	D.C at 20°C	ohm/km	1.91	1.20	0.868	0.641	0.443	0.320
		*A.C at 90°C	ohm/km	2.42	1.54	1.11	0.822	0.568	0.411
	*Inductance		mH/km	0.253	0.255	0.247	0.244	0.241	0.234
	Reactance at 50 Hz		ohm/km	0.080	0.081	0.078	0.077	0.076	0.074
	Impedance at 90°C		ohm/km	2.42	1.54	1.11	0.826	0.574	0.418
Unarmoured Cable	Sustained current rating (based on the standard conditions on page 12).	laid direct	amp	92	120	150	180	225	265
		in single way ducts	amp	77	100	120	140	180	220
		in air	amp	79	105	130	155	200	245
Armoured Cable		laid direct	amp	105	135	165	195	240	285
		in single way ducts	amp	85	110	130	155	195	235
		in air	amp	89	120	145	175	220	270
Unarmoured or Armoured Cable	Maximum symmetrical short-circuit current rating	for 0.2 sec	kA	3.2	5.0	7.0	9.4	13.7	19.0
		for 1.0 sec	kA	1.4	2.2	3.1	4.2	6.1	8.5
		for 3.0 sec	kA	0.8	1.3	1.8	2.4	3.5	4.9
Armoured Cable	Maximum earth fault short-circuit current rating for 1.0 sec.	steel wire	kA	1.4	1.7	2.6	2.3	2.6	3.7
		aluminium strip	kA	1.5	1.8	2.1	1.8	3.5	4.0

* Circular conductors

Note 1: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

THREE-CORE 600 / 1000 V
XLPE Insulated Cables
Stranded Aluminium Conductors


Unarmoured

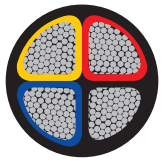

Armoured

Nominal Area of Conductor			sq.mm	*16	25	35	50	70	95	120	150	185	240	300
Thickness of Insulation			mm	0.7	0.9	0.9	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8
Unarmoured Cable	Thickness of overheath		mm	1.8	1.8	1.8	1.8	1.9	2.0	2.2	2.2	2.4	2.6	2.7
	Approximate overall diameter		mm	18	20	22	25	29	33	37	40	45	51	55
	Approximate cable weight		kg/km	350	450	550	700	950	1250	1500	1850	2300	2900	3550
	Minimum bending radius		mm	175	200	200	200	250	250	300	350	350	400	450
Armoured Cable	Thickness of bedding	Extruded	mm	0.8	1.0	1.0	1.0	1.0	1.2	1.2	1.4	1.4	1.4	1.6
		Lapped	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	Armour wire diameter		mm	1.25	1.6	1.6	1.6	1.6	2.0	2.0	2.5	2.5	2.5	2.5
	Armour strip	thickness	mm	0.6	0.6	0.6	1.6	1.0	1.0	1.4	1.4	1.4	1.4	1.8
		width	mm	2.4	2.4	2.4	2.4	3.6	3.6	4.8	4.8	4.8	4.8	6.4
	Thickness of oversheath		mm	1.6	1.7	1.8	1.8	1.9	2.1	2.2	2.3	2.4	2.6	2.7
	Approx. overall diameter (wire)	Extruded bedding	mm	22	24	26	29	33	37	42	47	54	57	62
		Lapped bedding	mm	22	24	26	28	32	36	40	44	49	54	59
	Approximate cable weight		kg/km	650	1000	150	1400	1700	2300	2700	3500	4100	4950	5800
	Approx. overall diameter (strip)	Extruded bedding	mm	20	24	26	26	30	34	38	42	46	51	56
		Lapped bedding	mm	20	23	26	25	30	33	37	41	45	50	55
	Approximate cable weight		kg/mm	400	550	650	800	1150	1500	1900	2250	2750	3400	4250
	Minimum bending radius		mm	175	250	250	250	250	300	350	400	400	450	500
	Maximum resistance of armour at 20 °C	steel wire	ohm/km	3.7	2.4	2.1	2.2	1.9	1.3	1.2	0.86	0.76	0.69	0.63
		aluminium strip	ohm/km	1.4	1.2	1.1	1.1	0.52	0.46	0.30	0.27	0.25	0.21	0.15
Unarmoured or Armoured Cable	Maximum resistance of conductor	D.C at 20 °C	ohm/km	1.91	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100
		*A.C at 90 °C	ohm/km	2.42	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130
	Inductance		mH/km	0.253	0.255	0.247	0.244	0.241	0.234	0.233	0.235	0.236	0.233	0.231
	Reactance at 50 Hz		ohm/km	0.080	0.081	0.078	0.077	0.076	0.074	0.074	0.074	0.075	0.074	0.073
	Impedance at 90 °C		ohm/km	2.42	1.54	1.11	0.826	0.574	0.418	0.334	0.276	0.225	0.179	0.150
Unarmoured Cable	Sustained current rating (based on the standard conditions on page 12).	laid direct in single way ducts	amp	86	110	135	165	195	240	270	305	345	405	455
		in air	amp	70	92	105	130	165	195	230	250	290	335	385
			amp	74	100	120	155	185	230	270	310	360	425	495
[1] Armoured Cable		laid direct in single way ducts	amp	89	115	135	165	200	240	275	310	350	410	460
		in air	amp	72	94	110	135	165	200	230	255	295	340	385
			amp	77	105	125	155	195	235	280	320	370	440	510
[1] Unarmoured or Armoured Cable	Maximum symmetrical short-circuit current rating	for 0.2 sec	kA	3.2	5.0	7.0	9.4	13.7	19.0	24.0	29.5	37.0	48.7	>60
		for 1.0 sec	kA	1.4	2.2	3.1	4.2	6.1	8.5	10.7	13.2	16.5	21.7	27.3
		for 3.0 sec	kA	0.8	1.3	1.8	2.4	3.5	4.9	6.2	7.6	9.5	12.5	15.7
[1] Armoured Cable	Maximum earth fault short-circuit current rating for 1.0 sec.	steel wire	kA	1.6	2.4	2.7	2.7	3.1	4.4	4.9	6.8	7.7	8.6	9.4
		aluminium strip	kA	1.6	2.0	2.2	2.2	4.2	4.7	7.4	8.2	9.1	10.4	15.1

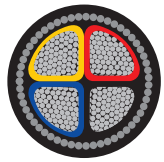
* Circular conductors

Note 1: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

FOUR-CORE 600 / 1000 V
XLPE Insulated Cables
Stranded Aluminium Conductors



Unarmoured



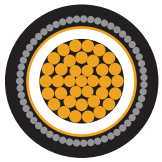
Armoured

Nominal Area of Conductor			sq.mm	*16	25	35	50	70	95	120	150	185	240	300
Thickness of Insulation			mm	0.7	0.9	0.9	1.0	1.1	1.1	1.2	1.4	1.6	1.7	1.8
Unarmoured Cable	Thickness of overheath		mm	1.8	1.8	1.8	1.8	2.0	2.1	2.2	2.4	2.6	2.8	3.0
	Approximate overall diameter		mm	18	24	26	29	33	38	42	47	52	59	64
	Approximate cable weight		kg/km	400	550	700	900	1200	1600	1950	2400	3000	3800	4700
	Minimum bending radius		mm	175	200	250	250	250	300	350	400	450	500	550
Armoured Cable	Thickness of bedding	Extruded	mm	0.8	1.0	1.0	1.0	1.2	1.2	1.4	1.4	1.4	1.6	1.6
		Lapped	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	Armour wire diameter		mm	1.25	1.6	1.6	1.6	2.0	2.0	2.5	2.5	2.5	2.5	2.5
	Armour strip	thickness	mm	0.6	0.6	0.6	1.0	1.0	1.4	1.4	1.4	1.4	1.4	1.8
		width	mm	2.4	2.4	2.4	3.6	3.6	4.8	4.8	4.8	4.8	6.4	6.4
	Thickness of oversheath		mm	1.6	1.7	1.8	1.9	1.9	2.2	2.3	2.4	2.6	2.7	2.9
	Approx. overall diameter (wire)	Extruded bedding	mm	23	28	31	31	37	40	45	49	54	60	66
		Lapped bedding	mm	23	27	30	31	36	39	44	48	53	59	65
	Approximate cable weight		kg/km	800	1150	1350	1650	2350	2850	3700	4300	5100	6150	7200
	Approx. overall diameter (strip)	Extruded bedding	mm	21	26	29	30	34	39	43	47	52	59	64
		Lapped bedding	mm	21	25	28	29	34	38	42	46	51	57	63
	Approximate cable weight		kg/mm	450	650	800	1100	1500	2000	2400	2850	3500	4500	5450
	Minimum bending radius		mm	200	250	250	250	300	350	400	400	450	500	550
	Maximum resistance of armour at 20°C	steel wire	ohm/km	3.4	2.1	1.9	1.9	1.3	1.2	0.82	0.74	0.66	0.59	0.54
		aluminium strip	ohm/km	1.3	1.0	0.90	0.51	0.44	0.28	0.25	0.23	0.20	0.14	0.13
Unarmoured or Armoured Cable	Maximum resistance of conductor	D.C at 20°C	ohm/km	1.91	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100
		*A.C at 90°C	ohm/km	2.42	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130
	Inductance		mH/km	0.253	0.255	0.247	0.244	0.241	0.234	0.233	0.235	0.236	0.233	0.231
	Reactance at 50 Hz		ohm/km	0.080	0.081	0.078	0.077	0.076	0.074	0.074	0.074	0.075	0.074	0.073
	Impedance at 90°C		ohm/km	2.42	1.54	1.11	0.826	0.574	0.418	0.334	0.276	0.225	0.179	0.150
Unarmoured Cable	Sustained current rating (based on the standard conditions on page 12).	laid direct	amp	86	110	135	165	195	240	270	305	345	405	455
		in single way ducts	amp	70	92	105	130	165	195	230	250	290	335	385
		in air	amp	74	100	120	155	185	230	270	310	360	425	495
1 Armoured Cable		laid direct	amp	89	115	135	165	200	240	275	310	350	410	460
		in single way ducts	amp	72	94	110	135	165	200	230	255	295	340	385
		in air	amp	77	105	125	155	195	235	280	320	370	440	510
1 Unarmoured or Armoured Cable	Maximum symmetrical short-circuit current rating	for 0.2 sec	kA	3.2	5.0	7.0	9.4	13.7	19.0	24.0	29.5	37.0	48.7	>60
		for 1.0 sec	kA	1.4	2.2	3.1	4.2	6.1	8.5	10.7	13.2	16.5	21.7	27.3
		for 3.0 sec	kA	0.8	1.3	1.8	2.4	3.5	4.9	6.2	7.6	9.5	12.5	15.7
1 Armoured Cable	Maximum earth fault short-circuit current rating for 1.0 sec	steel wire	kA	1.7	2.7	3.0	3.0	4.6	5.1	7.1	7.9	8.8	9.9	10.8
		aluminium strip	kA	1.8	2.2	2.5	4.2	4.9	7.8	8.7	9.6	10.9	15.9	17.4

* Circular conductors

Note 1: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

SINGLE-CORE 1900 / 3300 V
XLPE Insulated Cables
Stranded Copper Conductors

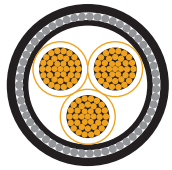


Nominal Area of Conductor		sq.mm	50	70	95	120	150	185	240	300	400	500	630
Thickness of Insulation		mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.4
Thickness of bedding	Extruded	mm	0.8	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.2	1.2	1.2
	Lapped	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Armour wire diameter		mm	1.25	1.25	1.25	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0
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
Approx. overall diameter	Extruded bedding	mm	21	23	25	28	29	31	34	36	40	44	51
	Lapped bedding	mm	21	23	25	27	29	31	33	36	40	43	50
Approximate cable weight		kg/km	850	1050	1350	1700	2000	2400	3000	3650	4600	5700	7250
Minimum bending radius		mm	175	200	200	250	250	250	300	300	350	400	450
Maximum armour resistance of at 20 °C		kg/km	0.76	0.68	0.62	0.43	0.41	0.37	0.35	0.31	0.23	0.20	0.18
Maximum resistance of conductor	D.C at 20 °C	ohm/km	0.387	0.268	0.193	0.153	0.124	.0991	.0754	.0601	.0470	.0366	.0283
	*A.C at 90 °C	ohm/km	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.079	0.063	.0505	.0405
* Inductance		mH/km	0.364	0.343	0.327	0.319	0.310	0.301	0.291	0.283	0.280	0.274	0.268
* Reactance at 50 Hz		ohm/km	0.115	0.108	0.103	0.101	0.098	0.095	0.092	0.089	0.088	0.087	0.085
Impedance at 90 °C		ohm/km	0.498	0.352	0.263	0.217	0.185	0.158	0.134	0.119	0.108	0.101	0.095
ø Sustained current rating (based on the standard conditions on page 12).	laid direct	amp	225	275	325	370	415	465	530	590	660	720	790
	in single way ducts	amp	220	270	315	345	380	420	470	510	540	580	630
	in air	amp	245	305	370	430	490	560	660	750	860	960	1080
2 Maximum symmetrical short-circuit current rating	for 0.2 sec	kA	15.2	21.9	30.4	38.5	47.3	59.3	>60	>60	>60	>60	>60
	for 1.0 sec	kA	6.8	9.8	13.6	17.2	21.1	26.5	34.9	43.7	55.9	>60	>60
	for 3.0 sec	kA	3.9	5.6	7.8	9.9	12.2	15.3	20.1	25.2	32.3	40.7	52.6
2 Maximum fault short-circuit current rating	for 0.2 sec	kA	6.4	7.1	8.1	11.1	12.0	12.9	14.4	15.6	21.6	24.0	26.8
	for 1.0 sec	kA	2.8	3.2	3.6	4.9	5.3	5.8	6.4	7.0	9.6	10.7	12.0
	for 3.0 sec	kA	1.6	1.8	2.0	2.8	3.1	3.3	3.7	4.0	5.5	6.2	6.9

* Cable in touching trefoil arrangement.
ø Cable in touching trefoil or trefoil ducts.

Note 1: Ratings assume armour is bonded at both ends of route.
Note 2: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

THREE-CORE 1900 / 3300 V
XLPE Insulated Cables
Stranded Copper Conductors

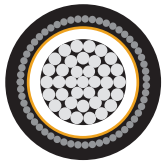


Nominal Area of Conductor		sq.mm	*16	25	35	50	70	95	120	150	185	240	300
Thickness of Insulation		mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Thickness of bedding	Extruded	mm	1.0	1.0	1.0	1.0	1.2	1.2	1.4	1.4	1.4	1.6	1.6
	Lapped	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Armour wire diameter		mm	1.6	1.6	1.6	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5
Thickness of oversheath		mm	1.8	1.8	1.9	2.0	2.1	2.2	2.3	2.4	.25	2.6	2.7
Approx. overall diameter	Extruded bedding	mm	31	33	35	36	39	42	47	49	53	58	62
	Lapped bedding	mm	31	32	35	36	38	41	45	48	52	56	61
Approximate cable weight		kg/km	1500	1850	2250	2950	3700	4700	5950	6900	8150	10150	12150
Minimum bending radius		mm	250	300	300	300	350	350	400	400	450	500	500
Maximum armour resistance of at 20°C		ohm/km	1.9	1.8	1.6	1.3	1.2	1.1	0.78	0.73	0.68	0.61	0.56
Maximum resistance of conductor	D.C at 20°C	ohm/km	1.15	0.727	0.524	0.387	0.268	0.193	0.153	0.124	.0991	.0754	.0601
	*A.C at 90°C	ohm/km	1.47	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.079
Inductance		mH/km	0.326	0.306	0.286	0.275	0.264	0.255	0.246	0.241	0.236	0.231	0.227
Reactance at 50 Hz		ohm/km	0.103	0.097	0.090	0.087	0.083	0.081	0.078	0.076	0.075	0.073	0.072
Impedance at 90°C		ohm/km	1.47	0.933	0.675	0.502	0.353	0.267	0.212	0.177	0.149	0.123	.1087
Sustained current rating (based on the standard conditions on page 12).	laid direct	amp	115	145	175	205	255	305	345	385	435	500	560
	in single way ducts	amp	95	120	145	175	215	255	295	330	370	425	480
	in air	amp	110	145	175	210	265	325	380	430	495	580	660
1 Maximum symmetrical short-circuit current rating	for 0.2 sec	kA	5.1	8.1	11.2	15.2	21.9	30.4	38.5	47.3	59.3	>60	>60
	for 1.0 sec	kA	2.2	3.6	5.0	6.8	9.8	13.6	17.2	21.1	26.5	34.9	43.7
	for 3.0 sec	kA	1.3	2.0	2.9	3.9	5.6	7.8	9.9	12.2	15.3	21.1	25.2
1 Maximum earth fault short-circuit current rating	for 0.2 sec	kA	7.0	7.6	8.2	10.0	11.0	12.4	16.9	18.1	19.3	21.8	23.5
	for 1.0 sec	kA	3.1	3.4	3.7	4.4	4.9	5.5	7.5	8.1	8.6	9.7	10.5
	for 3.0 sec	kA	1.8	1.9	2.1	2.5	2.8	3.2	4.3	4.6	5.0	5.6	6.0

* Circular conductors

Note 1: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

SINGLE-CORE 1900 / 3300 V
XLPE Insulated Cables
Stranded Aluminium Conductors

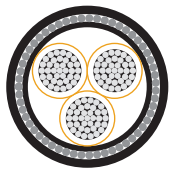


Nominal Area of Conductor		sq.mm	50	70	95	120	150	185	240	300
Thickness of Insulation		mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Thickness of	Extruded	mm	0.8	0.8	0.8	1.0	1.0	1.0	1.0	1.0
bedding	Lapped	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Armour wire diameter		mm	1.25	1.25	1.25	1.6	1.6	1.6	1.6	1.6
Armour strip	thickness	mm	0.6	0.6	0.6	0.6	0.6	1.0	1.0	1.0
	width	mm	2.4	2.4	2.4	2.4	2.4	3.6	3.6	3.6
Thickness of oversheath		mm	1.6	1.6	1.6	1.7	1.7	1.8	1.8	1.9
Approx. overall	Extruded bedding	mm	20	22	23	26	28	29	32	34
diameter	Lapped bedding	mm	20	22	23	26	27	29	31	34
Approximate cable weight		kg/km	500	600	700	850	950	1100	1350	1550
Approx. overall	Extruded bedding	mm	19	20	22	24	25	28	30	33
diameter strip	Lapped bedding	mm	19	20	22	24	25	28	30	32
Approximate cable weight		kg/km	450	500	600	700	800	1050	1250	1500
Minimum bending radius		mm	175	200	200	250	250	250	300	300
Maximum armour resistance	Aluminium wire	ohm/km	0.82	0.74	0.68	0.48	0.45	0.41	0.37	0.35
of at 20 °C	Aluminium strip	ohm/km	1.6	1.4	1.3	1.1	1.1	0.54	0.49	0.46
Maximum resistance of	D.C at 20 °C	ohm/km	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100
conductor	A.C at 90 °C	ohm/km	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130
* Inductance		mH/km	0.375	0.353	0.335	0.331	0.321	0.311	0.314	0.291
* Reactance at 50 Hz		ohm/km	0.118	0.111	0.106	0.104	0.101	0.098	0.099	0.092
Impedance at 90 °C		ohm/km	0.814	0.569	0.416	0.336	0.279	0.230	0.187	0.157
1 Sustained current rating	laid direct	amp	175	220	260	295	330	375	435	490
(based on the standard	in single way ducts	amp	180	220	260	295	330	365	410	455
conditions on page 12).	in air	amp	170	215	265	310	355	410	495	570
2 Maximum symmetrical	for 0.2 sec	kA	9.4	13.7	19.0	24.0	29.5	37.0	48.7	>60
short-circuit	for 1.0 sec	kA	4.2	6.1	8.5	10.7	13.2	16.5	21.7	27.3
current rating	for 3.0 sec	kA	2.4	3.5	4.9	6.2	7.6	9.5	12.5	15.7
2 Maximum earth fault	Aluminium wire	kA	2.6	2.9	3.2	4.5	4.8	5.2	5.7	6.2
short-circuit current rating	Aluminium strip	kA	1.4	1.6	1.8	2.0	2.1	4.0	4.3	4.7
for 1.0 sec.										

* Cable in touching trefoil arrangement.
ø Cable in touching trefoil or trefoil ducts.

Note 1: Ratings assume armour is bonded at both ends of route.
Note 2: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

THREE-CORE 1900 / 3300 V
XLPE Insulated Cables
Stranded Aluminium Conductors



Nominal Area of Conductor		sq.mm	*16	25	35	50	70	95	120	150	185	240	300
Thickness of Insulation		mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Thickness of	Extruded	mm	1.0	1.0	1.0	1.2	1.2	1.2	1.4	1.4	1.4	1.6	1.6
bedding	Lapped	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Armour wire diameter		mm	1.6	1.6	1.6	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5
Armour strip	thickness	mm	0.6	0.6	1.0	1.0	1.0	1.4	1.4	1.4	1.4	1.8	1.8
	width	mm	2.4	2.4	3.6	3.6	3.6	4.8	4.8	4.8	4.8	6.4	6.4
Thickness of oversheath		mm	1.8	1.8	1.9	2.0	2.0	2.2	2.3	2.4	2.5	2.6	2.7
Approx. overall	Extruded bedding	mm	29	31	34	34	37	40	44	47	50	55	59
diameter	Lapped bedding	mm	29	31	33	33	36	40	43	46	49	53	57
Approximate cable weight		kg/km	1150	1300	1500	1900	2250	2700	3400	3800	4350	5100	5900
Approx. overall	Extruded bedding	mm	27	29	33	32	35	39	42	45	48	53	57
diameter strip	Lapped bedding	mm	27	29	32	31	34	38	41	44	47	52	56
Approximate cable weight		kg/km	600	750	950	1100	1400	1800	2150	2450	2900	3650	4350
Minimum bending radius		mm	250	250	300	300	300	350	400	400	400	450	500
Maximum armour resistance	Steel wire	ohm/km	2.1	1.9	1.7	1.4	1.3	0.12	0.84	0.80	0.72	0.66	0.61
of at 20°C	Aluminium strip	ohm/km	1.0	0.90	0.45	0.50	0.45	0.28	0.27	0.24	0.24	0.15	0.15
Maximum resistance of	D.C at 20°C	ohm/km	1.91	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100
conductor	A.C at 90°C	ohm/km	2.42	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130
* Inductance		mH/km	0.325	0.305	0.291	0.280	0.267	0.257	0.251	0.245	0.240	0.234	0.230
* Reactance at 50 Hz		ohm/km	0.103	0.096	0.092	0.088	0.084	0.081	0.079	0.077	0.076	0.074	0.073
Impedance at 90°C		ohm/km	2.42	1.54	1.11	0.827	0.575	0.419	0.335	0.277	0.225	0.179	0.150
Sustained current rating	laid direct	amp	86	110	135	155	195	230	265	295	335	390	440
(based on the standard	in single way ducts	amp	73	93	110	130	165	195	225	250	285	330	375
conditions on page 12).	in air	amp	82	110	130	160	200	245	285	320	370	440	510
1 Maximum symmetrical	for 0.2 sec	kA	3.2	5.0	7.0	9.4	13.7	19.0	24.0	29.5	37.0	48.7	>60
short-circuit	for 1.0 sec	kA	1.4	2.2	3.1	4.2	6.1	8.5	10.7	13.2	16.5	21.7	27.3
current rating	for 3.0 sec	kA	0.8	1.3	1.8	2.4	3.5	4.9	6.2	7.6	9.5	12.5	15.7
1 Maximum earth fault	Steel wire	kA	2.8	3.1	3.4	4.2	4.7	5.1	7.0	7.5	8.1	8.8	9.5
short-circuit current rating	Aluminium strip	kA	2.3	2.6	4.8	4.5	4.9	7.8	8.2	9.1	9.6	14.4	15.1
for 1.0 sec.													

* Circular conductors

Note 1: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

Specification 6.35/11 kV - 8.7/15 kV & 19/33 kV
Siolinx Cables to IEC 60502-2

CONDUCTORS are plain annealed stranded copper or stranded aluminium complying with IEC 60228.

CONDUCTORS SCREENING is a layer of extruded semi-conducting compound having a nominal thickness of 0.7 mm.

INSULATION consists of Cross-linked polyethylene which is applied by extrusion to form a compact homogeneous layer, the average thickness of the insulation is than 3.4 mm for 11 kV, 4.5 for 15 kV and 8 mm for 33 kV Cables.

INSULATION SCREEN This will be a layer of cross-linkable semi-conducting compound extruded directly over the insulation at the same time when the conductor screen and XLPE insulation are extruded OR Insulation consist of a semi-conducting varnish & semi-conducting tape to IEC 502 .

METALLIC SCREEN It will consist of a layer of copper tape applied helically with overlap over insulation screen. Other combinations of metallic screens as per customer»s requirement can also be provided on request. The metallic screen provides the earth fault current path and it is of a cross section designed as per customer»s performance specification. In case of three core cables, phase identification tapes (red/ yellow/blue) are generally applied under the metallic screen.

LAYING-UP The screened cores of multi-core cables are laid up with suitable fillers to form a compact circular assembly. A suitable binder is applied over the laid up cores.

BEDDING consists of an extruded layer of black PVC compound complying with the requirements of Type 9 to BS. 7655.

ARMOUR Multi-core cables are armoured with galvanised steel wires or double Steel Tape. These give the cable strength. While single-core cables are not normally armoured, nonmagnetic armour of aluminium wire or strip is available if requested.

OVERSHEATH consists of an extruded layer of black PVC compound complying with the requirements of Type 9 to BS. 7655.

BENDING RADIUS during installation, Siolinx cables should not be bent to a radius smaller than that given in the appropriate table.

DIMENSIONS AND WEIGHTS given in the tables on pages 30-41 are approximate.

OTHER CONSTRUCTIONS It is possible to supply cables with construction other than mentioned above, indeed minor changes may be made at any time enabling us to maintain an economically priced cable as the relative material prices vary.

SUSTAINED CURRENT RATING (50 Hz A.C.)

Current ratings are given for the three customary methods of installation laid direct in ground, in ducts or in air.

Generally, the current rating will be reduced if there is a variation from 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) on pages 42-45.

STANDARD CONDITIONS

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

Thermal resistivity of soil (g)*	= 1.2°C m/W
Standard ground temperature	= 15°C
Ambient air temperature	= 25°C
Maximum conductor temperature*	= 90°C
Depth of burial, from ground surface to centre of cable, centre of duct or to centre of trefoil group of cables or ducts:	= 0.8 m

BONDING screens will normally be earthed at the terminations.

OVERLOAD CONDITIONS

Cross-linked polyethylene cables can, without undue detriment, safety 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 factory given in the appropriate adjustment table on pages 42-45.

SHORT-CIRCUIT CURRENT RATINGS

In addition to the normal sustained current ratings, consideration must also be given to short-circuit ratings when selecting cable sizes. Ratings for given durations are listed in the tables on pages 30-41.

* If cables are buried in the ground and loaded continuously, consideration should be given to the possibility of local increase in soil thermal resistivity due to moisture migration, making it desirable to reduce the maximum conductor operating temperature to 80°C. A conductor operating temperature of 90°C is only recommended if the thermal resistivity of the soil in the dry conductions is known and is used in the calculation of the current rating.

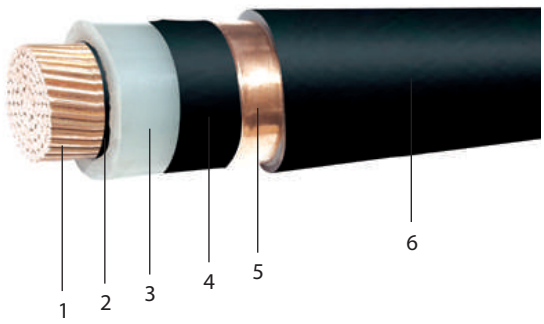
See pages 42-45 for variations in standard conditions.

CONSTRUCTIONAL DETAILS
6.35/11 kV - 8.7/15 kV - 19/33 kV
SIOLINX CABLES TO IEC 60502-2

SINGLE CORE CABLE

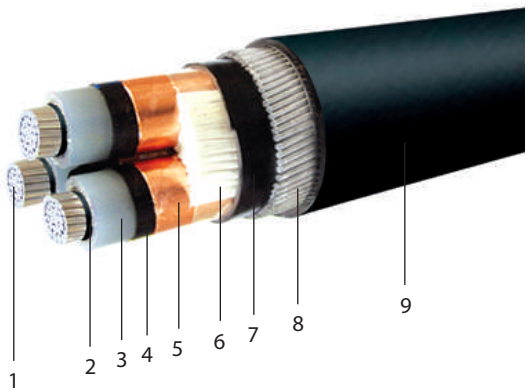
1. CONDUCTOR
   Compacted Circular Stranded Copper
   OR Aluminium Conductor
2. CONDUCTOR SCREEN
   Extruded Semi Conducting Layer
3. INSULATION
   XLPE
4. INSULATION SCREEN
   Extruded Semi Conducting Layer with
   Copper Tape OR Semi Conducting Tape
   with Copper Tape
5. METALLIC SCREEN
   Plain Copper Tape
6. OVERSHEATH
   PVC

Note: Can also make Aluminium Wire Armoured

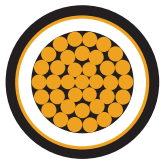


THREE CORE CABLE SINGLE WIRE ARMOURED CABLE

1. CONDUCTOR
   Compacted Circular Stranded Copper
   OR Aluminium Conductor
2. CONDUCTOR SCREEN
   Extruded Semi Conducting Layer
3. INSULATION
   XLPE
4. INSULATION SCREEN
   Extruded Semi Conducting Layer with
   Copper Tape OR Semi Conducting Tape
   with Copper Tape
5. METALLIC SCREEN
   Plain Copper Tape
6. PP FILLER
7. INNER SHEATH
   PVC
8. ARMOUR
   Steel Wires
9. OVERSHEATH
   PVC



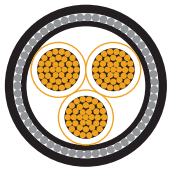
SINGLE-CORE 6350 / 11000 V
Cable with Stranded Copper Conductors



Nominal Area of Conductor		sq.mm	16	25	35	50	70	95	120	150	185	240	300	400	500	630
Thickness of Insulation		mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Thickness of copper screen tape		mm	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076
Thickness of Oversheath		mm	1.5	1.6	1.6	1.7	1.7	1.8	1.8	1.9	1.9	2.0	2.1	2.2	2.3	2.4
Approximate overall diameter		mm	19	21	22	23	25	27	29	30	32	34	37	40	43	47
Approximate cable weight		kg/mm	450	560	695	830	1080	1365	1640	1940	2330	2940	3600	4460	5495	6925
Minimum bending radius		mm	350	400	400	450	450	500	500	550	600	600	650	700	750	850
Maximum resistance of conductor	D.C at 20°C	ohm/km	1.15	0.727	0.524	0.387	0.268	0.193	0.153	0.124	.0991	.0754	.0601	.0470	.0366	.0283
	*A.C at 90°C	ohm/km	1.47	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.079	0.063	.0505	.0405
* Inductance		mH/km	0.505	0.472	0.441	0.422	0.398	0.382	0.365	0.358	0.344	0.331	0.321	0.313	0.304	0.288
* Reactance at 50 Hz		ohm/km	0.158	0.148	0.138	0.132	0.125	0.120	0.114	0.112	0.108	0.103	0.100	0.098	0.095	0.090
Impedance at 90°C		ohm/km	1.44	0.919	0.669	0.500	0.356	0.269	0.223	0.192	0.164	0.140	0.126	0.15	0.107	0.098
Maximum Capacitance		µf/km	0.200	0.230	0.250	0.280	0.310	0.350	0.380	0.410	0.450	0.500	0.540	0.600	0.660	0.780
Max. Charging current at normal voltage and frequency		amp/km	0.40	0.45	0.49	0.54	0.61	0.69	0.75	0.81	0.88	0.98	1.07	1.19	1.31	1.53
ø Sustained current rating (based on the standard conditions on page 28).	laid direct	amp	120	155	180	215	260	315	355	395	450	520	580	660	740	830
	in single way ducts	amp	120	150	180	215	260	310	350	390	440	510	570	640	710	790
	in air	amp	130	170	205	245	310	375	435	495	570	670	770	890	1020	1190
1 Maximum symmetrical short-circuit current rating	for 0.2 sec	kA	5.1	8.1	11.5	15.2	21.9	30.4	38.5	47.3	59.3	>60	>60	>60	>60	>60
	for 1.0 sec	kA	2.2	3.6	5.0	6.8	9.8	13.6	17.2	21.1	26.5	34.9	43.7	55.9	>60	>60
	for 3.0 sec	kA	1.3	2.0	2.9	3.9	5.6	7.8	9.9	12.2	15.3	21.1	25.2	32.3	40.7	52.6
1 Maximum earth-fault short-circuit current rating	for 0.2 sec	kA	3.9	3.9	3.9	3.9	3.9	6.2	6.2	6.2	8.5	8.5	8.5	12.3	12.3	12.3
	for 1.0 sec	kA	1.7	1.7	1.7	1.7	1.7	2.7	2.7	2.7	3.8	3.8	3.8	5.5	5.5	5.5
	for 3.0 sec	kA	1.0	1.0	1.0	1.0	1.0	1.6	1.6	1.6	2.2	2.2	2.2	3.1	3.1	3.1

* Cable in touching trefoil arrangement.
ø Cable in touching trefoil or trefoil ducts.

Note 1: Ratings assume armour is bonded at both ends of route.
Short-circuit current rating based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.



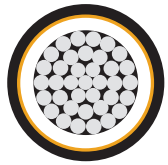
THREE-CORE 6350 / 11000 V
Cable with Stranded Copper Conductors

Nominal Area of Conductor		sq.mm	16	25	35	50	70	95	120	150	185	240	300
Thickness of Insulation		mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Thickness of copper screen tape		mm	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076
Thickness of extruded bedding		mm	1.2	1.3	1.3	1.4	1.4	1.5	1.6	1.6	1.7	1.8	1.9
Armour wire diameter		mm	2.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.15	3.15
Thickness of oversheath		mm	2.3	2.5	2.5	2.6	2.8	2.9	3.1	3.1	3.2	3.4	3.6
Approximate over all diameter		mm	44	47	51	53	57	62	65	69	72	79	86
Approximate cable weight		kg/km	3045	3565	4588	5150	6140	7315	8400	9520	10860	13900	16565
Minimum bending radius		mm	600	650	700	750	800	850	900	900	950	1050	1150
Maximum Armour resistance at 20 °C		ohm/km	0.87	0.65	0.61	0.58	0.54	0.51	0.45	0.45	0.43	0.31	0.29
Maximum resistance of conductors	D.C at 20 °C	ohm/km	1.15	0.727	0.524	0.387	0.268	0.193	0.153	0.124	.0991	.0754	.0601
	A.C at 90 °C	ohm/km	1.47	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.079
Inductance		mH/km	0.449	0.418	0.390	0.372	0.351	0.334	0.319	0.310	0.300	0.289	0.280
Reactance	at 50 Hz	ohm/km	0.141	0.131	0.122	0.116	0.110	0.104	0.100	0.097	0.094	0.090	0.087
Impedance	at 90 °C	ohm/km	1.46	0.934	0.679	0.506	0.359	0.267	0.220	0.186	0.158	0.133	0.117
Maximum capacitance		±f/km	0.20	0.230	0.250	0.280	0.310	0.350	0.380	0.410	0.450	0.500	0.540
Max. Charging current at normal voltage & frequency		amp/km	0.40	0.45	0.49	0.54	0.61	0.69	0.75	0.81	0.88	0.98	1.07
Armour loss at 50 Hz and at maximum laid direct current rating		kW/km	0.1	0.2	0.3	0.5	0.9	1.4	2.0	2.7	3.5	6.2	8.2
Sustained current rating (based on the standard conditions on page 28).	laid direct	amp	110	145	170	200	245	295	335	375	420	485	540
	in single way ducts	amp	94	120	145	170	210	250	280	315	365	620	465
	in air	amp	110	145	175	210	260	320	365	415	470	560	630
1 Maximum symmetrical short-circuit current rating	for 0.2 sec	kA	5.1	8.1	11.2	15.2	21.9	30.4	47.3	47.3	59.3	>60	>60
	for 1.0 sec	kA	2.2	3.6	5.0	6.8	9.8	13.6	17.2	21.1	26.5	34.9	43.7
	for 3.0 sec	kA	1.3	2.0	2.9	3.9	5.6	7.8	9.9	12.2	15.3	21.1	25.2
Maximum earth fault short-circuit current rating	for 0.2 sec	kA	5.1	8.1	11.2	15.2	21.9	27.9	29.7	31.4	33.2	45.7	48.5
	for 1.0 sec	kA	2.2	3.6	5.0	6.8	9.8	12.4	13.2	14.0	14.8	20.4	21.7
	for 3.0 sec	kA	1.3	2.0	2.9	3.9	5.6	7.2	7.6	8.1	8.5	11.8	12.5

Note 1: Short-circuit current ratings based upon:

Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 75°C to 160°C.

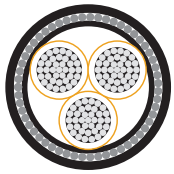
SINGLE-CORE 6350 / 11000 V
Cable with Stranded Aluminium Conductors



Nominal Area of Conductor		sq.mm	16	25	35	50	70	95	120	150	185	240	300	400	500	630
Thickness of Insulation		mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Thickness of copper screen tape		mm	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076
Thickness of Oversheath		mm	1.5	1.6	1.6	1.7	1.7	1.8	1.8	1.9	1.9	2.0	2.1	2.2	2.3	2.4
Approximate overall diameter		mm	19	21	22	23	25	27	29	30	32	34	37	40	43	47
Approximate cable weight		kg/mm	345	400	475	530	640	760	875	985	1140	1380	1610	1970	2350	2870
Minimum bending radius		mm	350	400	400	450	450	500	500	550	600	600	650	700	750	850
Maximum resistance	D.C at 20°C	ohm/km	1.91	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	.0778	.0605	.0469
of conductor	*A.C at 90°C	ohm/km	2.42	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102	0.080	0.064
* Inductance		mH/km	0.505	0.472	0.441	0.422	0.398	0.382	0.365	0.358	0.344	0.331	0.321	0.313	0.304	0.288
* Reactance at 50 Hz		ohm/km	0.158	0.148	0.138	0.132	0.125	0.120	0.114	0.112	0.108	0.103	0.100	0.098	0.095	0.090
Impedance at 90°C		ohm/km	2.39	1.51	1.09	0.815	0.571	0.418	0.337	0.282	0.233	0.187	0.160	0.139	0.124	0.110
Maximum Capacitance		µf/km	0.200	0.230	0.250	0.280	0.310	0.350	0.380	0.410	0.450	0.500	0.540	0.600	0.660	0.780
Max. Charging current at normal voltage and frequency		amp/km	0.40	0.45	0.49	0.54	0.61	0.69	0.75	0.81	0.88	0.98	1.07	1.79	1.31	1.53
Sustained current rating (based on the standard conditions on page 28).	laid direct	amp	92	155	140	165	200	240	275	305	345	400	450	520	590	670
	in single way ducts	amp	91	115	140	165	200	240	270	300	340	395	445	510	570	650
	in air	amp	98	130	115	185	235	285	330	375	430	510	585	710	810	960
1 Maximum symmetrical short-circuit current rating	for 0.2 sec	kA	3.2	5.2	7.2	9.7	14.1	19.5	24.7	30.3	38.1	50.1	>60	>60	>60	>60
	for 1.0 sec	kA	1.4	2.3	3.2	4.3	6.3	8.7	11.0	13.5	17.0	22.4	28.1	35.9	45.3	58.5
	for 3.0 sec	kA	0.8	1.3	1.8	2.5	3.6	5.0	6.3	7.8	9.8	12.9	16.2	20.7	26.1	33.7
1 Maximum earth-fault short-circuit current rating	for 0.2 sec	kA	3.2	3.9	3.9	3.9	3.9	6.2	6.2	6.2	8.5	8.5	8.5	12.3	12.3	12.3
	for 1.0 sec	kA	1.4	1.7	1.7	1.7	1.7	2.7	2.7	2.7	3.8	3.8	3.8	5.5	5.5	5.5
	for 3.0 sec	kA	0.8	1.0	1.0	1.0	1.0	1.6	1.6	1.6	2.2	2.2	2.2	3.1	3.1	3.1

* Cable in touching trefoil arrangement.
ø Cable in touching trefoil or trefoil ducts.

Note 1: Ratings assume armour is bonded at both ends of route.
Short-circuit current rating based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

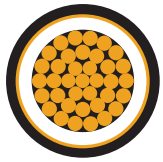


THREE-CORE 6350 / 11000 V
Cable with Stranded Aluminium Conductors

Nominal Area of Conductor		sq.mm	16	25	35	50	70	95	120	150	185	240	300
Thickness of Insulation		mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Thickness of copper screen tape		mm	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076
Thickness of extruded bedding		mm	1.2	1.3	1.3	1.4	1.4	1.5	1.6	1.6	1.7	1.8	1.9
Armour wire diameter		mm	2.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.15	3.15
Thickness of oversheath		mm	2.3	2.5	2.5	2.6	2.8	2.9	3.1	3.1	3.2	3.4	3.6
Approximate overall diameter		mm	44	47	51	53	57	62	65	69	72	79	86
Approximate cable weight		kg/km	2740	3090	3915	4250	4820	5490	6090	6630	7295	9215	10610
Minimum bending radius		mm	600	650	700	750	800	850	900	900	950	1050	1150
Maximum Armour resistance at 20 °C		ohm/km	0.87	0.65	0.61	0.58	0.54	0.51	0.48	0.45	0.43	0.31	0.29
Maximum resistance of conductors	D.C at 20 °C	ohm/km	1.91	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100
	A.C at 90 °C	ohm/km	2.42	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130
Inductance		mH/km	0.449	0.418	0.390	0.372	0.351	0.334	0.319	0.310	0.300	0.289	0.280
Reactance	at 50 Hz	ohm/km	0.141	0.131	0.122	0.116	0.110	0.104	0.100	0.097	0.094	0.090	0.087
Impedance	at 90 °C	ohm/km	2.42	1.53	1.11	0.830	0.578	0.422	0.340	0.261	0.230	0.184	0.156
Maximum capacitance		±f/km	0.200	0.230	0.250	0.280	0.310	0.350	0.380	0.410	0.450	0.500	0.540
Max. charging current at normal voltage & frequency		amp/km	0.40	0.45	0.49	0.54	0.61	0.69	0.75	0.81	0.88	0.98	1.07
Armour loss at 50 Hz and at maximum laid direct current rating		kW/km	0.1	0.1	0.2	0.3	0.5	0.8	1.2	1.6	2.1	3.6	5.1
Sustained current rating (based on the standard conditions on page 28).	laid direct	amp	86	110	130	155	190	225	260	290	325	370	425
	in single way ducts	amp	73	93	110	130	160	190	215	245	275	325	365
	in air	amp	86	110	135	160	200	240	280	315	360	425	485
1 Maximum symmetrical short circuit current rating	for 0.2 sec	kA	3.2	5.2	7.2	9.7	14.1	19.5	24.7	30.3	38.1	50.1	>60
	for 1.0 sec	kA	1.4	2.3	3.2	4.3	6.3	8.7	11.0	13.5	17.0	22.4	28.1
	for 3.0 sec	kA	0.8	1.3	1.8	2.5	3.6	5.0	6.3	7.8	9.8	12.9	16.2
Maximum earth fault short-circuit current rating	for 0.2 sec	kA	3.2	5.2	7.2	9.7	14.1	19.5	24.7	30.3	33.2	45.7	48.5
	for 1.0 sec	kA	1.4	2.3	3.2	4.3	6.3	8.7	11.0	13.5	14.8	20.4	21.7
	for 3.0 sec	kA	0.8	1.3	1.8	2.5	3.6	5.0	6.3	7.8	8.5	11.8	12.5

Note 1: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 75°C to 160°C.

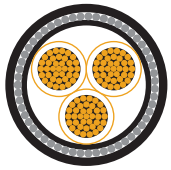
SINGLE-CORE 8700 / 15000 V
Cable with Stranded Copper Conductor



Nominal Area of Conductor	sq.mm	16	25	35	50	70	95	120	150	185	240	300	400	500	630
Thickness of Insulation	mm	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Thickness of copper screen tape	mm	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076
Thickness of oversheath	mm	1.5	1.6	1.7	1.7	1.8	1.8	1.8	1.9	1.9	2.0	2.1	2.2	2.3	2.4
Approximate overall diameter	mm	22	23	25	26	28	29	31	32	34	36	39	42	46	50
Approximate cable weight	kg/km	595	715	845	990	1240	1550	1825	2160	2530	3165	3870	4715	5785	7340
Minimum bending radius	mm	400	450	450	500	550	550	600	600	700	700	800	800	900	950
Maximum resistance of conductor D.C at 20°C	ohm/km	1.15	0.727	0.524	0.387	0.268	0.193	0.153	0.124	.0991	.0754	.0601	.0470	.0366	.0283
Maximum resistance of conductor *A.C at 90°C	ohm/km	1.47	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.079	0.063	.0505	.0405
* Inductance	mH/km	0.505	0.472	0.441	0.422	0.398	0.382	0.365	0.358	0.344	0.331	0.321	0.313	0.304	0.288
* Reactance	ohm/km	0.158	0.148	0.138	0.132	0.125	0.120	0.114	0.112	0.108	0.103	0.100	0.098	0.095	0.09
Impedance	ohm/km	1.44	0.919	0.669	0.500	0.356	0.269	0.223	0.192	0.164	0.140	0.126	0.125	0.107	0.098
Maximum Capacitance	µf/km	0.166	0.186	0.207	0.223	0.25	0.278	0.30	0.325	0.345	0.383	0.426	0.433	0.475	0.525
Max. Charging current at normal voltage & frequency	amp/km	0.453	0.508	0.57	0.6	0.68	0.760	0.82	0.88	0.94	1.046	1.164	1.184	1.3	1.435
ø Sustained current rating (based on the standard conditions on page 28). laid direct	amp	120	155	180	215	260	315	355	395	450	520	580	660	740	830
in single way ducts	amp	120	150	180	215	260	310	350	390	440	510	570	640	710	790
in air	amp	130	170	205	245	310	375	435	495	570	670	770	890	1020	1190
Maximum symmetrical short-circuit current rating for 0.2 sec	kA	5.1	8.1	11.2	15.2	21.9	30.4	38.5	47.3	59.3	>60	>60	>60	>60	>60
for 1.0 sec	kA	2.2	3.6	5	6.8	9.8	13.6	17.2	21.1	26.5	34.9	43.7	55.9	>60	>60
for 3.0 sec	kA	1.3	2.0	2.9	3.9	5.6	7.8	9.9	12.2	15.3	20.1	25.2	32.3	40.7	52.6
1 Maximum earth-fault short-circuit current rating for 0.2 sec	kA	3.9	3.9	3.9	3.9	3.9	6.2	6.2	6.2	8.5	8.5	8.5	12.3	12.3	12.3
for 1.0 sec	kA	1.7	1.7	1.7	1.7	1.7	2.7	2.7	2.7	3.8	3.8	3.8	5.5	5.5	5.5
for 3.0 sec	kA	1.0	1.0	1.0	1.0	1.0	1.6	1.6	1.6	2.2	2.2	2.2	3.1	3.1	3.1

* Cable in touching trefoil arrangement.
ø Cable in touching trefoil or trefoil ducts.

Note 1: Ratings assume armour is bonded at both ends of route.
Short-circuit current rating based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

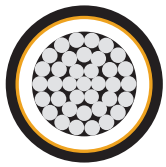


THREE-CORE 8700 / 15000 V
Cable with Stranded Copper Conductors

Nominal Area of Conductor		sq.mm	16	25	35	50	70	95	120	150	185	240	300
Thickness of Insulation		mm	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Thickness of copper screen tape		mm	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076
Thickness of extruded bedding		mm	1.4	1.4	1.5	1.5	1.5	1.6	1.7	1.7	1.8	1.9	2.0
Armour wire diameter		mm	2.0	2.5	2.5	2.5	2.5	2.5	2.5	3.15	3.15	3.15	3.15
Thickness of oversheath		mm	2.5	2.6	2.7	2.8	2.9	3.1	3.2	3.3	3.4	3.5	3.8
Approximate over all diameter		mm	50	53	56	59	63	67	71	74	79	84	90
Approximate cable weight		kg/km	4330	4900	5500	6180	7200	8420	9530	11545	12990	15390	18260
Minimum bending radius		mm	650	700	750	800	850	900	900	950	1050	1050	1150
Maximum Armour resistance		ohm/km	0.84	0.64	0.6	0.57	0.53	0.50	0.47	0.34	0.32	0.31	0.29
Maximum resistance of conductor	D.C at 20 °C	ohm/km	1.15	0.727	0.524	0.387	0.268	0.193	0.153	0.124	.0991	.0754	.0601
	A.C at 90 °C	ohm/km	1.47	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.079
Inductance		mH/km	0.451	0.422	0.393	0.377	0.355	0.377	0.321	0.312	0.305	0.291	0.283
Reactance		ohm/km	0.143	0.133	0.125	0.118	0.115	0.108	0.102	0.099	0.095	0.092	0.890
Impedance		ohm/km	1.48	0.939	0.681	0.507	0.361	0.272	0.226	0.188	0.160	0.135	0.119
Maximum capacitance													
Max. Charging current at normal		±f/km	0.166	0.186	0.207	0.223	0.25	0.278	0.30	0.325	0.345	0.383	0.426
voltage & frequency		amp/km	0.33	0.37	0.412	0.44	0.5	0.55	0.6	0.65	0.69	0.76	0.85
Armour loss at 50 Hz and at maximum laid direct		kW/km	0.12	0.22	0.33	0.54	0.95	1.9	2.5	3.5	4.00	7.5	9.5
sustained current rating	laid direct	amp	115	152	180	215	260	298	340	390	437	490	545
(based on the standard	in single way ducts	amp	98	132	155	185	220	262	304	345	390	430	490
conditions on page 28).	in air	amp	115	161	195	230	285	338	388	449	505	580	670
Maximum symmetrical short	for 0.2 sec	kA	5.1	8.1	11.2	15.2	21.9	30.4	38.5	47.3	59.3	>60	>60
circuit current rating	for 1.0 sec	kA	2.2	3.6	5.0	6.8	9.8	13.4	17.2	21.1	26.5	34.9	43.7
	for 3.0 sec	kA	1.3	2.0	2.9	3.9	5.6	7.8	9.9	12.2	15.53	20.1	25.2
Maximum earth fault	for 0.2 sec	kA	5.1	8.1	11.2	15.2	21.9	27.9	29.7	31.4	33.2	45.7	48.5
short-circuit current rating	for 1.0 sec	kA	2.2	3.6	5.0	6.8	9.8	12.4	13.2	14.0	14.8	20.4	21.7
	for 3.0 sec	kA	1.3	2.0	2.9	3.9	5.6	7.2	7.6	8.1	8.5	11.8	12.5

Note 1: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 75°C to 160°C.

SINGLE-CORE 8700 / 15000 V
Cable with Stranded Aluminium Conductors



Nominal Area of Conductor	sq.mm	16	25	35	50	70	95	120	150	185	240	300	400	500	630
Thickness of Insulation	mm	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Thickness of copper screen tape	mm	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076
Thickness of oversheath	mm	1.5	1.6	1.7	1.7	1.7	1.8	1.8	1.9	1.9	2.0	2.1	2.2	2.3	2.4
Approximate overall diameter	mm	22	23	25	26	28	29	31	32	34	36	39	42	46	50
Approximate cable weight	kg/km	490	560	625	690	800	940	1055	1210	1340	1605	1880	2225	2625	3150
Minimum bending radius	mm	400	450	450	500	550	550	600	600	700	700	800	800	900	950
Maximum resistance of conductors D.C at 20°C	ohm/km	1.91	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	0.778	.0605	.0469
Maximum resistance of conductors A.C at 90°C	ohm/km	2.42	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102	0.080	0.064
* Inductance	mH/km	0.505	0.472	0.441	0.422	0.398	0.382	0.365	0.358	0.344	0.331	0.321	0.313	0.304	0.288
* Reactance	ohm/km	1.58	0.148	0.138	0.132	0.125	0.120	0.114	0.112	0.108	0.103	0.100	0.098	0.095	0.090
Impedance	ohm/km	2.37	1.51	1.09	0.815	0.571	0.418	0.337	0.282	0.233	0.187	0.160	0.139	0.124	0.110
Maximum Capacitance	µf/km	0.166	0.186	0.207	0.223	0.25	0.278	0.30	0.325	0.345	0.383	0.426	0.433	0.475	0.525
Max. Charging current at normal voltage & frequency	amp/km	0.453	0.508	0.57	0.6	0.68	0.760	0.82	0.88	0.94	1.046	1.164	1.184	1.3	1.435
ø Sustained current rating (based on the standard conditions on page 28). laid direct	amp	92	115	140	165	200	240	275	305	345	400	450	520	590	670
ø Sustained current rating (based on the standard conditions on page 28). in single way ducts	amp	91	115	140	165	200	240	270	300	340	395	445	510	570	650
ø Sustained current rating (based on the standard conditions on page 28). in air	amp	98	130	155	185	235	285	330	375	430	510	585	710	810	960
Maximum symmetrical short circuit current rating for 0.2 sec	kA	3.2	5.2	7.2	9.7	14.1	19.5	24.7	30.3	38.1	50.1	>60	>60	>60	>60
Maximum symmetrical short circuit current rating for 1.0 sec	kA	1.4	2.3	3.2	4.3	6.3	8.7	11.0	13.5	17.0	22.4	28.1	35.9	45.3	58.5
Maximum symmetrical short circuit current rating for 3.0 sec	kA	0.8	1.3	1.8	2.5	3.6	5.0	6.3	7.8	9.8	12.9	16.2	20.7	26.1	33.7
1 Maximum earth-fault short-circuit current rating for 0.2 sec	kA	3.2	3.9	3.9	3.9	3.9	6.2	6.2	6.2	8.5	8.5	8.5	12.3	12.3	12.3
1 Maximum earth-fault short-circuit current rating for 1.0 sec	kA	1.4	1.7	1.7	1.7	1.7	2.7	2.7	2.7	3.8	3.8	3.8	5.5	5.5	5.5
1 Maximum earth-fault short-circuit current rating for 3.0 sec	kA	0.8	1.0	1.0	1.0	1.0	1.6	1.6	1.6	2.2	2.2	2.2	3.1	3.1	3.1

* Cable in touching trefoil arrangement.
ø Cable in touching trefoil or trefoil ducts.

Note 1: Ratings assume armour is bonded at both ends of route.
Short-circuit current rating based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

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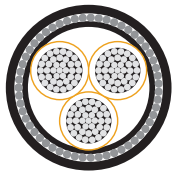
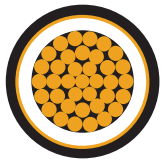


THREE-CORE 8700 / 15000 V
Cable with Stranded Aluminium Conductors

Nominal Area of Conductor		sq.mm	16	25	35	50	70	95	120	150	185	240	300
Thickness of Insulation		mm	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Thickness of copper screen tape		mm	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076
Thickness of extruded bedding		mm	1.4	1.4	1.5	1.5	1.5	1.6	1.7	1.7	1.8	1.9	2.0
Armour wire diameter		mm	2.0	2.5	2.5	2.5	2.5	2.5	2.5	3.15	3.15	3.15	3.15
Thickness of oversheath		mm	2.3	2.6	2.7	2.8	2.9	3.1	3.2	3.3	3.4	3.5	3.8
Approximate overall diameter		mm	50	53	56	59	63	67	71	74	79	84	90
Approximate cable weight		kg/km	4030	4430	4830	5280	5895	6605	7230	8670	9436	10725	12325
Minimum bending radius		mm	650	700	750	800	850	900	900	950	1050	1050	1150
Maximum Armour resistance	at 20 °C	ohm/km	0.86	0.64	0.6	0.57	0.53	0.50	0.47	0.34	0.32	0.31	0.29
Maximum resistance	D.C at 20 °C	ohm/km	1.91	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100
of conductors	A.C at 90 °C	ohm/km	2.42	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130
Inductance		mH/km	0.451	0.422	0.393	0.377	0.355	0.377	0.321	0.312	0.305	0.291	0.283
Reactance		ohm/km	0.143	0.133	0.125	0.188	0.115	0.108	0.102	0.099	0.095	0.092	0.089
Impedance		ohm/km	2.43	1.55	1.13	0.835	0.578	0.425	0.345	0.282	0.232	0.186	0.159
Maximum capacitance		±f/km	0.166	0.186	0.207	0.223	0.25	0.278	0.30	0.325	0.345	0.383	0.426
Max. charging current at normal voltage & frequency		amp/km	0.453	0.508	0.57	0.6	0.68	0.760	0.82	0.88	0.94	1.046	1.164
Armour loss at 50 Hz and at maximum laid direct current rating		kW/km	0.12	0.22	0.33	0.35	0.52	0.85	1.25	1.65	2.2	3.8	5.1
Sustained current rating	laid direct	amp	86	110	130	155	190	225	260	290	325	370	425
(based on the standard conditions	in single way ducts	amp	73	93	110	130	160	190	215	245	275	325	365
on page 28).	in air	amp	80	110	135	160	200	240	280	315	360	425	485
1 Maximum symmetrical short	for 0.2 sec	kA	3.2	5.2	7.2	9.7	14.1	19.5	24.7	30.3	38.1	50.1	>60
circuit current rating	for 1.0 sec	kA	1.4	2.3	3.2	4.3	6.3	8.7	11.0	13.5	17.0	22.4	28.1
	for 3.0 sec	kA	0.8	1.3	1.8	2.5	3.6	5.0	6.3	7.8	9.8	12.9	16.2
Maximum earth fault	for 0.2 sec	kA	3.2	5.2	7.2	9.7	14.1	19.5	24.7	30.3	33.2	45.7	48.5
short-circuit current rating	for 1.0 sec	kA	1.4	2.3	3.2	4.3	6.3	8.7	11.0	13.5	14.8	20.4	21.7
	for 3.0 sec	kA	0.8	1.3	1.8	2.5	3.6	5.0	6.3	7.8	8.5	11.8	12.5

Note 1: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 75°C to 160°C.

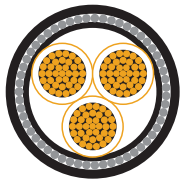
SINGLE-CORE 19000 / 33000 V
Cable with Stranded Copper Conductors



Nominal Area of Conductor		sq.mm	50	70	95	120	150	185	240	300	400	500	630
Thickness of Insulation		mm	8.0	8.0	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Thickness of copper screen tape		mm	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076
Thickness of oversheath		mm	2.0	2.0	2.1	2.1	2.2	2.2	2.3	2.4	2.5	2.6	2.7
Approximate overall diameter		mm	35	36	39	40	42	43	46	49	51	55	58
Approximate cable weight		kg/km	1415	1685	2035	2320	2695	3090	3740	4475	5390	6630	8190
Minimum bending radius		mm	800	850	950	950	1000	1100	1100	1200	1200	1300	1400
Maximum resistance of conductors	D.C at 20°C	ohm/km	0.387	0.268	0.193	0.153	0.124	.0991	.0754	.0601	.0470	.0366	.0283
	A.C at 90°C	ohm/km	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.079	0.063	.0505	.0405
* Inductance		mH/km	0.490	0.462	0.442	0.423	0.410	0.397	0.380	0.367	0.356	0.344	0.325
* Reactance at 50 Hz		ohm/km	0.153	0.145	0.138	0.132	0.128	0.124	0.119	0.115	0.111	0.108	0.102
Impedance at 90°C		ohm/km	0.506	0.364	0.277	0.232	0.201	0.175	0.152	0.138	0.126	0.119	0.109
Maximum capacitance		µf/km	0.160	0.170	0.190	0.200	0.220	0.230	0.250	0.270	0.300	0.330	0.380
Max. charging current at normal voltage & frequency		amp/km	0.90	1.0	1.10	1.18	1.26	1.35	1.48	1.61	1.75	1.91	2.20
Sustained current rating (based on the standard conditions on page 28).	laid direct	qmp	215	265	315	355	400	450	520	590	670	750	860
	in single way ducts	amp	215	260	310	355	395	445	520	580	660	750	850
	in air	amp	260	320	390	450	510	590	690	790	910	1040	1210
1 Maximum symmetrical short circuit current rating	for 0.2 sec	kA	15.2	21.9	30.4	38.5	47.3	59.3	>60	>60	>60	>60	>60
	for 1.0 sec	kA	6.8	9.8	13.6	17.2	21.1	26.5	34.9	43.7	55.9	>60	>60
	for 3.0 sec	kA	3.9	5.6	7.8	9.9	12.2	15.3	20.1	25.2	32.3	40.7	52.6
Maximum earth fault short-circuit current rating	for 0.2 sec	kA	3.9	3.9	6.2	6.2	6.2	8.5	8.5	8.5	12.3	12.3	12.3
	for 1.0 sec	kA	1.7	1.7	2.7	2.7	2.7	3.8	3.8	3.5	5.5	5.5	5.5
	for 3.0 sec	kA	1.0	1.0	1.6	1.6	1.6	2.2	2.2	2.2	3.1	3.1	3.1

* Cable in touching trefoil arrangement.
ø Cable in touching trefoil or trefoil ducts.

Note 1: Ratings assume armour is bonded at both ends of route.
Short-circuit current rating based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.

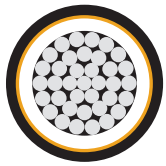


THREE-CORE 19000 / 33000 V
Cable with Stranded Copper Conductors

Nominal Area of Conductor		sq.mm	50	70	95	120	150	185	240	300
Thickness of Insulation		mm	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Thickness of copper screen tape		mm	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076
Thickness of extruded bedding		mm	1.8	1.8	1.9	2.0	2.0	2.1	2.2	2.3
Armour wire diameter		mm	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15
Thickness of oversheath		mm	3.4	3.5	3.7	3.8	3.9	4.0	4.2	4.3
Approximate overall diameter		mm	80	84	88	92	95	98	104	110
Approximate cable weight		kg/km	9550	10330	11720	12920	14120	16115	18320	21530
Minimum bending radius		mm	1600	1700	1700	1800	1900	1900	2000	2200
Maximum resistance of conductor	D.C at 20 °C	ohm/km	0.387	0.268	0.193	0.153	0.124	.0991	.0754	.0601
	A.C at 90 °C	ohm/km	0.494	0.342	0.247	0.196	0.159	0.127	0.098	0.079
Maximum armour resistance at 20 °C		ohm/km	0.34	0.30	0.29	0.28	0.27	0.25	0.24	0.23
Inductance		mH/km	0.460	0.434	0.412	0.393	0.381	0.367	0.352	0.340
Reactance at 50 Hz		ohm/km	0.144	0.136	0.129	0.123	0.119	0.115	0.110	0.106
Impedance		ohm/km	0.513	0.368	0.277	0.231	0.199	0.171	0.147	0.132
Maximum capacitance		±f/km	0.16	0.17	0.19	0.20	0.22	0.23	0.25	0.27
Max. charging current at normal voltage & frequency		amp/km	0.90	1.00	1.10	1.18	1.26	1.35	1.48	1.61
Armour loss at 50 Hz		kW/km	1.0	1.7	2.6	3.3	4.3	5.7	7.9	10.2
Sustained current rating	laid direct	amp	205	250	300	335	375	420	485	540
(based on the standard	in single way ducts	amp	180	220	260	295	325	375	430	475
conditions on page 28).	in air	amp	225	275	330	380	425	485	570	640
1 Maximum symmetrical short	for 0.2 sec	kA	15.2	21.9	30.4	38.5	47.3	59.3	>60	>60
circuit current rating	for 1.0 sec	kA	6.8	9.8	13.6	17.2	21.1	26.5	34.9	43.7
	for 3.0 sec	kA	3.9	5.6	7.8	9.9	12.2	15.3	20.1	25.2
1 Maximum earth fault	for 0.2 sec	kA	15.2	21.9	30.4	38.5	47.3	56.3	59.1	>60
short-circuit current rating	for 1.0 sec	kA	6.8	9.8	13.6	17.5	21.1	25.1	26.4	28.0
	for 3.0 sec	kA	3.9	5.6	7.8	9.9	12.2	14.5	15.2	16.1

Note 1: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 75°C to 160°C.

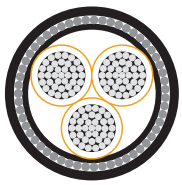
SINGLE-CORE 19000 / 33000 V
Cable with Stranded Aluminium Conductors



Nominal Area of Conductor		sq.mm	50	70	95	120	150	185	240
Thickness of Insulation		mm	8.0	8.0	8.5	8.0	8.0	8.0	8.0
Thickness of copper screen tape		mm	0.076	0.076	0.076	0.076	0.076	0.076	0.076
Thickness of oversheath		mm	2.0	2.0	2.1	2.1	2.2	2.2	2.3
Approximate overall diameter		mm	35	36	39	40	42	43	46
Approximate cable weight		kg/km	1130	1275	1455	1580	1785	1950	2240
Maximum bending radius		mm	800	850	950	950	1000	1100	1100
Maximum resistance of conductors	D.C at 20°C	ohm/km	0.641	0.443	0.320	0.253	0.206	0.164	0.125
	A.C at 90°C	ohm/km	0.822	0.568	0.411	0.325	0.265	0.211	0.162
* Inductance		mH/km	0.490	0.462	0.442	0.423	0.410	0.397	0.380
* Reactance at 50 Hz		ohm/km	0.153	0.145	0.138	0.132	0.128	0.124	0.119
Impedance at 90°C		ohm/km	0.819	0.576	0.424	0.344	0.288	0.241	0.197
Maximum capacitance		µf/km	0.160	0.170	0.190	0.200	0.220	0.230	0.250
Max. charging current at normal voltage & frequency		amp/km	0.90	1.00	1.10	1.18	1.26	1.35	1.48
ø Sustained current rating (based on the standard conditions on Page 28).	laid direct	amp	165	205	245	275	310	350	410
	in single way ducts	amp	165	200	240	275	305	345	400
	in air	amp	200	250	305	350	395	455	540
1 Maximum symmetrical short circuit current rating	for 0.2 sec	kA	9.7	14.1	19.5	24.7	30.3	38.1	50.1
	for 1.0 sec	kA	4.3	6.3	8.7	11.0	13.3	17.0	22.4
	for 3.0 sec	kA	2.5	3.6	5.0	6.3	7.8	9.8	12.9
Maximum earth fault short-circuit current rating	for 0.2 sec	kA	3.9	3.9	6.2	6.2	6.2	8.5	8.5
	for 1.0 sec	kA	1.7	1.7	2.7	2.7	2.7	3.8	3.8
	for 3.0 sec	kA	1.0	1.0	1.6	1.6	1.6	2.2	2.2

* Cable in touching trefoil arrangement.
ø Cable in touching trefoil or trefoil ducts.

Note 1: Ratings assume armour is bonded at both ends of route.
Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 85°C to 160°C.



THREE-CORE 19000 / 33000 V
Cable with Stranded Aluminium Conductors

Nominal Area of Conductor		sq.mm	50	70	95	120	150	185	240
Thickness of Insulation		mm	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Thickness of copper screen tape		mm	0.076	0.076	0.076	0.076	0.076	0.076	0.076
Thickness of extruded bedding		mm	1.8	1.8	1.9	2.0	2.0	2.1	2.2
Armour wire diameter		mm	3.15	3.15	3.15	3.15	3.15	3.15	3.15
Thickness of oversheath		mm	3.4	3.5	3.7	3.8	3.9	4.0	4.2
Approximate overall diameter		mm	80	84	88	92	95	98	104
Approximate cable weight		kg/km	8650	9015	9915	10650	11335	12630	13750
Minimum bending radius		mm	1600	1700	1700	1800	1900	1900	2000
Maximum armour resistance of conductor	D.C at 20 °C	ohm/km	0.641	0.443	0.320	0.253	0.206	0.164	0.125
	A.C at 90 °C	ohm/km	0.822	0.568	0.411	0.325	0.265	0.211	0.162
Maximum armour resistance at 20 °C		ohm/km	0.34	0.30	0.29	0.28	0.27	0.25	0.24
Inductance		mH/km	0.460	0.434	0.412	0.393	0.381	0.367	0.352
Reactance at 50 Hz		ohm/km	0.144	0.136	0.129	0.123	0.119	0.115	0.110
Impedance		ohm/km	0.834	0.584	0.429	0.347	0.289	0.240	0.194
Maximum capacitance		±f/km	0.16	0.17	0.19	0.20	0.22	0.23	0.25
Max. charging current at normal Voltage & frequency		amp/km	0.90	1.00	1.10	1.18	1.26	1.35	1.48
Armour loss at 50 Hz		kW/km	0.6	1.0	1.5	2.1	2.6	3.5	4.8
Sustained current rating	laid direct	amp	160	195	230	265	295	330	380
(based on the standard	in single way ducts	amp	140	170	200	230	2553	295	340
conditions on page 28).	in air	amp	175	215	260	295	35	380	445
1 Maximum symmetrical short	for 0.2 sec	kA	9.7	14.1	19.5	24.7	30.3	38.1	50.1
circuit current rating	for 1.0 sec	kA	4.3	6.3	8.7	11.0	13.5	17.0	22.4
	for 3.0 sec	kA	2.5	3.6	5.0	6.3	7.8	9.8	12.9
Maximum earth fault	for 0.2 sec	kA	9.7	14.1	19.5	24.7	30.3	38.1	50.1
short-circuit current rating	for 1.0 sec	kA	4.3	6.3	8.7	11.0	13.5	17.0	22.4
	for 3.0 sec	kA	2.5	3.6	5.0	6.3	7.8	9.8	12.9

Note 1: Short-circuit current ratings based upon:
Symmetrical, conductor temperature rise, 90°C to 250°C.
Earth fault, armour temperature rise, 75°C to 160°C.

ADJUSTMENT TABLES

The following tables of adjustment factors are to be applied to sustained ratings when installation conditions vary from the Standard.

CABLES LAID DIRECT IN GROUND
Variation in Soil Thermal Resistivity

Twin and Multicore

Nominal area of conductor sq. mm	Value of g. degree C m/W							
	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0
16	1.16	1.12	1.08	1.05	0.93	0.84	0.77	0.72
25	1.17	1.13	1.09	1.05	0.93	0.83	0.77	0.71
35	1.17	1.13	1.09	1.06	0.92	0.83	0.76	0.71
50	1.17	1.13	1.09	1.06	0.92	0.83	0.76	0.71
70	1.18	1.14	1.09	1.06	0.92	0.83	0.75	0.70
95	1.18	1.14	1.09	1.06	0.92	0.83	0.75	0.70
120	1.19	1.14	1.10	1.06	0.92	0.82	0.75	0.69
150	1.19	1.14	1.10	1.06	0.92	0.82	0.75	0.69
185	1.19	1.14	1.10	1.06	0.92	0.82	0.74	0.69
240	1.20	1.15	1.10	1.07	0.92	0.81	0.74	0.69
300	1.20	1.15	1.10	1.07	0.92	0.81	0.74	0.69

Single Core

Nominal area of conductor sq. mm	Value of g. degree C m/W							
	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0
50	1.21	1.16	1.11	1.07	0.91	0.81	0.73	0.68
70	1.22	1.16	1.12	1.07	0.91	0.81	0.73	0.68
95	1.22	1.66	1.12	1.07	0.91	0.81	0.73	0.68
120	1.22	1.16	1.12	1.07	0.91	0.81	0.73	0.68
150	1.22	1.16	1.12	1.07	0.91	0.81	0.73	0.68
185	1.22	1.17	1.12	1.07	0.91	0.81	0.73	0.68
240	1.23	1.17	1.12	1.07	0.91	0.80	0.73	0.68
300	1.23	1.17	1.12	1.07	0.91	0.80	0.73	0.67
400	1.23	1.17	1.12	1.07	0.91	0.80	0.73	0.67
500	1.23	1.17	1.12	1.07	0.91	0.80	0.73	0.67
630	1.23	1.17	1.12	1.07	0.91	0.80	0.73	0.67

Variation in Ground Temperature and or Conductor Temperature

Conductor Temperature, °C	Ground Temperature °C						
	10	15	20	25	30	35	40
90	1.03	1.00	0.97	0.93	0.89	0.86	0.82
85	1.00	0.97	0.94	0.90	0.86	0.82	0.78
80	0.98	0.95	0.91	0.87	0.83	0.79	0.74
130*	1.19	1.16	1.14	1.11	1.08	1.06	1.03

* Limited use - see note on overload.

Variation in Depth of Laying

Depth of Laying, Metre	600 / 1000 Volt Cables			1900 / 3300 Volt to 19000 / 33000 Volt Cables	
	Up to 50 sq.mm	70 sq.mm to 300 sq.mm	Above 300 sq.mm	Up to 300 sq.mm	Above 300 sq.mm
0.5	1.00	1.00	1.00	√	√
0.6	0.99	0.98	0.97	√	√
0.8	0.97	0.96	0.94	1.00	1.00
1.0	0.95	0.94	0.92	0.98	0.97
1.25	0.94	0.92	0.90	0.96	0.95
1.50	0.93	0.91	0.89	0.95	0.94
1.75	0.92	0.89	0.87	0.94	0.92
2.0	0.91	0.88	0.86	0.92	0.90
2.5	0.90	0.87	0.85	0.91	0.89
3.0 or more	0.89	0.86	0.83	0.90	0.88

CABLES LAID IN DUCTS

Variation in Soil Thermal Resistivity

Twin and Multicore

Nominal area of conductor sq. mm	Value of g. degree C m/W							
	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0
16	1.06	1.04	1.03	1.02	0.97	0.92	0.88	0.85
25	1.06	1.05	1.03	1.02	0.96	0.92	0.88	0.84
35	1.06	1.05	1.03	1.02	0.96	0.92	0.87	0.83
50	1.07	1.05	1.03	1.02	0.96	0.91	0.87	0.83
70	1.07	1.05	1.04	1.02	0.96	0.91	0.86	0.82
95	1.07	1.06	1.04	1.02	0.96	0.91	0.86	0.82
120	1.08	1.06	1.04	1.03	0.95	0.90	0.85	0.81
150	1.09	1.06	1.04	1.03	0.95	0.90	0.85	0.80
185	1.09	1.07	1.05	1.03	0.95	0.89	0.84	0.80
240	1.09	1.07	1.05	1.03	0.95	0.89	0.84	0.79
300	1.10	1.07	1.05	1.03	0.95	0.88	0.83	0.78

Single Core

Nominal area of conductor sq. mm	Value of g. degree C m/W							
	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0
50	1.11	1.08	1.06	1.04	0.94	0.87	0.82	0.77
70	1.12	1.09	1.06	1.04	0.94	0.87	0.81	0.76
95	1.12	1.09	1.06	1.04	0.94	0.87	0.81	0.76
120	1.13	1.10	1.07	1.04	0.94	0.86	0.80	0.75
150	1.13	1.10	1.07	1.04	0.94	0.86	0.80	0.75
185	1.13	1.10	1.07	1.04	0.93	0.86	0.79	0.75
240	1.14	1.11	1.07	1.04	0.93	0.86	0.79	0.74
300	1.14	1.11	1.08	1.05	0.93	0.85	0.79	0.74
400	1.14	1.11	1.08	1.05	0.93	0.85	0.78	0.73
500	1.15	1.11	1.08	1.05	0.93	0.85	0.78	0.73
630	1.15	1.12	1.08	1.05	0.93	0.84	0.78	0.72

Variation in Ground Temperature and or Conductor Temperature

Conductor Temperature, °C	Ground Temperature °C						
	10	15	20	25	30	35	40
90	1.03	1.00	0.97	0.93	0.89	0.86	0.82
85	1.00	0.97	0.94	0.90	0.86	0.82	0.78
80	0.98	0.95	0.91	0.87	0.83	0.79	0.74
130*	1.19	1.16	1.14	1.11	1.08	1.06	1.03

* Limited use - see note on overload.

Variation in Depth of Laying

Depth of Laying, Metre	600 / 1000 Volt Cables		1900 / 3300 Volt to 19000 / 33000 Volt Cables	
	Single-core	Multi-core	Single-core	Multi-core
0.5	1.00	1.00	√	√
0.6	0.98	0.99	√	√
0.8	0.95	0.97	1.00	1.00
1.0	0.93	0.96	0.98	0.99
1.25	0.90	0.95	0.95	0.97
1.50	0.89	0.94	0.93	0.96
1.75	0.88	0.94	0.92	0.95
2.0	0.87	0.93	0.90	0.94
2.5	0.86	0.93	0.89	0.93
3.0 or more	0.85	0.92	0.88	0.92

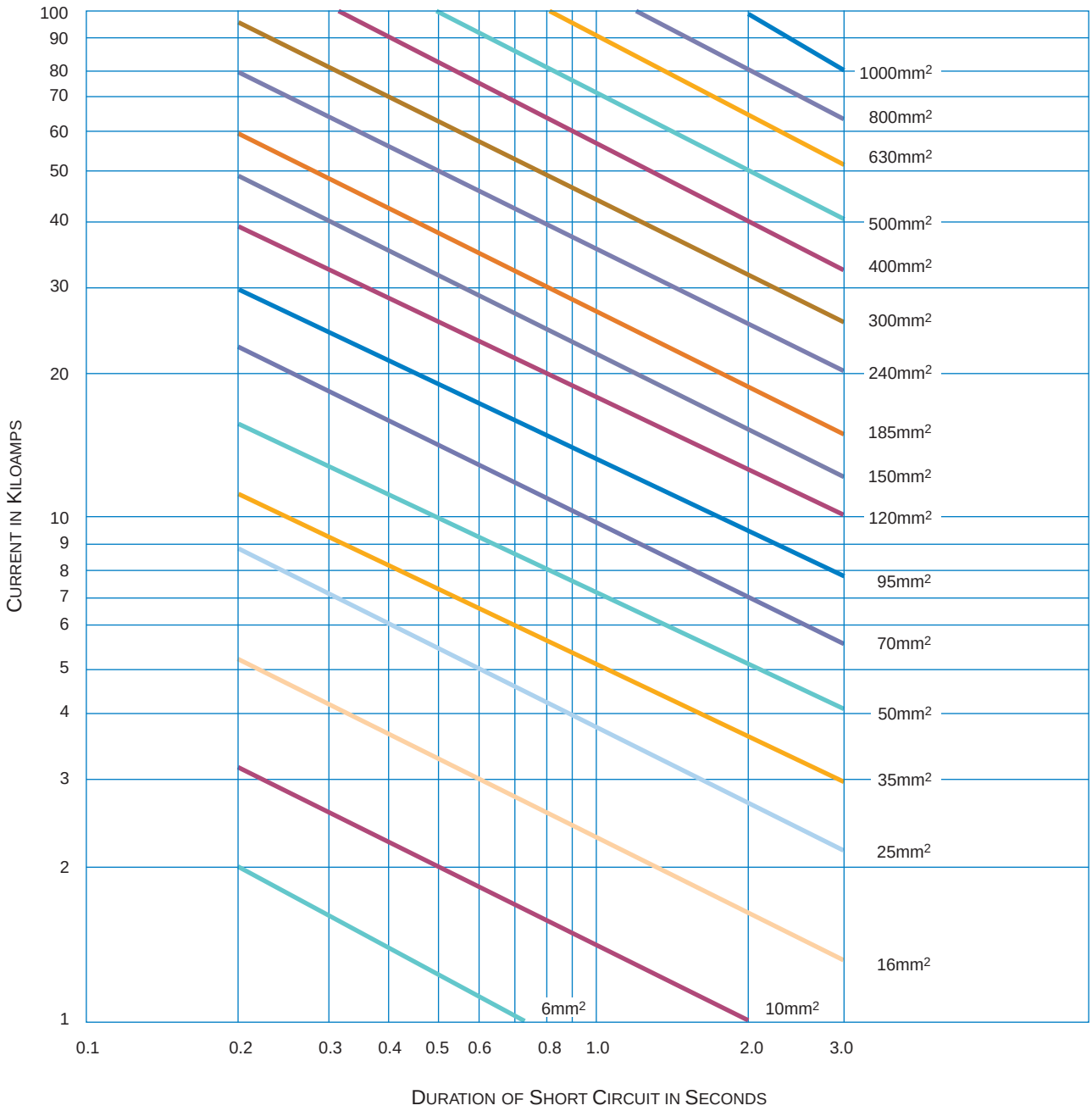
CABLE IN AIR

Variation in Ambient Temperature and/or Conductor Temperature

Conductor Temperature, °C	Ground Temperature °C						
	25	30	35	40	45	50	55
90	1.00	0.95	0.91	0.86	0.81	0.75	0.70
85	0.95	0.91	0.86	0.81	0.75	0.70	0.64
130*	1.20	1.18	1.15	1.15	1.11	1.08	1.06

* Limited use - see note on overload.

SHORT CIRCUIT RATING
COPPER CONDUCTOR (XLPE)



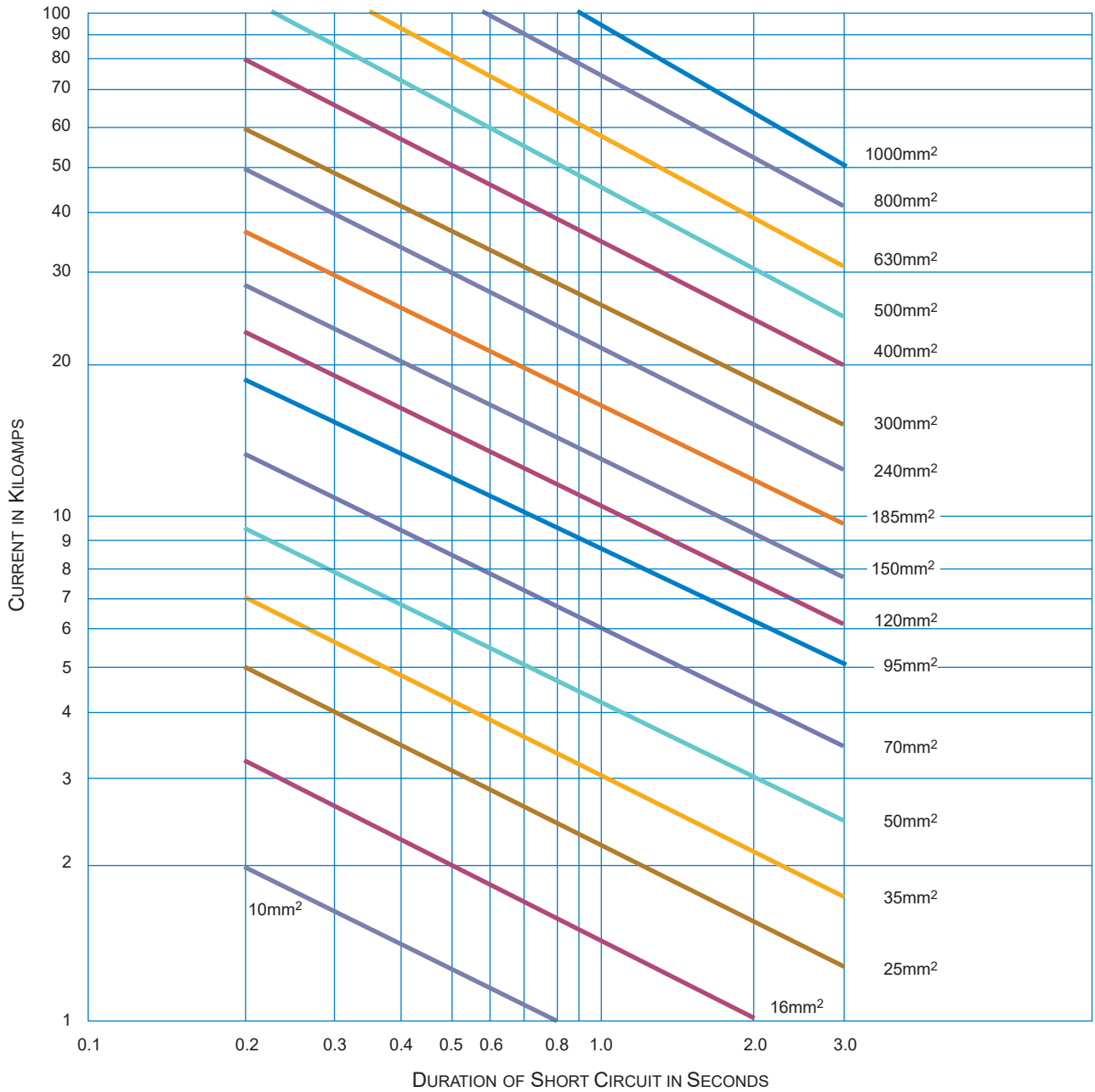
Basis

1. Cable fully loaded at start of short circuit.
   (Conductor temperature 90^{o}C)
2. Conductor temperature at end of short circuit: 250^{o}C

Note:

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

SHORT CIRCUIT RATING
ALUMINIUM CONDUCTOR (XLPE)



Basis

1. Cable fully loaded at start of short circuit.
   (Conductor temperature 90°C)
2. Conductor temperature at end of short circuit: 250°C

Note:

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

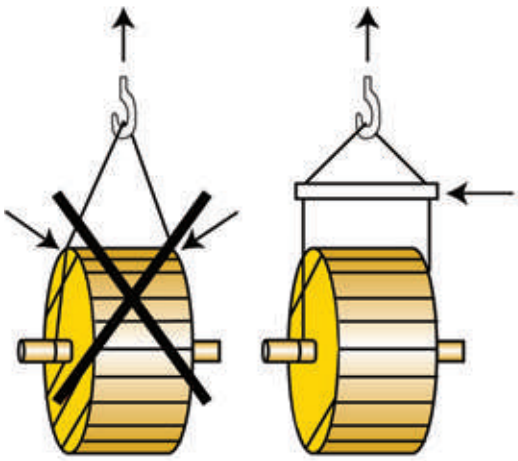
AMERICAN WIRE GAUGE
Metric Comparison Chart

U.S. Standard (AWG)	Equivalent Cross-Section (mm^2)	Nearest Available Cross-Section (mm^2)
24	0.205	0.20
22	0.324	0.50
20	0.511	0.50 - 0.75
18	0.806	1.00
16	1.286	1.50
14	2.042	2.50
12	3.244	4.00
10	5.169	6.00
9	6.508	10.00
8	8.237	10.00
7	10.36	16.00
6	13.06	16.00
5	16.51	16.00 - 25.00
4	20.78	25.00
3	26.21	25.00 - 35.00
2	33.08	35.00
1	41.66	50.00
1/0	52.44	70.00
2/0	66.19	70.00
3/2	83.29	95.00
4/0	105.20	120.00
250 MCM	124.30	120.00 - 150.00
300	149.00	15.00
350	174.10	185.00
400	198.90	240.00
500	248.30	240.00 - 300.00
600	298.30	300.00
700	347.70	400.00
750	372.80	400.00
800	397.80	400.00
1000	496.60	500.00
1250	620.90	630.00
1500	745.60	800.00
2000	993.90	1000.00

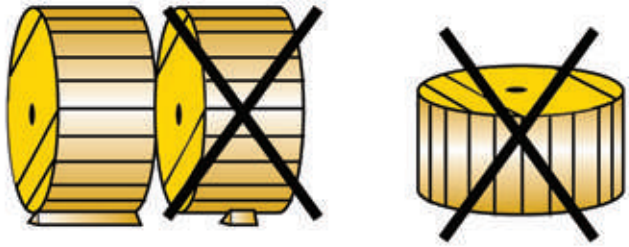
The Right Way of Handling Cable Drums

Incorrect handling of cable drums while lifting, loading / unloading and storing can be very hazardous. Cables are supplied on heavy wooden / steel drums and should be handled by trained persons according to International Regulations.

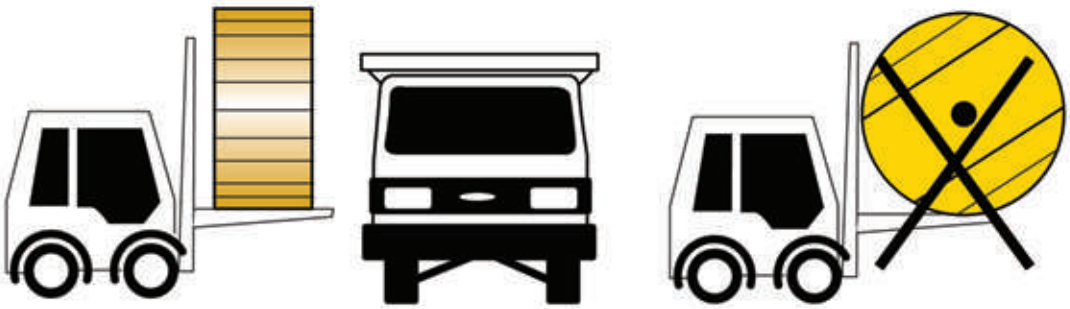
Follow these Instructions



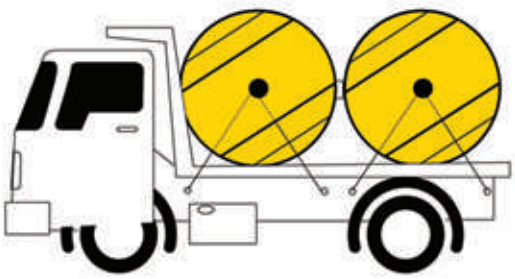
Lifting cable drum using cranes



Drums should never be laid flat on their sides
Always use proper wedges to prevent drums rolling



Lifting cable drums correctly using fork lifts



Secure drums properly for transportation

The right way to roll the drums
Follow the direction shown by the arrow

بعض کیبلز بڑے شوق سے بجلی ھڑپ کرجاتی ھیں -اور بِل آپ کو ادا کرنا پڑتا ھے۔

بجلی تانبے کے ان باریک تاروں میں سفر کرتی ہے جو وائیرنگ میں استعمال ہونے والے کیبلز کے اندر ہوتے ہیں۔ اگر استعمال شدہ تانبہ ضروری معیار کا (کنڈیکٹر گریڈ) نہیں ہے تو کیبلز میں بجلی کی روکو رواں رکھنے کی استعداد کم ہوگی اور مزاحمت زیادہ۔ جس کا سیدھا سیدھا مطلب یہ ہے کہ مین لائن سے آنے والی بہت ساری بجلی استعمال کے پوائنٹس تک پہنچتے پہنچتے کیبلز کی مزاحمتی قوت کی نذر ہوجائے گی۔ مگر اس کا بل تو آئے گا۔

بعض کیبلز ہلکے میٹریل کے استعمال کی بدولت بظاہر سستی معلوم ہوتی ہیں۔ ان کیبلز میں بجلی رواں رکھنے کی کم استعداد اور از حد زیادہ مزاحمتی قوت کرنٹ لیک ہونے کے خطرہ اور نقصان کے امکان میں اضافہ تو کرتے ہی ہیں۔ آپ کے بلوں میں بھی ہر ماہ اضافہ کرتے رہتے ہیں۔

پائنیر کیبلز استعمال کیجئے جو ایک ایسی کمپنی کے تیار کردہ ہیں جو اپنی مصنوعات کے معیار کی ضامن ہے۔ پائنیر کیبلز جدید ترین پلانٹ پر عمدہ ترین ۹۹٫۹ فیصد خالص کنڈیکٹر گریڈ تانبے سے بنائے جاتے ہیں اور ہر میٹر کو انتہائی سخت کوالٹی کنٹرول کے مراحل سے گزارا جاتا ہے۔ پائنیر کیبلز بین الاقوامی معیار پر پورے اترتے ہیں۔ اسی لئے ماہرین انہیں دوسرے کیبلز پر فوقیت دیتے ہیں۔

پائنیر کیبلز نام لے کر طلب کریں۔ ماہرین کے انتخاب کو اپنائیں۔

PIONEER CABLES LTD

Leaders in Cable Technology

ہیڈ/سیلز آفس کراچی: 1001 ، یونی ٹاورز، آئی آئی چندریگر روڈ، پی او بکس نمبر 6643 ، کراچی 74000 (پاکستان)۔ فون: 14-32416511-21-92+
سیلز: 32417786 ,32410553-21-92+ فیکس: 32475078-21-92+ ای میل: raza@pioneercables.com, enquiry@pioneercables.com
hasnain@pioneercables.com ویب سائٹ: www.pioneercables.com +92335 (PIONEER) 7466337

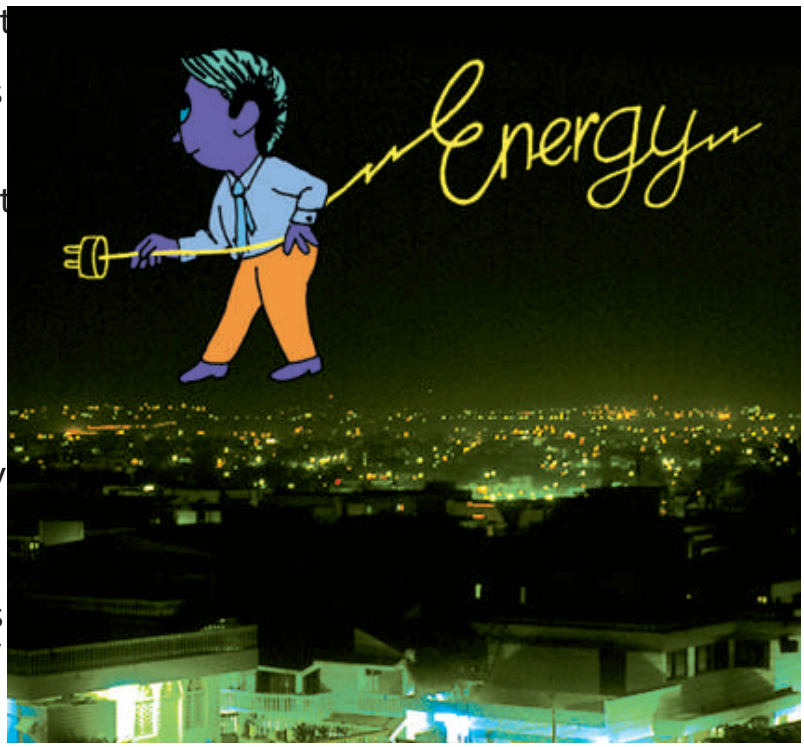
THINNER

Let Us Fully Utilise The Energy We Have !

Energy needs to be brought to you safely and efficiently without current leakages and risk or short circuits.

Energy needs to be brought to you economically without recurring re-wiring costs and risk of increased power bills.

PIONEER CABLES are energy efficient. A Company devoted to product quality using Prime Grade Raw Materials and 99.9% pure Copper Rod. Every meter of cable manufactured is subject to stringent quality control tests to conform to international standards.



SURVEY : Samples Test of 3/.029 CU/PVC Market Survey.

	Standard	ST Value	Pioneer Cables	Brand X	Brand XX
1	Conductivity	100.00%	102.56	97.51	37.10
2	Resistivity	17.241	16.8107	17.68107	46.470
3	Cond. Resistance	13.76 Ohms/KM	12.90	13.57	35.66
4	Elog. PVC	125%	225	350	190
5	T/s PVC	12.5 N/sqmm	14.16	16.98	11.68
6	Overall Dia	3.36 mm	3.50	3.50	3.65
7	Ins. Thick	0.889 mm	0.9-1.0	0.85-1.0	1.0-1.2
8	Lay Length	40 to 47.7	42.0 RH	103.0 R.H.	Straight
9	Dia of Strand	0.736 mm	0.74	0.72	0.71

COSTS : Brand xx/Brand x may cost less initially but increases Risk of damages and Current Leakages, causing continuous increased power bills and overload on our already scarce energy resources.

Make The Professionals Choice - Your Choice

PIONEER CABLES LTD

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THANVER

PIONEER CABLES LTD

Leaders in Cable Technology

Leaders in Cable Technology
Paving the way for future generations

Installation of Power Cables

√ Conforming to International Standards
√ High Conductivity 99.9% Pure Copper
√ Economical

High Conductivity 99.9% Pure Copper Rod.
99.5% Minimum Purity Aluminium Rod.
Made by Bawany Metals Ltd.

Transmission Line Conductors

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