

NEOCAB®

Wires & Cables



INTRODUCTION



NEOCAB® one of the most trusted brands in cable and conductors, was created with an aim to cater high-quality premium Electrical products to market. Through times we catered products that required high-end **INNOVATION** and **RESEARCH**.

Within a short period **NEOCAB®** has developed into one of the most reliable names among the conductors and wires suppliers, winning trust of our clients thru many award winning products in our portfolio.

We provide International Quality Products and Prompt delivery in attractive optimum packaging. We also try to keep close encounter with our customers and provide best services before & after sales.

No Compromise in Quality & Service is our Motto, which is possible with our world class infrastructure that achieves Indian and international benchmarks.

OUR STRENGTH

- Strong technical expertise & Professional Management
- Well-Equipped Plant and Machineries
- Trained and Skilled Manpower
- Optimum utilization of **MAN-MACHINE-MATERIALS**
- Safe, Healthy & Happy Work Environments

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THE NATIONAL SMALL INDUSTRIES CORPORATION LIMITED
(A Government of India Enterprise)

Branch Office : 202-203, Sarveswari Bldg, Opp. Sakar-BI, Near Income Tax Circle, Ashram Road, AnnaSalai 2nd Cross -600014
Ph : 974-27544853 Fax : 974-27540189

STORAGE DETAILS CERTIFICATE

Invoice Certificate (Material Invoice Number) No. 15/16/2024
ANNEXURE TO GOVERNMENT PURCHASES ENLISTMENT CERTIFICATE
NO. NSIC/MP/AM/2014/000773A D.D. 15/07/2024
ISSUED TO: M/s. N.E. INDUSTRIES, GULBARG

Plant No. 318, Industrial Estate, N-S Road, Dindur Road, ANAND, GUJARAT-388011

Sl. No.	Brand / Specification	Quantity	Capacity
1	Single Core Wire & Cable PVC / Double Core with Flexible & Right Conductor	As per Bill No. 2010-10/208 Prod L-988 & Cable P/C / Division IS 10355:2002 & IS 1554 (Including 50kg/mtr)	Black/White

Quantity (Kilo) : 10000
Quantity (Meters) : 10000

Authorized Signatory

Authority of the certificate can be checked through the web portal: www.naicorindia.com

ON : 9741-60611955601002481

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Invoice No: NSIC/MP/AM/2014/000773A Date: 15/07/2024

M/s. N.E. INDUSTRIES
Plot No 200 Industrial Estate, N-S Road, Chokla Road, ANAND, GUJARAT-388011

Factory Address:
1, 7th, 6th, 5th, Industrial Estate, N-S Road, Dindur Road, ANAND, GUJARAT-388011

Urgency Registration Number: URGENT
Electronic Social Class: SCHE 1(A)

Special Category: SCHE 1(A)

GOVERNMENT PURCHASE REGISTRATION NO. NSIC/MP/AM/2014/000773A

Mandatory Limit: 1 Lakh (One Thousand Three Hundred Three Lakh Only)

Financial Year	Annual Turnover
2018-19	1765.91
2019-20	2208.68
2020-21	2824.18

Mandatory Limit: 1000

WIRE: registered with NSIC and approved for inclusion of Government Buyer irrespective of value of the order. Your name can be registered in NSIC Unit only to participate in the Central Government Store Purchase Programme as per the Single Point Registration Scheme No. The following conditions shall apply:

Name of the Store/Shop	Specifications	Quantitative Capacity	P.M.

Disclaimer - The purchasing agencies are allowed to supply the material with the above details in the certificate when they are in the process of placing the order with the NSIC. This certificate will be valid subject to compliance of provisions of Government Procurement Act, 2002 and the rules made thereunder.

Authorized Signatory

Authority of the certificate can be checked through the web portal: www.naicorindia.com

ON : 9741-60611955601002481

Handwritten: 1000



Ministry of Power
New Delhi

Mr. P. S. Jaiswal (Jr)
Secretary (Power Division)
D & S Department
Ministry of Power, Government of India
Indira Park, New Delhi, India
Tel: 2301-1211
Fax: 2301-1211
E-mail: psjaiswal@nic.nic.in

Subject: Request for approval in S.O. for the Year 2017/18
Ref: E.O. 10000/2017

To: Mr. A. S. Indrajith
T-4, Armed Industrial Estate
Borivali (West)
Mumbai - 400082

Re: Request for approval in S.O. for the Year 2017/18
E.O. 10000/2017

1. After reviewing and comparing details brought with the T.O. (Reference: E.O. 10000/2017) in respect of S.O. for being the "M/S. R.S. INDUSTRIES" under brand name "NEOCAB" (NEOCAB) in respect of S.O. for being used in various types of cables and accessories for use in various parts of the State of Maharashtra for the financial year 2017-18, it is noted that the same are approved by the Government of India in the year 2017/18.

S/N	DESCRIPTION	CATEGORY
1	House wire PVC & Multistrand Flexible Cable	APPROVED

The Government of India as well as the State Government of Maharashtra are not responsible for any loss or damage to the goods or materials, if any, and for any other liability, in case there is any change in design or specification of the product, the office should be informed to the same immediately. Also, any other modification of the details.

It is requested to send a set of Samples of the products, to the office as well as to the Office of the Executive Engineers of all Districts, along with the necessary instructions for the office to be followed in case when the same are received. The Government reserves the right to withdraw the inclusion of the name of firm without assigning any reasons therefor.

Handwritten Signature
Sd/-
Secretary (Power Division)
D & S Department, Government of India

Self Declaration of the Supplier

- I hereby declare that the products mentioned in the above certificate are manufactured in India.
- I hereby declare that the products mentioned in the above certificate are manufactured in India.
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R.S. INDUSTRIES
Corporate Office: Sector Palak Vijaya Bhawan,
5th Floor, Race Course, Vadodra - 390 007
Phone No. 0220 - 2374000 - 2374001
Fax No. 0220 - 2374008 (2374009) (2374010) (2374011)
E-mail: rsindia@rsindia.com
Cell No. 9820022222, 9820022222

By Speed Post No. 10000/2017 (Date: 18.03.2017) (Time: 10:00 AM)

To: Mr. A. S. Indrajith
T-4, Armed Industrial Estate
Borivali (West)
Mumbai - 400082

Subject: Request for approval in S.O. for the Year 2017/18
Ref: E.O. 10000/2017

TO WHOM SO EVER IT MAY CONCERN

This is to certify that M/s R.S. Industries, Vadodra has supplied below mentioned material as per P.O.

PO NO./PURCHASE ORDER NO & DATE	ORDER TYPE & SIZE OF CABLE	Ordered Qty in Cmts	Supplied Qty. in Cmts
MVCL/WR/2007/2016/ST/17 PVC 325 AC/MS/120V 400 01.05.2016	LT PVC Cable (1) 42 X 4 mm ² (2) 42 X 16 mm ²	420 220	420 220
MVCL/WR/2007/2016/ST/18 AC LT PVC/MS/120V/120V 400 06.05.2017	LT PVC Cable (1) 42 X 4 mm ² (2) 42 X 16 mm ²	617 1167	617 1167

The party has supplied the above material as per P.O.

The performance of the material LT PVC of size 42 X 4 mm² and 42 X 16 mm² supplied against above orders in M/s R.S. Industries, Vadodra has been found generally in order of satisfactory.

This certificate is given to M/s R.S. Industries, Vadodra as requested by them vide letter dated 18.03.2017.

Handwritten Signature
Sd/-
M. T. Sengupta
Sr. Additional Chief Engineer (P&D)

To:
M/s R.S. Industries
T-4, Gate No. 4, Industrial Estate,
Near Borivali (West), Mumbai - 400082 (Wholesale Branch)

Page 1 of 1



QSA INTERNATIONAL

Certificate of Registration

This is to certify that
R. S. INDUSTRIES
ADDRESS: T-4, Gate No. 4, Industrial Estate, Borivali (West), Mumbai - 400082

has been assessed and found to conform to the requirements of the

The certificate of registration has been issued against M/s R.S. Industries on the basis of Product Testing as per Test Samples and Test Report.

RoHS

conforms to the scope of

"Manufacturing and Supply of Electrical Cables & Wires and Plastic Cable Joints Cables"

By QSA International, UK

Registration Number	QSA-16072017
Issue/Certificate Date	09 March 2016
Recertification Date	09 March 2022
Certificate Expiry Date	09 March 2025

Handwritten Signature
Certification Manager



QSA INTERNATIONAL LIMITED
11, Ashchurch Road, Ashchurch, Gloucestershire, ENGLAND



CGA

Email: info@qsa.co.uk
Web: www.qsa.co.uk

RoHS is a European Union Directive (2002/95/EC) which restricts the use of certain hazardous substances in electrical and electronic equipment. QSA International is a RoHS compliant company and our products are RoHS compliant.

CABLES RANGE AT A GLANCE

Type & Size	Options	Cross Sectional View
<p>LV Power Cables 1.1kv PVC/XLPE Power cables as per IS: 1554-I & IS: 7098 - I Sizes: Single Core 1.5 to 1000 sq. mm Multi core 1.5 to 630 sq. mm</p>	<p>Conductor - Stranded / Solid / Circular/shaped/Aluminium/Copper Insulation - PVC / XLPE / HR PVC / Zero Halogen Innersheath - PVC / HR PVC / FR / FRLS PVC Unarmoured / Armoured - G.S. Roud Wire/ Flat Strip or Aluminium wire / Flat Strip Outer sheath - PVC / HR PVC / FR / FRLS PVC / Zero Halogen</p>	<p>Outer Sheath Armouring Inner Sheath Insulation Aluminium/Copper Conductor</p>
<p>Copper Control Cables 650/1100 v Annealed electrolytic copper conductor, PVC/XLPE, Insulated, PVC Sheathed as per IS: 1554-I & IS: 7098 - I Sizes: 1.5/2.5 sq. mm up to 61 core 4&6 sq. mm up to 4 core</p>	<p>Conductor - Solid / Stranded / Plain / Tinned Insulation - PVC / HR PVC / XLPE / Zero Halogen Innersheath - PVC / HR PVC / FR / FRLS / Zero Halogen Unarmoured / Armoured - G.S. Roud Wire / Flat Strip Outersheath - PVC / HR PVC / FR / FRLS / Zero Halogen</p>	<p>Outer Sheath Armour Inner Sheath Conductor Insulation</p>
<p>Mining Cable - for coal mines and refineries up to 3.3 kv as per customer specifications</p>	<p>Conductor - Circular / Shaped - Aluminium / Copper Insulation - PVC Armouring - Wire / Strip Additional Option - Normally Double Wire Armoured with Tinned Copper wire - Conductivity not less than 75% of Phased Conductor</p>	<p>Outer Sheath Armouring Separator Armouring Inner Sheath Insulation Aluminium / Copper Conductor</p>
<p>MV Power Cables Upto 33 KV XLPE Power Cable as per IS : 7098 Part - II</p>	<p>Conductor - Aluminium /Copper Insulation - Semicon / XLPE / Copper Tape Innersheath - PVC Armoured - Wire/Strip Outersheath - PVC / HR PVC / FR / FRLS</p>	<p>PVC Outer-Sheath Armouring PVC Inner-Sheath Filler Stranded Conductor Conductor Screening XLPE Insulation Insulation Screening Metallic Screening</p>
<p>Flat Cables 1.1 KV Stranded Plain Copper/Aluminium, PVC Insulated & PVC sheathed as per IS : 694 Sizes : 2 & 3 Core - 1.5 to 35 sq. mm</p>	<p>Conductor - Copper/Aluminium Insulation - PVC / HR PVC sheathing - PVC / HR PVC</p>	<p>Flexible Copper Conductor PVC Insulations of Cores PVC Sheath (Black) (Red, Yellow, Blue)</p>
<p>LV & MV Aerial Bunched Cables 1100 Volts, Polyethelene / cross linked polyethelene insulated cables with aluminium conductor twisted over central bare/insulated alloy messenger wire IS:14255- 1995 & IS:7098 (Part - 2)1985 Size : Phase conductor upto - 300 sq. mm Messenger conductor up to - 300 sq. mm</p>	<p>Conductor - All Aluminium / alloy Insulation - Polythelene / Cross linked polythelene (upto 1.1KV) - Semicon/XLPE/Copper Tape (upto 33KV) Outer Sheath - PVC/HDPE (upto 33KV)</p>	<p>Phase Conductor AAC 1350 Lighting Conductor XLPE Insulation Messenger Conductor AAAC</p>
<p>Flexible Multi core Cables 1100V Multi strand, Flexible, bright annealed electrolytic copper conductor, PVC insulated and sheathed as per IS : 694 Sizes : Two, Three or Four core</p>	<p>Conductor - Multi stranded Plain/ Tinned Insulation - PVC / XLPE / HR PVC / FR / FRLS / Zero Halogen Sheathed - PVC / HR PVC / FR / FRLS / Zero Halogen</p>	<p>Conductor Insulation Filler Sheath</p>
<p>Solar Cable 1100V Multi strand, Aluminium/Copper, PVC/XLPE Cables Sizes : Single core 1.5 to 630 sq.mm & Multi core upto 400 sq.mm</p>	<p>Conductor - Bright Annealed Copper / Aluminium Insulation - PVC / HR PVC / XLPE / FR / FRLS PVC / Zero Halogen Outer Sheath - PVC / FR / FRLS / Zero Halogen</p>	<p>Conductor Insulation Jacket</p>

MANUFACTURING PROCESS

Copper or Aluminium Rod

WIRE DRAWING	Wire are drawn for required size.
ANNEALING	Drawn Copper/Aluminium wire are annealed.
STRANDING	Required conductor size is manufactured with specified design i. e. Shaped / Round / Compacted Circular.
INSULATION	Conductors are insulated with PVC / XLPE / PE as per required specification to make Core.
CORE REWINDING & CURING	Coresh to be rewound & Cured with specified required (for XLPE only)
LAYING UP	All rewound cores are laid together to form a cable with specified design.
INNER SHEATHING	Is done with required specification either with Tape or Extrusion
ARMOURING	Is done with required specification with galvanised strip / aluminium strip / wire.
OUTER SHEATHING	Is done by Extrusion with specified type of PVC as per specification.
REWINDING & TESTING	All cables are rewound on Wooden Drums & Tests are carried-out as per required specification.
PACKING	All tested and passed cables are packed in required sized wooden / steel drums prior to dispatch.

MANUFACTURING OF CABLES

Cable with aluminium and copper conductor and polymer insulation are manufactured at works at Jaipur (Rajasthan). Essentially cables comprise of conductors, insulation, innersheath, armour and outersheath.

CONDUCTOR

Neocab are available with both aluminium and copper conductor.

Neocab are manufactured with solid / stranded circular / shaped / aluminium / copper conductor.

Stranding makes cables flexible and easy to handle while shaping makes them compact.

Compaction is provided to all stranded constructions as under:

1. Circular Conductor : With one wire in the center conductor contains 6, 12, 18, 24, 30..... wire layers in either unilay or opposite helical directions. The conductor is compacted.
2. Shaped Conductor : In all multicore low voltage from 16 sq. mm & above upto 400 sq.mm size, conductors are generally "shape".

Neocab copper conductor cables are of the same construction as that of cables with aluminium conductor except for higher tensile strength, higher current carrying capacity, superior conductivity, better flexibility and ease of jointing. Copper cables are used in power control, instrumentation, winding, submarine, mining and ship wiring application etc.

All conductors of Neocab are manufactured strictly in accordance with National and International Specification.

National Specification	IS:8130
International Specification	IS: 602228/BS:6360/IEC:60502

INSULATION

Insulation for Neocab is strictly as per National and International Specifications

Neocab are designed and manufactured with polymer dielectrics to bear thermal and thermomechanical stresses safely at continuous normal and short circuit temperature conditions.

Neocab available with both thermoplastic & thermo setting insulations

- PVC Cables	Thermoplastic dielectric
- XLPE Cables	Thermo setting dielectric

Neocab PVC Cable use PVC Compound that take care of over load short circuit current with both coarse & fine protection systems.

Neocab XLPE Cables use XLPE compound with anti oxidant stabilizers and traces of aromatic polynuclear hydrocarbon. Thus improving electrical treeing characteristics and mechanical strength of insulation.

LAYING UP

Coresh are laid up together to make cable. control is observed within tight tolerance limit for dimensions in case of PVC/XLPE insulation.

INNERSHEATH

Laid up cables are provided with innersheath to tape/extruded PVC with high quality of PVC which acts as bedding for steel wire / strip armouring and to maintain circularity. Taped inner sheath is provided during laying up to process where as extruded PVC inner sheath is provided by extrusion process separately.

Neocab polymers used for innersheath are softer than insulation or outersheath & are compatible with temperature rating of cables & do not have deleterious effects on any other component of cable.

The Innersheath dimensions are maintained strictly in accordance with laid down specification.

Specification	For PVC Cables IS: 1554 (Part-I), For XLPE Cables IS: 7098 (Part-I) & (Part-II)
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ARMOURING

Mechanical protection to the cable is provided with armouring. Neocab single core cables are armoured with aluminium wire / aluminium strip. Thus avoiding magnetic hysteresis losses on A.C. system.

Multicore cables are provided with galvanized steel wire / steel strips. Neocab are provided with galvanized wire armouring, where cables are to run vertically and are subjected to stresses.

Neocab are armoured with double steel wire and tinned copper wires. so as to provide conductivity of armouring more than 75% of main conductor of cable.

Neocab armour wire / strips are of low resistivity material and meet the requirement of IS : 3975.

OUTERSHEATH

All Neocab are provided with PVC/HR PVC / FR / FRLS outersheath

Neocab are manufactured with various characteristics of sheathing compounds.

General purpose sheathing compound	ST-1
Heat resistant compound for sheath (H.R.)	ST-2
Fire Retardant Low smoke compounds (FRLS)	IEC 754 Part I
	IEC- 332 Part I&III
	IEEE - 383
	ASTM - 2843
	ASTM - 2863

Anti Rodent and Anti Termite Compound is applied wherever the customers ask for it.

PVC compound used for Neocab are of various grades to meet specifications IS:5831.

In order to be indentified, Neocab have their name embossed / printed / indented on outersheath at regular intervals.

On the outersheath of Dynamic cables, Voltage grade, Cable size, Trade name & Year of manufacture are embossed, as desired by the customer.

Cables / wires are sequentially marked for length at **every meter** throughout its length.

PROCESS INSPECTION

Process inspection is carried out at each step & proper records are maintained. Tools used for process inspection are calibrated and well maintained. High standards of workmanship are laid down. This is achieved through regular inspection & checks at different stages of productions. The process checks are supervised by experienced technicians and monitored by the product satisfying the design parameters and quality standards is released for the next process.

FINAL TESTING

Each Neocab is tested for all applicable routine tests. Each lot of cable is Type tested, as per relevant specification.

Neocab conducts the testing at it's works at Jaipur for acceptance test as per relevant specifications.

Testing of Neocab are carried out as per work standards for testing, besides applicable standards.

ROUTINE TESTS

- | | | |
|-------------------------|-----------------|--|
| 01 Conductor Resistance | 02 High Voltage | 03 Armour resistance (for Mining cables) |
|-------------------------|-----------------|--|

TYPE TESTS

- | | | |
|---|---|-------------------------------------|
| 01 Annealing (for Copper) | 02 Tensile strength (for Aluminium) | 03 Wrapping (for Aluminium) |
| 04 Conductor - resistance | | |
| 05 Test for armour wires / strips | 06 Test for thickness for insulation & sheath | |
| 07 Physical tests for insulation | | |
| (a) Tensile strength and elongation. | (b) Ageing in air oven | (c) Loss of mass (where applicable) |
| (d) Hot deformation (XLPE cable only) | (e) Heat Shock | (f) Shrinkage |
| (g) Thermal stability | | |
| 08 Water absorption (for insulation, where applicable) | 09 Dielectric retention test (for insulation, where applicable) | |
| 10 Insulation resistance | 11 High voltage (room temperature) | 12 High Voltage (water immersion) |
| 13 Flammability / fire resistance | 14 Cold bend (optional) | 15 Cold impact (optional) |
| 16 Anti rodent / termite (for outer sheath where specified by customer) | | |

ACCEPTANCE TESTS

The Following tests are carried out by the customer on sample taken from a lot for the purpose of acceptance of the lot.

- | | | |
|---|---|-----------------------------|
| 01 Annealing (for copper) | 02 Tensile (for aluminium) | 03 Wrapping (for aluminium) |
| 04 Conductor resistance | 05 Test for thickness for insulation & sheath | |
| 06 Tensile strength and elongation of insulation & sheath | | |
| 07 Insulation resistance | 08 High voltage test at room temperature | |

LV PVC CABLES

The cables are suitable for use on AC single phase or three phase (earthed or unearthed) systems for rated voltage up to and including 1100 volts. These cables can be used on DC systems for rated voltage up to and including 1500 volts to earth.

CONDUCTOR

The most acceptable metals for conductors are copper and aluminium due to their higher conductivity and ductility.

As copper has got higher affinity for sulphur, it corrodes in the atmosphere where sulphur fumes are present. In these conditions tinned copper should be used.

Aluminium oxide film which is always present on Aluminium conductor surface acts as barrier and it protects the Aluminium conductor from corrosion in fumes laden atmosphere.

CONDUCTOR CONSTRUCTION

The most economical construction for conductor is solid conductor i.e. conductor is made of one single wire. As the area of conductor increase, solid conductor becomes more stiff and hence difficult to handle. In this case stranded construction is adopted. Here the conductor is made of number of strands. The strands are arranged in spiral layers in 1+6+12+18+..... formations. This construction provides more flexibility. Where crimping of lugs are required, the conductor has to be of stranded construction only.

To economise in insulating material, weight and overall diameter, shaped conductors are employed in bigger sized cables. Here the stranded conductor is shaped in to a segment of a circle so that when all the cores are laid together, they form a complete circle. I.S. 1554 permits solid conductor construction upto 10 sq.mm in Aluminium and upto 6 sq.mm in copper. It permits the use of shaped conductors for sizes from 16 sq.mm onwards.

INSULATION

The PVC covering over conductor is called insulation and is provided by extrusion process only. The insulated conductor is called core. I.S. 1554 permits two types of PVC insulation as follows :

- 1) Insulation with TYPE A PVC compound as per I.S. 5831 which is suitable for 70 deg.C continuous operation.
- 2) Insulation with TYPE C PVC compound as per I.S. 5831 which is suitable for 85 deg.C continuous operation

The following colour code is used for identification :

- Single Core : Red, Black, Yellow or Blue (any one) .
- Two Cores : Red and Black
- Three Cores : Red, Yellow and Blue.
- Three & Half : Red, Yellow, Blue and Black (Reduced neutral).
- Four Core : Red, Yellow, Blue and Black.
- Five Core : Red, Yellow, Blue, Black, and Grey
- Six Cores : Two adjacent cores. Blue and Yellow (Counting and direction core) And remaining Grey in each layer. OR By printing numbers on each core.

LAYING UP

The cores are laid up together with suitable lay. The final layer always has a right hand lay i.e. if you look along the cable, the cores move to your right hand.

INNERSHEATH

Innersheath is provided over the laid up cores. It is provided to give circular shape to the cable and it provides bedding for the armouring.

I.S. 1554 permits following two methods of applying the innersheath of any thermoplastic material i.e. PVC, Polyethylene, etc.

a) **EXTRUDED INNERSHEATH:** Here the innersheath is provided by extrusion of Thermoplastic over the laid up cores. This type of innersheath is generally provided in cables having round cores i.e in control cables and power cables upto 10 sq.mm size. This type of innersheath also acts as a water barrier between cores and outersheath. In case of puncture in the outersheath the water can not reach to the cores and hence we recommend that cables for outdoor underground uses should have extruded innersheath.

b) **TAPPED INNERSHEATH:** Here the innersheath is provided by wrapping a thermoplastic tape over the laid up cores. It is generally employed in cables having sector shaped cores i.e. multicore cables of 16 sq.mm and above. This method saves a process and hence manufacturers always provide this type of innersheath unless the purchase specifications ask for extruded innersheath.

ARMOURING

In case of armoured cables, generally galvanized steel wire / strip armouring is provided over the innersheath in multi-core cables and over the insulation in single core cables. It provides mechanical protection to inside cores and it carries earth return current in case of a short circuit.

In long run of cables and in case of mines, round wire armouring is must, as strip construction provides higher resistance to earth fault current and sometimes this current may not be sufficient to operate the circuit breaker in case of earth fault.

In mines, the resistance of the armour in no case should exceed the resistance of the main core by more than 33% for safety reasons. To achieve this, sometimes tinned hard drawn copper wires are required to be used along with galvanized steel wires. Most of Times two layers of steel wires are provided to give extra protection.

In case of single core armoured cables for use in AC circuits, the material for armouring has to be non magnetic, as in this case the return current is not passing through the same cable and hence it will not cancel the magnetic lines produced by the current. These magnetic lines which are oscillating in case of AC current will give rise to eddy current in magnetic armouring and hence armouring will become hot, and this may lead to the failure of the cable. Generally hard drawn aluminium wires / strip are used for armouring in this case.

OUTERSHEATH

The PVC covering on armouring in case of armoured cables and over the innersheath in case of unarmoured cables is called outersheath. I.S. 1554 specifies nominal and minimum thicknesses of outer sheath for unarmoured cables and only minimum thickness of outer sheath for armoured cables.

It permits the following types of outer sheath PVC compounds.

- 1) Outer sheath with type ST1 PVC compound as per IS-5831, which is suitable for 70 deg.C continuous operation.
- 2) Outer sheath with Type ST2 PVC compound as per IS-5831, which is suitable for 85 deg.C continuous operation.

PVC has got fire retardant properties due to its halogen content. The fire in the cable gets extinguished immediately on removal of the fire source.

In the modern Power, Chemical, Fertilizer and Cement Plants many PVC cables are bunched in the cable shaft or on cable trays. In case of fire in these cables, the fire becomes self sustaining. Moreover due to the burning of PVC a dense corrosive smoke is emitted which makes fire fighting very difficult, due to poor visibility and toxic nature of the smoke. HCL content of the smoke, not only damages other costly equipment lying nearby, but also penetrates the RCC and corrodes the steel reinforcement. Due to this there is an extensive damage to the property.

To overcome these deficiencies FRLS i.e. Fire Retardant Low Smoke PVC was developed.

If required, DCPL can provide Fire Retardant Low Smoke (FRLS) PVC Inner sheath and / or outer sheath. This PVC compound, apart from meeting the requirements of Type ST2 as per IS-5831, has got better fire retardant properties and it emits lower smoke and acid fumes when it catches fire.

CABLE CODE

The following codes are used for designating the cables as per IS-1554.

CONSTITUENT	CODE LETTER
COPPER CONDUCTOR	-
ALUMINIUM CONDUCTOR	A
PVC INSULATION	Y
STEEL ROUND WIRE ARMOUR	W
STEEL STRIP ARMOUR	F
STEEL DOUBLE ROUND WIRE ARMOUR	WW
STEEL DOUBLE STRIP ARMOUR	FF
PVC OUTER SHEATH	Y

YY means Copper conductor, PVC insulated, unarmoured and PVC sheathed cable.

YWY means Copper conductor, PVC insulated, round wire armoured and PVC sheathed cable.

YFY means copper conductor , PVC insulated, flat GI strip armour and PVC sheathed cable.

AYY means Aluminium conductor, PVC insulated, unarmoured and PVC sheathed cable.

AYWY means aluminum conductor, PVC insulated, round wire armoured and PVC sheathed cable.

AYFY means aluminum conductor, PVC insulated, flat GI strip armoured and PVC sheathed cable.

A2XY means aluminum conductor, XLPE Insulated unarmoured cable & PVC sheathed cable.

A2XWY means aluminum conductor, XLPE Insulated round wire armored & PVC sheathed cable.

A2XFY means aluminum conductor, XLPE Insulated Flat GI sprit armoured & PVC sheathed cable.

LV PVC TECHNICAL DATA

Table - 1 : Single Core PVC Insulated armoured & unarmoured cable with Aluminium / Copper Conductor Conf. to IS:1554 (P-I)

Area mm ²	Thickness of PVC Insulation		Dimension of Armour		Thickness of PVC Outer Sheath		Approx. Overall Diameter		Approx. Net Wt. of Cable				Max.D.C. Resistance at 20°C		Approx. A.C. Resistance at Opt. Temp.70°C		Approx. Reactance at 50Hz.		Current Rating						Short Circuit Rating for 1 Sec.					
	Arm	Un-Arm	Wire	Strip	Arm	Un-Arm	Arm	Un-Arm	Armoured	Unarmoured	kg / km	kg / km	Al	Cu	Ohm / km	Ohm / km	Al	Cu	Ohm / km	Ohm / km	Al	Cu	Al	Cu	Al	Cu	Al	Cu		
4	1.3	1.0	1.4	-	1.24	1.8	11	9	140	165	80	105	7.41	4.61	8.89	5.52	0.153	0.137	31	39	30	38	27	35	30	38	27	35	0.30	0.46
6	1.3	1.0	1.4	-	1.24	1.8	12	9.5	170	205	100	140	4.61	3.08	5.53	3.69	0.147	0.131	39	49	37	48	35	44	35	44	35	44	0.46	0.69
10	1.3	1.0	1.4	-	1.24	1.8	13	10	200	260	125	185	3.08	1.83	3.70	2.19	0.136	0.121	51	65	51	64	47	60	47	60	47	60	0.76	1.15
16	1.3	1.0	1.4	-	1.24	1.8	14	11	225	320	150	245	1.91	1.15	2.29	1.38	0.125	0.111	66	85	65	83	64	82	64	82	64	82	1.22	1.84
25	1.5	1.2	1.4	-	1.24	1.8	15	13	290	440	200	350	1.20	0.727	1.44	0.87	0.118	0.107	86	110	84	110	84	110	84	110	84	110	1.90	2.88
35	1.5	1.2	1.4	-	1.24	1.8	16	14	340	555	240	455	0.868	0.524	1.04	0.627	0.111	0.101	100	130	100	125	105	130	100	125	105	130	2.66	4.03
50	1.7	1.4	1.4	-	1.24	1.8	18	16	420	705	305	590	0.641	0.387	0.77	0.463	0.108	0.098	120	155	115	150	130	165	130	165	130	165	3.80	5.75
70	1.7	1.4	1.4	-	1.4	1.8	20	17	530	960	385	815	0.443	0.268	0.53	0.321	0.100	0.090	140	190	135	175	155	205	155	205	155	205	5.32	8.05
95	1.9	1.6	1.6	-	1.4	1.8	21	20	620	1200	500	1075	0.320	0.193	0.38	0.232	0.094	0.087	175	220	155	200	190	245	190	245	190	245	7.22	10.9
120	1.9	1.6	1.6	-	1.4	1.8	23	21	720	1450	605	1335	0.253	0.163	0.30	0.184	0.090	0.085	195	250	170	220	220	280	220	280	220	280	9.12	13.8
150	2.1	1.8	1.8	-	1.4	2.0	25	23	860	1765	725	1645	0.206	0.124	0.25	0.150	0.089	0.084	220	280	190	245	250	320	250	320	250	320	11.4	17.3
185	2.3	2.0	2.0	-	1.4	2.0	27	25	1020	2135	875	2005	0.164	0.0991	0.20	0.120	0.086	0.082	240	305	210	260	290	370	290	370	290	370	14.1	21.3
240	2.5	2.2	2.2	-	1.4	2.0	30	28	1255	2675	1095	2515	0.125	0.0754	0.15	0.0924	0.084	0.080	270	345	225	285	335	425	335	425	335	425	18.2	27.6
300	2.8	2.4	2.4	-	1.4	2.0	32	31	1510	3345	1320	3145	0.100	0.0601	0.12	0.0746	0.082	0.078	295	375	245	310	380	475	380	475	380	475	22.8	34.5
400	3.0	2.6	2.6	-	1.4	2.2	36	35	1870	4240	1685	4140	0.0778	0.0470	0.0934	0.0597	0.081	0.077	325	400	275	335	435	550	435	550	435	550	30.4	46.0
500	3.4	3.0	3.0	-	1.4	2.2	40	38	2325	5310	2110	5165	0.0605	0.0366	0.0726	0.0481	0.080	0.077	345	425	295	355	480	600	480	600	480	600	38.0	57.5
630	3.9	3.4	3.4	-	1.4	2.4	43	44	2955	6865	2695	6500	0.0469	0.0283	0.0563	0.0395	0.077	0.075	390	470	320	375	550	700	550	700	550	700	47.9	72.5
800	3.9	3.4	3.4	-	1.4	2.4	48	48	3820	8565	3285	7940	0.0367	0.0221	0.0440	0.0314	0.078	0.077	440	530	360	420	620	745	620	745	620	745	60.8	92.0
1000	4.0	3.4	3.4	-	1.4	2.6	54	53	4375	10530	4010	10065	0.0291	0.0176	0.0349	0.0271	0.076	0.074	490	590	400	470	700	835	700	835	700	835	76.0	115.0

Table - 2 : 2 Core PVC Insulated armoured & unarmoured cable with Aluminium / Copper Conductor Conf. to IS:1554 (P-I)

Area mm ²	Thickness of PVC Insulation	Thickness of Inner Sheath	Dimension of Armour	Dimension of PVC Outer Sheath		Approx. Overall Diameter		Approx. Net Wt. of Cable				Max.D.C. Resistance at 20°C		Approx. A.C. Resistance at Opt. Temp.70°C		Approx. Reactance at 50Hz.	Current Rating						Short Circuit Rating for 1 Sec.							
				Arm	Un-Arm	Arm	Un-Arm	Armoured	Unarmoured	kg / km	kg / km	Al	Cu	Ohm / km	Ohm / km		Al	Cu	Al	Cu	Al	Cu	Al	Cu	Al	Cu				
2.5	0.9	0.3	1.4	-	1.24	1.8	13	15	420	450	200	210	7.41	4.61	14.5	8.87	0.106	0.102	25	32	21	27	21	27	21	27	21	27	0.19	0.29
4	1.0	0.3	1.4	-	1.24	1.8	14	16	495	540	230	280	4.61	3.08	8.9	5.52	0.102	0.097	32	41	27	35	27	35	27	35	27	35	0.30	0.46
6	1.0	0.3	1.4	-	1.24	1.8	15	17	565	635	280	350	3.08	1.93	5.54	3.69	0.097	0.091	40	50	34	44	35	45	35	45	35	45	0.46	0.70
10	1.0	0.3	1.4	-	1.24	1.8	19	19	680	775	350	475	1.93	1.33	3.7	2.19	0.091	0.086	55	70	45	58	47	60	47	60	47	60	0.76	1.16
16	1.0	0.3	1.4	-	1.4	1.8	18	18	780	920	425	515	1.15	0.727	1.44	0.87	0.086	0.082	70	90	58	75	59	78	59	78	59	78	1.22	1.86
25	1.2	0.3	1.4	-	1.4	2.0	21	19	995	1125	515	655	0.868	0.524	1.04	0.627	0.085	0.083	90	115	76	97	78	105	78	105	78	105	1.90	2.90
35	1.2	0.3	1.4	-	1.4	2.0	22	21	1100	1225	515	955	0.668	0.413	0.77	0.464	0.083	0.083	110	140	92	120	99	125	99	125	99	125	2.66	4.06
50	1.4	0.3	1.4	-	1.4	2.0	25	23	1400	1550	640	1230	0.524	0.321	0.53	0.321	0.077	0.077	135	165	115	145	125	155	125	155	125	155	3.80	5.80
70	1.4	0.3	1.4	-	1.4	2.0	27	26	1685	1825	815	1675	0.443	0.268	0.53	0.321	0.077	0.077	160	205	140	180	150	195	150	195	150	195	5.32	8.12
95	1.6	0.4	1.4	-	1.4	2.2	31	29	1900	2150	1090	2280	0.320	0.193	0.38	0.232	0.077	0.077	190	240	170	215	185	230	185	230	185	230	7.22	11.0
120	1.6	0.4	1.4	-	1.4	2.2	33	31	2150	2400	1385	2750	0.253	0.163	0.30	0.184	0.075	0.075	210	275	190	235	210	265	210	265	210	265	9.12	13.9
150	1.8	0.5	1.4	-	1.4	2.4	34	34	2420	2700	1685	3365	0.206	0.124	0.25	0.150	0.075	0.075	240	310	210	270	240	305	240	305	240	305	11.4	17.4
185	2.0	0.4	1.4	-	1.4	2.4	37	37	2820	3180	2025	4120	0.164	0.0991	0.198	0.124	0.074	0.074	275	350	240	300	275	350	275	350	275	350	14.1	21.5
240	2.2	0.5	1.4	-	1.4	2.6	44	42	3020	3480	2385	5260	0.125	0.0754	0.152	0.0929	0.074	0.074	320	405	275	345	325	415	325	415	325	415	18.2	27.8
300	2.4	0.6	1.4	-	1.4	2.8	48	46	3725	4285	2795	6640	0.100	0.0601	0.122	0.0753	0.074	0.074	355	430	305	385	385	465	385	465	385	465	22.8	34.8
400	2.6	0.7	1.4	-	1.4	3.0	52	52	4485	5120	3420	8500	0.0778	0.0470	0.096	0.0604	0.073	0.073	385	490	345	425	425	530	425	530	425	530	30.4	46.4
500	3.0	0.7	1.4	-	1.4	3.4	59	57	5420	6150	4065	10000	0.0669	0.0396	0.076	0.0489	0.073	0.073	437	555	391	482	476	601	476	601	476	601	38.0	58.0
630	3.4	0.7	1.4	-	1.4	3.8	66	64	6875	7850	5935	13760	0.0491	0.0283	0.061	0.0401	0.073	0.073	496	631	444	548	541	683	541	683	541	683	47.9	73.1

* The above data is indicative & may be changed without prior information. * Conductor up to 16 mm² will be non-compacted. * Above 16 mm² compacted sector conductor. * Cables can be supplied in multiples of 250 / 500 / 1000 mttrs per customers requirement.
Operating Conditions : * Ambient Air temp. 40°C * Ground temp. 30°C * Depth of laying. 75cm * Thermal resistivity of soil. 150°C-cm/W

LV PVC TECHNICAL DATA

Table - 3 : 3 Core PVC Insulated armoured & unarmoured cable with Aluminium / Copper Conductor Conf. to IS:1554 (P-I)

Area mm ²	Thickness of PVC Insulation		Thickness of PVC Inner Sheath		Dimension of Armour		Thickness of PVC Outer Sheath		Approx. Overall Diameter		Approx. Net Wt. of Cable				Max.D.C. Resistance at 20°C		Approx. A.C. Resistance at Opt. Temp.70°C		Approx. Reactance at 50Hz.		Current Rating						Short Circuit Rating for 1 Sec.													
	(Nom)	mm	(Min)	mm	Wire	Strip	mm	mm	mm	mm	Arm	Un-Arm	mm	mm	Armoured	Unarmoured	Ohm / km	Ohm / km	Ohm / km	Ohm / km	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	kA(rms)	kA(rms)		
2.5	0.9	1.4	0.3	1.24	1.4	-	1.24	1.8	16	13	480	505	205	250	12.1	7.41	8.87	0.106	21	27	18	24	18	24	18	24	18	24	18	24	18	24	18	24	0.19	0.29				
4	1.0	1.4	0.3	1.24	1.4	-	1.24	1.8	17	15	590	625	260	330	7.41	4.61	5.52	0.102	28	36	23	30	23	30	23	30	23	30	23	30	23	30	23	30	0.30	0.46				
6	1.0	1.4	0.3	1.24	1.4	-	1.24	1.8	19	16	615	730	315	420	4.61	3.08	3.69	0.097	35	45	30	38	30	38	30	38	30	38	30	38	30	38	30	38	0.30	0.46				
10	1.0	1.4	0.3	1.4	1.4	-	1.4	1.8	21	18	755	950	395	585	3.08	1.83	2.19	0.091	46	60	39	50	40	52	40	52	40	52	40	52	40	52	40	52	0.46	0.70				
16	1.0	1.4	0.3	1.4	1.4	-	1.4	1.8	20	19	670	965	400	665	1.91	1.15	1.38	0.086	60	77	50	64	51	66	51	66	51	66	51	66	51	66	51	66	51	66	0.70	1.16		
25	1.2	1.4	0.3	1.4	1.4	-	1.4	2.0	23	22	870	1325	575	1030	1.20	0.727	1.44	0.085	76	99	63	81	70	90	70	90	70	90	70	90	70	90	70	90	1.16	1.86				
35	1.2	1.4	0.3	1.4	1.4	-	1.4	2.0	25	24	1010	1660	710	1365	0.727	0.464	0.627	0.083	92	120	77	99	86	110	86	110	86	110	86	110	86	110	86	110	86	110	1.86	2.90		
50	1.4	1.4	0.3	1.56	1.4	-	1.56	2.0	28	27	1270	2150	900	1765	0.464	0.387	0.464	0.083	110	145	95	125	105	135	105	135	105	135	105	135	105	135	105	135	105	135	2.90	4.06		
70	1.4	1.4	0.4	1.56	1.4	-	1.56	2.2	31	30	1565	2880	1180	2470	0.387	0.268	0.321	0.077	135	175	115	150	130	165	130	165	130	165	130	165	130	165	130	165	130	165	130	165	4.06	5.80
95	1.6	1.6	0.4	1.56	1.4	-	1.56	2.2	35	33	1935	3725	1515	3280	0.268	0.193	0.232	0.077	165	210	140	175	155	200	175	200	155	195	180	230	175	200	155	195	180	230	5.80	8.12		
120	1.6	1.6	0.4	1.72	1.4	-	1.72	2.2	38	36	2280	4540	1790	4000	0.193	0.184	0.249	0.075	185	240	165	195	180	230	175	200	155	195	180	230	175	200	155	195	180	230	8.12	11.4		
150	1.8	1.8	0.5	1.88	1.4	-	1.88	2.4	42	40	2745	5540	2190	4935	0.206	0.124	0.249	0.074	210	270	175	225	205	265	205	265	205	265	205	265	205	265	205	265	205	265	11.4	17.4		
185	2.0	2.0	0.5	1.88	1.4	-	1.88	2.6	45	44	3245	6690	2695	6075	0.124	0.0991	0.198	0.074	235	300	200	255	240	305	240	305	240	305	240	305	240	305	240	305	240	305	17.4	21.5		
240	2.2	2.2	0.6	2.2	2.2	-	2.2	2.8	52	50	4250	8475	3485	7780	0.0991	0.0754	0.152	0.074	275	345	235	295	280	355	280	355	280	355	280	355	280	355	280	355	280	355	21.5	27.8		
300	2.4	2.4	0.6	2.36	2.0	-	2.36	3.0	58	55	5080	10500	4255	9800	0.0754	0.0601	0.122	0.073	305	385	260	335	315	400	315	400	315	400	315	400	315	400	315	400	315	400	27.8	34.8		
400	2.6	2.6	0.7	2.52	2.0	-	2.52	3.4	62	62	6230	13500	5375	12500	0.0601	0.0470	0.096	0.073	335	425	290	360	350	440	350	440	350	440	350	440	350	440	350	440	350	440	34.8	46.4		
500	3.0	3.0	0.7	2.84	2.0	-	2.84	3.6	72	69	7770	17000	6770	15800	0.0470	0.0366	0.076	0.073	380	482	329	408	425	516	425	516	425	516	425	516	425	516	425	516	425	516	46.4	58.0		

* The above data is indicative & may be changed without prior information. * Conductor up to 16 mm² will be non-compacted. * Above 16 mm² compacted sector conductor. * Cables can be supplied in multiples of 250 / 500 / 1000 mtrs per customers requirement.

Operating Conditions : * Ambient Air temp: 40°C * Ground temp: 30°C * Depth of laying: 75cm * Thermal resistivity of soil: 150°C-cm/W

Table - 4 : 3½ Core PVC Insulated armoured & unarmoured cable with Aluminium / Copper Conductor Conf. to IS:1554 (P-I)

Area mm ²	Thickness of PVC Insulation		Thickness of PVC Inner Sheath		Dimension of Armour		Thickness of PVC Outer Sheath		Approx. Overall Diameter		Approx. Net Wt. of Cable				Max.D.C. Resistance at 20°C		Approx. A.C. Resistance at Opt. Temp.70°C		Approx. Reactance at 50Hz.		Current Rating						Short Circuit Rating for 1 Sec.											
	Power	Neutral	mm	mm	mm	mm	mm	mm	mm	mm	Arm	Un-Arm	mm	mm	Armoured	Unarmoured	Ohm / km	Ohm / km	Ohm / km	Ohm / km	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	Amperes	kA(rms)	kA(rms)
25	1.2	1.0	0.3	4.0 X 0.8	1.4	2.0	1.4	2.0	25	23	985	1535	690	1245	1.20	0.727	1.44	0.085	76	99	63	81	70	90	70	90	70	90	70	90	70	90	70	90	1.90	2.90		
35	1.2	1.0	0.3	4.0 X 0.8	1.4	2.0	1.4	2.0	27	26	1150	1900	820	1560	0.868	0.524	1.04	0.083	92	120	77	99	86	110	86	110	86	110	86	110	86	110	86	110	86	110	2.90	4.06
50	1.4	1.2	0.3	4.0 X 0.8	1.56	2.0	1.56	2.0	30	28	1450	2460	1050	2060	0.641	0.387	0.77	0.083	110	145	95	125	105	135	105	135	105	135	105	135	105	135	105	135	105	135	4.06	5.80
70	1.4	1.2	0.4	4.0 X 0.8	1.56	2.2	1.56	2.2	33	32	1780	3290	1370	2885	0.443	0.268	0.533	0.077	135	175	115	150	130	165	130	165	130	165	130	165	130	165	130	165	130	165	5.80	8.12
95	1.6	1.4	0.4	4.0 X 0.8	1.56	2.2	1.56	2.2	38	36	2270	4315	1780	3815	0.320	0.193	0.385	0.077	165	210	140	175	155	200	175	200	155	195	180	230	175	200	155	195	180	230	8.12	11.4
120	1.6	1.4	0.5	4.0 X 0.8	1.72	2.4	1.72	2.4	41	40	2715	5350	2185	4815	0.263	0.153	0.305	0.075	185	240	155	195	180	230	175	200	155	195	180	230	175	200	155	195	180	230	11.4	13.9
150	1.8	1.4	0.5	4.0 X 0.8	1.88	2.4	1.88	2.4	45	43	3160	6330	2550	5760	0.206	0.124	0.249	0.075	210	270	175	225	205	265	205	265	205	265	205	265	205	265	205	265	205	265	13.9	17.4
185	2.0	1.6	0.5	4.0 X 0.8	2.04	2.6	2.04	2.6	50	48	3840	7810	3165	7165	0.164	0.0991	0.198	0.074	235	300	200	255	240	305	240	305	240	305	240	305	240	305	240	305	240	305	17.4	21.5
240	2.2	1.6	0.6	4.0 X 0.8	2.20	3.0	2.20	3.0	57	55	4845	9860	4070	9085	0.125	0.0754	0.152	0.074	275	345	235	295	280	355	280	355	280	355	280	355	280	355	280	355	280	355	21.5	27.8
300	2.4	1.8	0.6	4.0 X 0.8	2.36	3.2	2.36	3.2	62	60	5745	12360	4950	11370	0.100	0.0601	0.122	0.073	305	385	260	335	315	400	315	400	315	400	315	400	315	400	315	400	315	400	27.8	34.8
400	2.6	2.0	0.7	4.0 X 0.8	2.68	3.4	2.68	3.4	70	68	7040	15585	6240	14625	0.0778	0.0470	0.096	0.073	335	425	290	360	350	440	350	440	350	440	350	440	350	440	350	440	350	440	34.8	46.4
500	3.0	2.2	0.7	4.0 X 0.8	2.84	3.8	2.84	3.8	78	77	8920	19500	7970	18500	0.0605	0.0366	0.076	0.073	380	482	329	408	425	516	425	516	425	516	425	516	425	516	425	516	425	516	46.4	58.0

* The above data is indicative & may be changed without prior information. * Conductor up to 16 mm² will be non-compacted. * Above 16 mm² compacted sector conductor. * Cables can be supplied in multiples of 250 / 500 mtrs per customers requirement.

Operating Conditions : * Ambient Air temp: 40°C * Ground temp: 30°C * Depth of laying: 75cm * Thermal resistivity of soil: 150°C-cm/W

LV PVC TECHNICAL DATA

Table - 5 : 4 Core PVC Insulated armoured & unarmoured cable with Aluminium / Copper Conductor Conf. to IS:1554 (P-I)

Area mm ²	Thickness of PVC Insulation (Nom) mm	Thickness of Inner Sheath (Min) mm	Dimension of Armour		Thickness of PVC Outer Sheath		Approx. Overall Diameter		Approx. Net Wt. of Cable				Max.D.C. Resistance at 20°C		Approx. A.C. Resistance at Opt. Temp.70°C		Approx. Reactance at 50Hz.		Current Rating						Short Circuit Rating for 1 Sec.		
			Wire	Strip	Arm	Un-Arm	Arm	Un-Arm	Armoured	Unarmoured	kg / km	Al	Cu	kg / km	Al	Cu	Ohm / km	Al	Cu	Ohm / km	Al	Cu	Al	Cu	Al	Cu	Al
2.5	0.9	0.3	1.4	-	1.24	1.8	17	14	515	580	235	285	7.41	14.5	8.87	0.106	21	27	18	24	18	24	24	24	0.19	0.29	
4	1.0	0.3	1.4	-	1.24	1.8	19	16	625	720	305	400	4.61	8.9	5.52	0.102	28	36	23	30	23	30	30	30	0.30	0.49	
6	1.0	0.3	1.4	-	1.24	1.8	20	18	715	860	370	510	3.08	5.54	3.69	0.097	35	45	30	38	30	38	38	38	0.46	0.70	
10	1.0	0.3	-	4 X 0.8	1.40	2.0	22	21	800	970	465	715	1.83	3.7	2.19	0.091	46	60	39	50	40	52	50	52	0.76	1.16	
16	1.0	0.3	-	4 X 0.8	1.40	2.0	22	21	800	1180	510	895	1.91	2.3	1.38	0.086	60	77	50	64	51	66	64	66	1.22	1.86	
25	1.2	0.3	-	4 X 0.8	1.40	2.0	26	25	1055	1680	725	1330	1.20	1.44	0.87	0.085	76	99	63	81	70	90	81	90	1.90	2.90	
35	1.2	0.3	-	4 X 0.8	1.40	2.0	28	27	1260	2130	900	1775	0.868	1.04	0.627	0.083	92	120	77	99	86	110	99	110	2.66	4.06	
50	1.4	0.4	-	4 X 0.8	1.56	2.2	32	31	1590	2740	1190	2345	0.641	0.77	0.464	0.083	110	145	95	125	105	135	105	135	3.80	5.80	
70	1.4	0.4	-	4 X 0.8	1.56	2.2	36	34	1910	3710	1510	3230	0.443	0.533	0.321	0.077	135	175	115	150	130	165	130	165	5.32	8.12	
95	1.6	0.4	-	4 X 0.8	1.72	2.4	40	39	2525	4860	1985	4335	0.320	0.385	0.232	0.077	165	210	140	175	155	200	175	200	7.22	11.0	
120	1.6	0.5	-	4 X 0.8	1.88	2.4	44	42	3000	5935	2370	5320	0.253	0.305	0.184	0.075	185	240	155	195	180	230	180	230	9.12	13.9	
150	1.8	0.5	-	4 X 0.8	1.88	2.6	48	46	3535	7190	2875	6530	0.124	0.249	0.149	0.075	210	270	175	225	205	265	205	265	11.4	17.4	
185	2.0	0.6	-	4 X 0.8	2.04	2.8	54	52	4290	8860	3560	8070	0.164	0.0991	0.198	0.074	235	300	200	285	240	305	240	305	14.1	21.5	
240	2.2	0.6	-	4 X 0.8	2.36	3.0	61	58	5395	11100	4545	10285	0.125	0.0754	0.0929	0.074	275	345	235	295	280	355	280	355	18.2	27.8	
300	2.4	0.7	-	4 X 0.8	2.52	3.4	67	66	6550	13925	5685	13100	0.100	0.0601	0.122	0.0753	305	385	260	335	315	400	315	400	22.8	34.8	
400	2.6	0.7	-	4 X 0.8	2.84	3.6	75	73	8080	17845	7060	16630	0.0778	0.0366	0.0604	0.073	335	425	290	360	375	455	360	455	30.4	46.4	
500	3.0	0.7	-	4 X 0.8	3.0	4.0	84	83	10115	22350	8980	21050	0.0605	0.0176	0.0489	0.073	380	482	329	408	425	516	408	516	38.0	58.0	

• The above data is indicative & may be changed without prior information. • Conductor up to 16 mm² will be non-compacted. • Above 16 mm² compacted sector conductor. • Cables can be supplied in multiples of 250 / 500 / 1000 mtrs per customers requirement.
 Operating Conditions : • Ambient Air temp: 40°C • Ground temp: 30°C • Depth of laying: 75cm • Thermal resistivity of soil: 150°C-cm/W



LV PVC TECHNICAL DATA



Table - 6 : PVC Insulated armoured & unarmoured Control cable with Copper Conductor of 1.5mm² Conf. to IS:1554 (P-I)

No. of Cores X Area	Thick. of PVC Insulation (Nom)	Thickness of Inner Sheath (Min)	Dimension of Armour		Thickness of PVC Outer Sheath		Approx. Overall Diameter		Approx. Net Wt. of Cable		Max.D.C. Resistance at 20°C	Approx. A.C. Resistance at Opt. Temp.70°C	Approx. Reactance at 50Hz.	Current Rating			Short Circuit Rating for 1 Sec.
			Wire	Strip	Arm	Un-Arm	Arm	Un-Arm	Armoured	Unarmoured				Direct in Ground	In Duct	In Air	
No X mm ²	mm	mm	mm	mm	mm	mm	mm	mm	kg / km	kg / km	Ohm / km	Ohm / km	Ohm / km	Amps	Amps	Amps	kA(rms)
2 X 1.5	0.8	0.3	1.4	-	1.24	1.8	13.5	11	410	170	12.1	14.5	0.110	23	20	20	0.173
3 X 1.5	0.8	0.3	1.4	-	1.24	1.8	14	12	450	190	12.1	14.5	0.110	21	17	17	0.173
4 X 1.5	0.8	0.3	1.4	-	1.24	1.8	15	13	495	225	12.1	14.5	0.110	21	17	17	0.173
5 X 1.5	0.8	0.3	1.4	-	1.24	1.8	16	14	540	260	12.1	14.5	0.110	21	17	17	0.173
6 X 1.5	0.8	0.3	1.4	-	1.24	1.8	17	15	605	292	12.1	14.5	0.110	15	13	13	0.173
7 X 1.5	0.8	0.3	1.4	-	1.24	1.8	17	15	620	315	12.1	14.5	0.110	14	13	13	0.173
10 X 1.5	0.8	0.3	1.4	-	1.40	1.8	21	18	640	430	12.1	14.5	0.110	13	11	11	0.173
12 X 1.5	0.8	0.3	-	4 X 0.8	1.40	1.8	20	18	725	480	12.1	14.5	0.110	12	10	10	0.173
14 X 1.5	0.8	0.3	-	4 X 0.8	1.4	1.8	21	19	820	535	12.1	14.5	0.110	11	10	10	0.173
16 X 1.5	0.8	0.3	-	4 X 0.8	1.4	1.8	22	20	900	595	12.1	14.5	0.110	11	9	9	0.173
19 X 1.5	0.8	0.3	-	4 X 0.8	1.4	2.0	23	22	985	695	12.1	14.5	0.110	10	9	9	0.173
24 X 1.5	0.8	0.3	-	4 X 0.8	1.4	2.0	26	25	1215	860	12.1	14.5	0.110	9	8	8	0.173
27 X 1.5	0.8	0.3	-	4 X 0.8	1.4	2.0	27	26	1280	930	12.1	14.5	0.110	9	8	8	0.173
30 X 1.5	0.8	0.3	-	4 X 0.8	1.4	2.0	28	26	1390	1010	12.1	14.5	0.110	9	7	7	0.173
37 X 1.5	0.8	0.3	-	4 X 0.8	1.4	2.0	30	28	1600	1200	12.1	14.5	0.110	8	7	7	0.173
44 X 1.5	0.8	0.3	-	4 X 0.8	1.56	2.0	33	32	1870	1410	12.1	14.5	0.110	7	6	6	0.173
52 X 1.5	0.8	0.4	-	4 X 0.8	1.56	2.2	35	34	2135	1655	12.1	14.5	0.110	7	6	6	0.173
61 X 1.5	0.8	0.4	-	4 X 0.8	1.56	2.2	37	36	2395	1895	12.1	14.5	0.110	6	6	6	0.173

• The above data is indicative & may be changed without prior information. • Conductor up to 16 mm² will be non-compacted. • Above 16 mm² compacted sector conductor. • Cables can be supplied in multiples of 500 /1000 mtrs per customers requirement. Operating Conditions : • Ambient Air temp: 40°C • Ground temp: 30°C • Depth of laying: 75cm • Thermal resistivity of soil: 150°C-cm/W



LV PVC TECHNICAL DATA

Table - 7 : PVC Insulated armoured & unarmoured Control cable with Copper Conductor of 2.5mm² Conf. to IS:1554 (P-I)

No. of Cores X Area	Thick. of PVC Insulation (Nom)	Thick. of Inner Sheath (Min)	Dimension of Armour		Thickness of PVC Outer Sheath		Approx. Overall Diameter		Approx. Net Wt. of Cable		Max.D.C. Resistance at 20°C	Approx. A.C. Resistance at Opt. Temp.70°C	Approx. Reactance at 50Hz.	Current Rating			Short Circuit Rating for 1 Sec.
			Wire	Strip	Arm	Un-Arm	Arm	Un-Arm	Armoured	Unarmoured				Ohm / km	Ohm / km	Ohm / km	
No X mm ²	mm	mm	mm	mm	mm	mm	mm	mm	kg / km	kg / km	Ohm / km	Ohm / km	Ohm / km	Amps	Amps	Amps	0.288
2 X 2.5	0.9	0.3	1.4	-	1.24	1.8	15	12.5	480	215	7.41	8.89	0.106	32	27	27	0.288
3 X 2.5	0.9	0.3	1.4	-	1.24	1.8	16	13.0	520	250	7.41	8.89	0.106	27	24	24	0.288
4 X 2.5	0.9	0.3	1.4	-	1.24	1.8	17	14	605	295	7.41	8.89	0.106	27	24	24	0.288
5 X 2.5	0.9	0.3	1.4	-	1.24	1.8	18	15	675	345	7.41	8.89	0.106	27	24	24	0.288
6 X 2.5	0.9	0.3	1.4	-	1.24	1.8	19	17	755	395	7.41	8.89	0.106	21	18	18	0.288
7 X 2.5	0.9	0.3	1.4	-	1.24	1.8	19	17	775	450	7.41	8.89	0.106	20	17	17	0.288
10 X 2.5	0.9	0.3	-	4 X 0.8	1.40	1.8	22	21	895	590	7.41	8.89	0.106	18	15	15	0.288
12 X 2.5	0.9	0.3	-	4 X 0.8	1.40	2.0	23	22	970	685	7.41	8.89	0.106	17	14	14	0.288
14 X 2.5	0.9	0.3	-	4 X 0.8	1.40	2.0	24	23	1075	765	7.41	8.89	0.106	16	13	13	0.288
16 X 2.5	0.9	0.3	-	4 X 0.8	1.40	2.0	25	24	1185	850	7.41	8.89	0.106	15	12	12	0.288
19 X 2.5	0.9	0.3	-	4 X 0.8	1.40	2.0	26	25	1330	975	7.41	8.89	0.106	14	12	12	0.288
24 X 2.5	0.9	0.3	-	4 X 0.8	1.40	2.0	30	29	1600	1205	7.41	8.89	0.106	13	11	11	0.288
27 X 2.5	0.9	0.3	-	4 X 0.8	1.40	2.0	31	29	1745	1320	7.41	8.89	0.106	12	10	10	0.288
30 X 2.5	0.9	0.3	-	4 X 0.8	1.56	2.0	32	30	1900	1435	7.41	8.89	0.106	12	10	10	0.288
37 X 2.5	0.9	0.4	-	4 X 0.8	1.56	2.2	35	33	2215	1760	7.41	8.89	0.106	11	9	9	0.288
44 X 2.5	0.9	0.4	-	4 X 0.8	1.56	2.2	38	37	2595	2075	7.41	8.89	0.106	10	9	9	0.288
52 X 2.5	0.9	0.4	-	4 X 0.8	1.56	2.2	40	39	2920	2375	7.41	8.89	0.106	10	8	8	0.288
61 X 2.5	0.9	0.4	-	4 X 0.8	1.56	2.2	42	41	3315	2725	7.41	8.89	0.106	9	8	8	0.288

• The above data is indicative & may be changed without prior information. • Conductor up to 16 mm² will be non-compacted. • Above 16 mm² compacted sector conductor. • Cables can be supplied in multiples of 500 /1000 mtrs per customers requirement.
Operating Conditions : • Ambient Air temp. 40°C • Ground temp. 30°C • Depth of laying: 75cm • Thermal resistivity of soil: 150°C-cm/mv



Table 8 : Group Rating Factors for Circuits for Three Single Core Cables in Trefoil and Touching Horizontal Formation laid Direct in Ground

No. of Circuits	Spacing (Between Centers of Circuits)				
	Touching	15 cm	30 cm	45 cm	60 cm
2	0.78	0.81	0.85	0.88	0.90
3	0.88	0.71	0.77	0.81	0.83
4	0.61	0.65	0.72	0.76	0.79
6	0.53	0.58	0.66	0.71	0.76
8	0.50	0.64	0.62	0.67	0.72

Table 9 : Rating Factors for Groups of Twin and Multicore Cables laid Direct in Ground in Tier Formation

No. of Circuits	Spacing (Between Centres of Circuits)				
	Touching	15 cm	30 cm	45 cm	60 cm
4	0.6	0.67	0.73	0.76	0.78
6	0.52	0.58	0.63	0.67	0.69
8	0.47	0.51	0.57	0.59	0.61

Table 10 : Rating Factors for Variation in thermal resistivity of soil (Multicore Cables laid Direct in Ground)

Nominal area of conductor mm ²	For values of thermal resistivity of soil in °C-cm/W					
	100	120	150	200	250	300
1.5	1.10	1.05	1.0	0.92	0.86	0.81
2.5	1.10	1.05	1.0	0.92	0.86	0.81
4	1.10	1.05	1.0	0.92	0.86	0.81
6	1.10	1.05	1.0	0.92	0.86	0.81
10	1.10	1.06	1.0	0.92	0.85	0.8
16	1.12	1.06	1.0	0.91	0.84	0.79
25	1.14	1.08	1.0	0.91	0.84	0.78
35	1.15	1.08	1.0	0.91	0.84	0.77
50	1.15	1.08	1.0	0.91	0.84	0.77
70	1.15	1.08	1.0	0.9	0.83	0.76
95	1.15	1.08	1.0	0.9	0.83	0.76
120	1.17	1.09	1.0	0.9	0.82	0.76
150	1.17	1.09	1.0	0.9	0.82	0.76
185	1.18	1.09	1.0	0.89	0.81	0.75
140	1.18	1.09	1.0	0.89	0.81	0.75
300	1.18	1.09	1.0	0.89	0.81	0.75
400	1.19	1.1	1.0	0.89	0.81	0.75
500	1.21	1.1	1.0	0.88	0.80	0.74
630	1.22	1.1	1.0	0.88	0.80	0.74

Table 11 : Rating Factors for Variation in thermal resistivity of soil, three single core cables laid direct in the Ground (three cables in trefoil touching)

Nominal area of conductor mm ²	For values of thermal resistivity of soil in °C-cm/W					
	100	120	150	200	250	300
1.5	1.18	1.09	1.0	0.90	0.82	0.76
2.5	1.18	1.09	1.0	0.90	0.82	0.76
4	1.18	1.09	1.0	0.90	0.82	0.76
6	1.18	1.09	1.0	0.90	0.82	0.76
10	1.18	1.09	1.0	0.89	0.81	0.75
16	1.19	1.09	1.0	0.89	0.81	0.74
25	1.19	1.09	1.0	0.88	0.80	0.74
35	1.2	1.09	1.0	0.88	0.80	0.74
50	1.2	1.09	1.0	0.88	0.80	0.74
70	1.21	1.1	1.0	0.88	0.80	0.74
95	1.22	1.1	1.0	0.88	0.80	0.74
120	1.22	1.1	1.0	0.88	0.79	0.74
150	1.22	1.1	1.0	0.88	0.79	0.73
185	1.22	1.1	1.0	0.88	0.79	0.73
140	1.22	1.1	1.0	0.88	0.79	0.73
300	1.22	1.1	1.0	0.88	0.79	0.72
400	1.24	1.11	1.0	0.88	0.79	0.72
500	1.24	1.11	1.0	0.88	0.79	0.72
630	1.24	1.11	1.0	0.88	0.79	0.72

Table 12 : Rating Factors for Variation in Dept. of laying in Ground

Dept. of Laying (cm)	75	90	105	120	150	180 & Above
Rating Factor upto 22 mm ²	1	0.99	0.98	0.97	0.96	0.95
Rating Factor above 22 mm ² and upto 300 mm ²	1	0.98	0.97	0.96	0.94	0.93
Rating Factor above 300 mm ²	1	0.97	0.96	0.95	0.92	0.91

Table 13 : Rating Factors for Variation in Ambient Air Temperature

Air temp. °C	15	20	25	30	35	40	45	50	55
Rating Factor	1.4	4.32	1.25	1.16	1.09	1.0	0.9	0.8	0.68

Table 14 : Rating Factors for Variation in Ground Temperature

Group temp. °C	15	20	25	30	35	40	45	50	55
Rating Factor	1.17	1.12	1.06	1.0	0.94	0.87	0.79	0.71	0.61

Table 15A : Rating Factors for multicore cables laid on open racks in air, cables laid on cable trays exposed to air, the cables spaced by one cable diameter & trays in tier by 300 mm. The clearance between the wall & the cable is 25 mm.

No. of Racks	No. of Cables per Rack			
	2	3	6	9
1	0.98	0.96	0.93	0.92
2	0.95	0.93	0.9	0.89
3	0.94	0.92	0.89	0.88
6	0.93	0.9	0.87	0.86

Table 15B : Rating Factors for multicore cables laid on open racks in air, cables laid on cable trays exposed to air, the cables are touching & trays in tier by 300 mm. The clearance between the wall & the cable is 5 mm.

No. of Racks	No. of Cables per Rack			
	2	3	6	9
1	0.84	0.8	0.75	0.73
2	0.8	0.76	0.71	0.69
3	0.78	0.74	0.7	0.68
6	0.76	0.72	0.68	0.66

Table 15C : Rating Factors for single core cables in trefoil circuits laid on open racks in air, cables laid on cable trays exposed to air, the trefoil group spaced by two cable diameter & trays in tier by 300 mm. The clearance between the wall & the cable is 25 mm.

No. of Racks	No. of Cables per Rack		
	1	2	3
1	1	0.98	0.96
2	1	0.95	0.93
3	1	0.94	0.92
6	1	0.93	0.90

Table 16 : Rating Factors for Groups of Twin and multicore cables laid direct in ground in horizontal formation.

No. of Cables	No. of Cables per Rack				
	Touching	15 cm	30 cm	45 cm	60 cm
2	0.79	0.82	0.85	0.88	0.90
3	0.69	0.71	0.77	0.81	0.83
4	0.62	0.65	0.72	0.76	0.79
6	0.54	0.58	0.66	0.71	0.76
8	0.48	0.54	0.62	0.67	0.72

Table 17 : Rating Factors for Circuits of Two Single core cables, side by side and Touching, Horizontal formation, Laid Direct in Ground.

No. of Cables	No. of Cables per Rack				
	Touching	15 cm	30 cm	45 cm	60 cm
2	0.79	0.86	0.91	0.93	0.95
3	0.69	0.78	0.84	0.88	0.91
4	0.64	0.73	0.81	0.86	0.88
6	0.56	0.67	0.77	0.83	0.87
8	0.51	0.65	0.75	0.82	0.86

LV XLPE CABLES

The XLPE insulated heavy duty cables are introduced worldwide in mid sixties. These cables have overcome the limitations of PVC Insulated Cables such as thermal degradation, poor moisture resistant and thermo plastic in nature.

The advantages of XLPE Insulated cables in comparison to PVC insulated cables are as under:-

Technical Advantage

- 1) Higher current rating, higher short Circuit Rating. Approx. 1.2 times that of PVC.
- 2) Thermosetting in nature.
- 3) Higher insulation resistance, 100 times more than PVC cables.
- 4) Higher resistance to moisture.
- 5) Better resistance to surge currents.
- 6) Low Dielectric Losses.
- 7) Better resistance to chemicals.
- 8) Longer Service life
- 9) Comparatively higher cable operation temperature 90°C and short circuit temperature 250°C. against 70°C and 160°C Short Circuit Temperature of PVC.

Commercial Advantage

- 1) Lower laying cost because of comparatively smaller diameter of cable and lighter weight*.
- 2) Lower installation Charges as the diameter of cable is comparatively lesser with smaller bending radius, requiring less space requirement for laying of cables.
- 3) One size lower cable can be used as compared to PVC insulated cable.**
* Density of XLPE is lower than PVC. (0.92 against 1.4)
** For longer cable length voltage drop shall be considered.

Selection Of Power Cables

Power cables are generally selected considering the application. However following factors are important for selection of suitable cable construction required to transport electrical energy from one end to the other.

- 1) Maximum operating voltage.
- 2) Insulation level.
- 3) Frequency.
- 4) Load to be carried.
- 5) Possible overloading duration & magnitude.
- 6) Route length and voltage drop.
- 7) Mode of installation considering installation environment such as ambient & ground temperature, chemical & physical properties of soil.
- 8) Flame retardant properties.

All size of DCPL XLPE cables are designed to standard operating in India and abroad. The standards are adopted considering the geographical/chemical conditions and general applications of power for utilities, distribution and generation purposes.

The cables are manufactured conforming to India and International cables specifications for XLPE Insulated cables. Customer specifications can also be met.

DCPL is manufacturing wide range of cables, so it is important that while placing enquiries or orders, as much information as possible shall be given to DCPL, so that the enquiries and orders are dealt quickly and efficiently.

DCPL guidelines for the same are as under

- 1) Voltage Grade – 650/1100 Volts.
- 2) Relevant Indian Standard – IS-7098 (part-1) – 1988 or International standard – IEC-60502 & BS -5467.
- 3) Number of cores. – Single, Two, Three, Three & Half or Four Cores.
- 4) Conductor – 1.5 mm² to 1000 mm²
- 5) Conductor Material- Copper / Aluminium.
- 6) Type of Insulation -XLPE.
- 7) Type of Inner Sheathing – PVC Wrapped / PVC Extruded.
- 8) Type of Armour – Unarmoured / Strip Armoured / Wire Armoured.
- 9) Type of Outer Sheath – PVC / Flame Retardant / Flame Retardant Low Smoke / Zero Halogen (LSOH).
- 10) Total Length of cable required and drum length.

The Various details to the above guidelines are tabulated in The preceding pages tables.

HANDLING STORAGE AND LAYING OF NEOCAB XLPE CABLES

A) HANDLING

- 1) The cable with drum shall not be thrown or dropped on the ground from the carriers such as trucks or railway wagons, during unloading.
- 2) The cable drum shall be unloaded with the help of cranes or forklifts or using a proper ramp having inclination 1:3 to 1:4 in order to avoid mechanical damage to the outer layers of the cables.
- 3) The cables drum shall be lifted or stored with its flanges always vertical.
- 4) The cables drum shall be rolled in the direction of the arrow only in order to avoid loosening of cable winding. The drum shall not be rolled on rocky, uneven surface and for longer distances, it may damage the drum and cable.

B) STORAGE

- 1) The cable shall be stored in dry covered places having concrete / firm surface capable of bearing the load of drum.
- 2) The cables end shall be sealed properly in order to prevent moisture ingress.
- 3) Antirodent / termite repulsion treatment shall be applied to the site wherever the drum are stored for very long period of time.

C) LAYING

- 1) Neocab recommend the laying installation of cables as per IS : 1255/84.
- 2) Care shall be taken during laying to avoid sharp bending and twisting.
- 3) Cable shall be un wound from the drum by lifting the drum on the center shaft supported both ends with suitable jacks /stands.
- 4) Under no circumstances the cable winding shall be lifted off a coil or drum laying flat at the flanges. This would cause serious twist and damages.
- 5) Suitable protection shall be provided to the cables against mechanical damages, it includes covers, pipes etc.

D) Recommended minimum bending radius for 650/1100 volts heavy duty cables

Single Core – 15 X D
Multi Core – 12 X D

Where D = Diameter of cable in mm

E) Recommended safe pulling force with stockings

A) For Unarmoured Cables	: $P = 5D^2$	Where P = Pulling force
B) For Armoured Cables	: $P = 9D^2$	D = Diameter of cable in mm

F) Recommended safe pulling force when Pulled with pulling eyes

A) For Aluminium Conductors	: 30N / mm ²
B) Copper Conductor	: 50N / mm ²



Advantages

Advantages of XLPE cable as compared to thermoplastic cable like PVC are listed below:

<ul style="list-style-type: none"> • Higher power rating. • Higher emergency overload rating. • Higher insulation resistance (100 times more than that of PVC.) • Higher resistance to moisture (100 times more than that of PVC.) • Better resistance to surge currents. 	<ul style="list-style-type: none"> • Capacity to withstand localized hot spot temperature (very important for industrial wiring in steel power stations etc.) • Resistant to chemicals and corrosive gases etc. - hence suitable for installation in polluted atmosphere. • Resistance to vibration, impact etc. - no hazard of hot deformation. • Quick method of jointing and termination with simple, - non expensive accessory. • Longer cable life.
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COMPARATIVE CURRENT RATINGS OF 1.1KV PVC AND XLPE CABLES continuous current rating of 3 & 4 core cables armoured and unarmoured laid Direct in the Ground or in air 650/1100V Aluminium conductor.

NOMINAL AREA OF CONDUCTOR	3 or 4 core cables to IS: 1554/1 (PVC)				3 or 4 core cables to IS: 7098/1 (XLPE)			
	In Ground	In Air	Approx. Voltage Drop	kA	In Ground	In Air	Approx. Voltage Drop	kA
(mm ²)	(Amps)	(Amps)	(mv/Amps/m)	sec.	(Amps)	(Amps)	(mv/Amps/m)	sec.
16	60	51	4.0	1.22	73	70	4.2	1.50
25	76	70	2.5	1.90	94	96	2.7	2.35
35	92	86	1.8	2.66	113	117	1.9	3.29
50	100	105	1.3	3.80	133	142	1.4	4.70
70	135	130	0.9	5.32	164	179	0.99	6.58
95	165	155	0.7	7.22	196	221	0.72	8.93
120	185	180	0.5	9.12	223	257	0.58	11.28
150	210	205	0.5	11.40	249	292	0.48	14.10
185	235	240	0.4	14.06	282	337	0.39	17.39
240	275	280	0.3	18.24	326	399	0.31	22.56
300	305	315	0.2	22.80	367	456	0.26	28.20
400	335	375	0.2	30.40	418	530	0.21	37.60



LV XLPE TECHNICAL DATA



Table - 1 : Single Core XLPE Insulated armoured & unarmoured cable with Aluminium / Copper Conductor Conf. to IS:7098 (P-I)

Area	Thickness of XLPE Insulation		Dimension of Armour		Thickness of PVC Outer Sheath		Approx. Overall Diameter		Approx. Net Wt. of Cable				Max.D.C. Resistance at 20°C				Approx. A.C. Resistance at Opt. Temp.90°C				Approx. Reactance at 50Hz.				Current Rating				Short Circuit Rating for 1 Sec.					
	Arm	Un-Arm	Wire	Strip	Arm	Un-Arm	Arm	Un-Arm	Armoured	Unarmoured	kg / km	Al	Cu	kg / km	Al	Cu	Ohm / km	Al	Cu	Ohm / km	Al	Cu	Ohm / km	Arm	Un-Arm	Amps	Al	Cu	Amps	Al	Cu	Al	Cu	Al
1.5	1.0	0.7	-	-	1.8	1.8	-	7	-	-	65	-	7.41	15.43	-	-	0.158	-	25	34	24	25	0.152	-	24	-	22	-	-	-	22	-	0.21	
2.5	1.0	0.7	-	-	1.8	1.8	-	7.5	-	80	-	12.1	9.45	-	-	0.146	-	34	44	33	34	0.136	-	33	-	30	-	-	-	30	-	0.36		
4	1.0	0.7	1.4	-	1.24	1.8	10.5	8	130	100	100	7.41	5.88	9.50	5.88	0.132	35	44	43	44	0.127	35	44	43	30	39	39	39	39	39	0.38	0.57		
6	1.0	0.7	1.4	-	1.24	1.8	11	9	155	190	90	4.61	3.93	5.91	3.93	0.143	44	56	42	55	0.118	56	74	58	49	49	49	49	49	49	0.56	0.86		
10	1.0	0.7	1.4	-	1.24	1.8	12	10	235	235	105	3.08	1.83	3.95	2.33	0.132	58	74	58	73	0.112	75	97	74	67	67	67	67	67	67	0.94	1.43		
16	1.0	0.7	1.4	-	1.24	1.8	13	11	300	300	130	2.25	1.91	2.45	1.47	0.125	97	125	96	125	0.107	97	125	96	92	92	92	92	92	92	1.54	2.29		
25	1.2	0.9	1.4	-	1.24	1.8	15	12	425	425	170	3.20	1.20	0.927	1.54	0.119	114	148	114	143	0.102	114	148	114	118	118	118	118	118	2.35	3.56			
35	1.2	0.9	1.4	-	1.24	1.8	16	13	540	540	205	4.20	0.868	1.113	0.688	0.114	138	180	138	180	0.100	138	180	138	142	142	142	142	142	3.29	5.01			
50	1.3	1.0	1.4	-	1.24	1.8	17	15	670	670	260	5.45	0.641	0.822	0.494	0.109	152	203	152	203	0.100	152	203	152	152	152	152	152	152	4.70	7.15			
70	1.4	1.1	1.4	-	1.24	1.8	19	17	850	850	345	7.70	0.443	0.568	0.342	0.101	170	222	170	222	0.092	170	222	170	194	194	194	194	194	6.58	10.01			
95	1.4	1.1	1.4	-	1.24	1.8	20	18	1130	1130	430	10.10	0.193	0.411	0.247	0.096	203	265	199	255	0.089	203	265	199	255	255	255	255	255	8.93	13.6			
120	1.5	1.2	-	-	1.40	1.8	22	20	1380	1380	535	12.65	0.253	0.325	0.196	0.087	231	301	225	286	0.087	231	301	225	286	286	286	286	286	11.28	17.2			
150	1.7	1.4	-	-	1.40	2.0	24	22	1660	1660	655	15.65	0.206	0.265	0.159	0.082	258	337	246	309	0.082	258	337	246	309	309	309	309	309	14.1	21.5			
185	1.9	1.6	-	-	1.40	2.0	26	25	1915	1915	785	19.15	0.164	0.211	0.1281	0.089	292	379	273	341	0.085	292	379	273	341	341	341	341	341	17.4	26.5			
240	2.0	1.7	-	-	1.40	2.0	29	27	2540	2540	990	24.10	0.125	0.162	0.0986	0.087	338	436	290	362	0.083	338	436	290	362	362	362	362	362	22.6	34.3			
300	2.1	1.8	-	-	1.56	2.0	31	29	3185	3185	1160	29.85	0.100	0.130	0.0797	0.085	359	466	310	417	0.081	359	466	310	417	417	417	417	28.2	42.9				
400	2.4	2.0	-	-	1.56	2.2	35	33	3680	3680	1515	38.95	0.0778	0.1023	0.0639	0.083	371	539	322	443	0.080	371	539	322	443	443	443	443	37.6	57.2				
500	2.6	2.2	-	-	1.56	2.2	38	37	4060	4060	1890	48.90	0.0605	0.0809	0.0518	0.082	393	597	336	480	0.079	393	597	336	480	480	480	480	47.0	71.5				
630	2.8	2.4	-	-	1.72	2.2	43	41	4590	4590	2325	62.85	0.0469	0.0644	0.0424	0.080	447	657	362	516	0.077	447	657	362	516	516	516	516	59.2	90.1				
800	3.1	2.6	-	-	1.88	2.4	48	46	5320	5320	2930	79.65	0.0367	0.0524	0.0358	0.079	505	693	432	540	0.077	505	693	432	540	540	540	540	75.2	114.4				
1000	3.3	2.8	-	-	2.04	2.6	53	51	6110	6110	3650	97.05	0.0291	0.0438	0.0311	0.078	567	735	485	574	0.077	567	735	485	574	574	574	574	94.0	143.0				

• The above data is indicative & may be changed without prior information. • Conductor up to 16 mm² will be non-compacted. • Above 16 mm² compacted sector conductor. • Cables can be supplied in multiples of 500/1000 mtrs as per customers requirement.
 Operating Conditions : • Ambient Air temp: 40°C • Ground temp: 30°C • Depth of laying: 75cm • Thermal resistivity of soil: 150°C-cm/W



LV XLPE TECHNICAL DATA

Table - 2 : 2 Core XLPE Insulated armoured & unarmoured cable with Aluminium / Copper Conductor Conf. to IS:7098 (P-I)

Area	Thickness of XLPE Insulation (Nom)	Thickness of Inner Sheath (Min)	Thickness of PVC Outer Sheath		Approx. Overall Diameter		Approx. Net Wt. of Cable				Max.D.C. Resistance at 20°C				Approx. A.C. Resistance at Opt. Temp.90°C	Approx. Reactance at 50Hz.	Current Rating						Short Circuit Rating for 1 Sec.		
			Arm	Un-Arm	Arm	Un-Arm	Armoured		Unarmoured		Ohm / km	Al	Cu	Ohm / km			Al	Cu	Amps	Al	Amps	Al	Amps	Al	Cu
							Wire	Strip	kg / km	Cu															
1.5	0.7	0.3	1.4	1.24	1.8	13	11	365	—	150	—	12.1	15.43	0.106	—	30	24	—	27	—	—	0.21			
2.5	0.7	0.3	1.4	1.24	1.8	14	12	405	—	185	—	7.41	9.45	0.099	—	38	32	—	36	—	—	0.36			
4	0.7	0.3	1.4	1.24	1.8	15	13	435	485	190	240	4.61	5.88	0.093	36	51	32	41	30	30	0.38	0.57			
6	0.7	0.3	1.4	1.24	1.8	16	14	490	560	230	300	3.08	3.93	0.089	46	63	41	52	39	62	0.56	0.86			
10	0.7	0.3	1.4	1.24	1.8	17	15	480	650	250	415	1.83	2.33	0.084	63	85	54	69	53	84	0.94	1.43			
16	0.7	0.3	1.4	1.4	1.8	18	16	585	705	290	440	1.91	1.47	0.081	84	110	69	90	84	111	1.50	2.29			
25	0.9	0.3	1.4	1.4	2.0	19	18	600	900	325	625	1.20	0.927	0.081	108	143	87	116	107	144	2.35	3.58			
35	0.9	0.3	1.4	1.4	2.0	21	19	705	1145	400	825	0.868	0.524	0.079	129	171	105	139	131	178	3.29	5.01			
50	1.0	0.3	1.4	1.4	2.0	23	21	825	1410	500	1060	0.641	0.387	0.078	163	202	125	165	158	215	4.70	7.15			
70	1.1	0.4	1.4	1.56	2.0	26	24	1065	1925	690	1500	0.443	0.268	0.074	188	247	154	203	200	269	6.88	10.01			
95	1.1	0.4	1.4	1.56	2.2	29	27	1300	2450	880	2000	0.320	0.193	0.071	225	297	185	244	235	333	8.93	13.6			
120	1.2	0.4	1.4	1.56	2.2	31	30	1540	3015	1080	2550	0.253	0.197	0.072	239	338	228	279	246	385	11.3	17.2			
150	1.4	0.4	1.4	1.72	2.2	34	32	1800	3625	1330	3100	0.206	0.128	0.072	274	379	232	313	289	439	14.1	21.5			
185	1.6	0.5	1.4	1.72	2.4	37	35	2165	4400	1600	3800	0.164	0.0991	0.071	314	427	288	355	308	507	17.4	26.5			
240	1.7	0.5	1.4	1.88	2.6	41	40	2600	5500	2000	4800	0.125	0.0754	0.071	365	493	330	411	364	598	22.6	34.3			
300	1.8	0.5	1.4	2.04	2.8	45	43	3275	6990	2520	6100	0.100	0.0601	0.071	405	553	366	462	409	682	28.2	42.9			
400	2.0	0.6	1.4	2.36	3.0	51	49	4040	8825	3120	7900	0.0778	0.0470	0.070	439	624	414	522	470	785	37.6	57.2			
500	2.2	0.7	1.4	2.52	3.4	56	54	4950	11000	3900	10000	0.0605	0.0366	0.070	488	707	469	592	533	890	47.0	71.5			
630	2.4	0.7	1.4	2.88	3.6	62	60	6060	13800	4950	12600	0.0469	0.0283	0.0697	585	804	533	673	606	1012	58.2	90.1			

Table - 3 : 3 Core XLPE Insulated armoured & unarmoured cable with Aluminium / Copper Conductor Conf. to IS:7098 (P-I)

Area	Thickness of XLPE Insulation (Nom)	Thickness of Inner Sheath (Min)	Thickness of PVC Outer Sheath		Approx. Overall Diameter		Approx. Net Wt. of Cable				Max.D.C. Resistance at 20°C				Approx. A.C. Resistance at Opt. Temp.90°C	Approx. Reactance at 50Hz.	Current Rating						Short Circuit Rating for 1 Sec.		
			Arm	Un-Arm	Arm	Un-Arm	Armoured		Unarmoured		Ohm / km	Al	Cu	Ohm / km			Al	Cu	Amps	Al	Amps	Al	Amps	Al	Cu
							Wire	Strip	kg / km	Cu															
1.5	0.7	0.3	1.4	1.24	1.8	14	12	400	—	170	—	12.1	15.43	0.106	—	22	20	—	23	—	—	0.21			
2.5	0.7	0.3	1.4	1.24	1.8	15	13	465	—	215	—	7.41	9.45	0.099	—	29	27	—	31	—	—	0.36			
4	0.7	0.3	1.4	1.24	1.8	16	14	475	205	280	7.41	4.61	5.88	0.093	34	38	28	35	29	41	0.38	0.57			
6	0.7	0.3	1.4	1.24	1.8	17	16	550	655	335	360	3.08	3.93	0.089	42	47	36	44	38	52	0.56	0.86			
10	0.7	0.3	1.4	1.24	1.8	19	17	645	830	325	510	1.83	2.33	0.084	55	63	44	59	50	72	0.94	1.43			
16	0.7	0.3	1.4	1.24	1.8	19	17	575	865	335	625	1.91	1.47	0.081	71	94	58	75	71	94	1.50	2.29			
25	0.9	0.3	1.4	1.4	2.0	21	20	740	1195	450	900	1.20	0.927	0.081	91	119	74	97	93	123	2.35	3.58			
35	0.9	0.3	1.4	1.4	2.0	23	22	900	1560	550	1200	0.868	0.524	0.079	109	142	88	116	114	151	3.29	5.01			
50	1.0	0.4	1.4	1.56	2.2	26	24	1075	1950	720	1530	0.641	0.387	0.078	129	169	105	138	138	184	4.70	7.15			
70	1.1	0.4	1.4	1.56	2.2	30	29	1400	2700	990	2220	0.443	0.268	0.074	158	208	130	170	174	231	6.58	10.01			
95	1.1	0.4	1.4	1.56	2.2	33	31	1720	3500	1260	2910	0.320	0.193	0.071	181	249	150	205	215	285	8.93	13.6			
120	1.2	0.4	1.4	1.72	2.2	36	34	2030	4250	1440	3660	0.253	0.197	0.072	217	285	180	234	249	331	11.3	17.2			
150	1.4	0.5	1.4	1.88	2.4	40	38	2430	5200	1800	4500	0.206	0.124	0.071	243	317	202	264	285	378	14.1	21.5			
185	1.6	0.5	1.4	2.04	2.6	44	42	2950	6350	2220	5610	0.164	0.0991	0.071	276	358	230	298	330	436	17.4	26.5			
240	1.7	0.6	1.4	2.20	2.8	50	48	3750	8100	2700	7200	0.125	0.0754	0.070	319	413	267	345	391	514	22.6	34.3			
300	1.8	0.6	1.4	2.36	3.0	55	53	4440	9990	3600	9000	0.100	0.0601	0.070	360	462	301	387	447	596	28.2	42.9			
400	2.0	0.7	1.4	2.52	3.2	61	59	5550	12825	4500	11700	0.0778	0.0470	0.070	406	521	342	445	461	674	37.6	57.2			
500	2.2	0.7	1.4	2.68	3.6	68	66	6600	15900	5550	14700	0.0605	0.0366	0.070	460	591	388	505	523	764	47.0	71.5			
630	2.4	0.7	1.4	2.84	3.8	75	73	8400	20100	7200	18900	0.0469	0.0283	0.0697	523	671	440	573	594	868	58.2	90.1			

* The above data is indicative & may be changed without prior information. • Conductor up to 16 mm² will be non-compacted. • Above 16 mm² compacted sector conductor. • Cables can be supplied in multiples of 250/500 /1000 mtrs per customers requirement.
Operating Conditions: • Ambient Air temp: 40°C • Ground temp: 30°C • Depth of laying: 75cm • Thermal resistivity of soil: 150-Cm/W

LV XLPE TECHNICAL DATA



Table - 4 : 3/2 Core XLPE Insulated armoured & unarmoured cable with Aluminium / Copper Conductor Conf. to IS:7098 (P-I)

Area	Thickness of XLPE Insulation (Nom)		Thickness of Inner Sheath (Min)	Dimension of Armour Strip	Thickness of PVC Outer Sheath		Approx. Overall Diameter		Approx. Net Wt. of Cable				Max.D.C. Resistance at 20°C	Approx. A.C. Resistance at Opt. Temp.90°C				Approx. Reactance at 50Hz.	Current Rating						Short Circuit Rating for 1 Sec.	
	Power	Neutral			Arm	Un-Arm	Arm	Un-Arm	Arm	Un-Arm	Armoured	Unarmoured		Ohm / km	Ohm / km	Ohm / km	Ohm / km		Al	Cu	Al	Cu	Al	Cu	Al	Cu
25	16	0.9	0.7	0.3	4.0 X 0.8	1.40	2.0	23	22	860	1400	540	1080	1.20	0.727	1.54	0.927	0.081	91	119	74	97	93	123	2.35	3.58
35	16	0.9	0.7	0.3	4.0 X 0.8	1.40	2.0	25	24	1000	1760	660	1440	0.868	0.524	1.11	0.668	0.079	109	142	88	116	114	151	3.29	5.01
50	25	1.0	0.9	0.3	4.0 X 0.8	1.40	2.0	27	26	1235	2225	810	1890	0.641	0.387	0.822	0.494	0.078	129	169	105	138	138	184	4.70	7.15
70	35	1.1	0.9	0.4	4.0 X 0.8	1.56	2.2	32	31	1600	3100	1110	2700	0.443	0.268	0.568	0.342	0.0742	158	208	130	170	174	231	6.58	10.01
95	50	1.1	1	0.4	4.0 X 0.8	1.56	2.2	35	34	1900	4000	1440	3510	0.320	0.193	0.411	0.247	0.0725	191	249	157	205	215	285	8.93	13.6
120	70	1.2	1.1	0.4	4.0 X 0.8	1.72	2.2	39	38	2390	5040	1710	4440	0.253	0.153	0.325	0.197	0.0722	217	283	180	234	249	331	11.28	17.2
150	70	1.4	1.1	0.5	4.0 X 0.8	1.72	2.4	43	42	2770	5975	2160	5400	0.206	0.124	0.265	0.160	0.0727	243	317	202	264	285	378	14.1	21.5
185	95	1.6	1.1	0.5	4.0 X 0.8	1.88	2.6	48	45	3400	7380	2160	6690	0.164	0.0991	0.211	0.128	0.072	276	358	230	298	330	436	17.4	26.5
240	120	1.7	1.2	0.6	4.0 X 0.8	2.04	2.8	54	52	4200	9300	3420	8550	0.125	0.0754	0.162	0.0989	0.0713	319	413	267	345	391	514	22.6	34.3
300	150	1.8	1.4	0.6	4.0 X 0.8	2.20	3.0	59	56	5100	11400	4140	10620	0.100	0.0601	0.130	0.08	0.071	360	462	301	387	447	586	28.2	42.9
400	185	2.0	1.6	0.7	4.0 X 0.8	2.52	3.4	67	65	6300	14820	5400	13900	0.0778	0.0470	0.102	0.0641	0.070	406	521	342	445	461	674	37.6	57.2
500	240	2.2	1.7	0.7	4.0 X 0.8	2.68	3.6	74	73	7770	18300	6660	17400	0.0605	0.0366	0.081	0.0519	0.070	460	591	388	505	523	764	47.0	71.5
630	300	2.4	1.8	0.7	4.0 X 0.8	3.00	4.0	84	82	9900	23400	8100	22200	0.0605	0.0366	0.0644	0.0424	0.0697	523	671	440	573	594	868	59.2	90.1

• The above data is indicative & may be changed without prior information. • Conductor up to 16 mm² will be non-compacted. • Above 16 mm² compacted sector conductor. • Cables can be supplied in multiples of 250/500 mtrs per customers requirement. Operating Conditions : • Ambient/Air temp: 40°C • Ground temp: 30°C • Depth of laying: 75cm • Thermal resistivity of soil: 150°C-cm/W

Table - 5 : 4 Core XLPE Insulated armoured & unarmoured cable with Aluminium / Copper Conductor Conf. to IS:7098 (P-I)

Area	Thickness of Insulation (Nom)	Thickness of Inner Sheath (Min)	Dimension of Armour	Thickness of PVC Outer Sheath		Approx. Overall Diameter		Approx. Net Wt. of Cable				Max.D.C. Resistance at 20°C	Approx. A.C. Resistance at Opt. Temp.90°C				Approx. Reactance at 50Hz.	Current Rating						Short Circuit Rating for 1 Sec.	
				Arm	Un-Arm	Arm	Un-Arm	Armoured	Unarmoured	Armoured	Unarmoured		Ohm / km	Ohm / km	Ohm / km	Ohm / km		Al	Cu	Al	Cu	Al	Cu	Al	Cu
1.5	0.7	0.3	1.4	1.4	1.8	12	15	440	200	440	200	12.1	15.43	0.106	22	22	20	20	23	23	23	23	23	0.21	0.36
2.5	0.7	0.3	1.4	1.4	1.8	13	16	515	250	515	250	7.41	9.45	0.099	29	29	27	27	31	31	31	31	31	0.36	0.57
4	0.7	0.3	1.4	1.4	1.8	15	17	625	335	625	335	4.61	5.88	0.093	34	34	28	28	35	35	35	35	35	0.56	0.86
6	0.7	0.3	1.4	1.4	1.8	18	18	750	435	750	435	3.08	3.93	0.089	42	42	36	36	44	44	44	44	44	0.86	1.43
10	0.7	0.3	1.4	1.4	1.8	21	18	1000	625	1000	625	1.83	3.95	0.084	55	55	47	47	59	59	59	59	59	1.43	2.29
16	0.7	0.3	1.4	1.4	1.8	21	19	1050	795	1050	795	1.91	2.42	0.081	71	71	58	58	71	71	71	71	71	1.50	2.29
25	0.9	0.3	1.4	1.4	1.8	23	23	1500	555	1500	555	1.20	1.54	0.081	91	91	74	74	93	93	93	93	93	2.35	3.58
35	0.9	0.3	1.4	1.4	1.8	26	25	1985	690	1985	690	0.868	1.11	0.079	109	109	88	88	114	114	114	114	114	3.29	5.01
50	1.0	0.3	1.4	1.4	1.8	29	28	2500	900	2500	900	0.641	0.387	0.078	129	129	105	105	138	138	138	138	138	4.70	7.15
70	1.1	0.4	1.4	1.4	1.8	33	33	3460	1200	3460	1200	0.443	0.268	0.0742	158	158	130	130	174	174	174	174	174	6.58	10.01
95	1.1	0.4	1.4	1.4	1.8	37	36	4465	1530	4465	1530	0.320	0.193	0.0725	191	191	157	157	205	205	205	205	205	8.93	13.6
120	1.2	0.5	1.4	1.4	1.8	41	40	5550	1800	5550	1800	0.253	0.153	0.0722	217	217	180	180	234	234	234	234	234	11.28	17.2
150	1.4	0.5	1.4	1.4	1.8	46	45	6900	2340	6900	2340	0.164	0.0991	0.072	243	243	202	202	264	264	264	264	264	14.1	21.5
185	1.6	0.5	1.4	1.4	1.8	46	45	8300	3000	8300	3000	0.128	0.081	0.0722	276	276	230	230	298	298	298	298	298	17.4	26.5
240	1.7	0.6	1.4	1.4	1.8	56	56	10500	3900	10500	3900	0.0754	0.0470	0.0713	319	319	267	267	345	345	345	345	345	22.6	34.3
300	1.8	0.7	1.4	1.4	1.8	64	62	13000	4590	13000	4590	0.0601	0.0366	0.071	360	360	267	267	345	345	345	345	345	28.2	42.9
400	2.0	0.7	1.4	1.4	1.8	71	70	16800	6000	16800	6000	0.0470	0.0283	0.070	406	406	342	342	445	445	445	445	445	37.6	57.2
500	2.2	0.7	1.4	1.4	1.8	80	79	20820	7500	20820	7500	0.0366	0.0233	0.0697	460	460	388	388	505	505	505	505	505	47.0	71.5
630	2.4	0.7	1.4	1.4	1.8	89	88	27000	9600	27000	9600	0.0283	0.0164	0.0697	523	523	440	440	573	573	573	573	573	59.2	90.1

• The above data is indicative & may be changed without prior information. • Conductor up to 16 mm² will be non-compacted. • Above 16 mm² compacted sector conductor. • Cables can be supplied in multiples of 250/500/1000 mtrs per customers requirement. Operating Conditions : • Ambient/Air temp: 40°C • Ground temp: 30°C • Depth of laying: 75cm • Thermal resistivity of soil: 150°C-cm/W

LV XLPE TECHNICAL DATA

Table - 6 : XLPE Insulated armoured & unarmoured Control cable with Copper Conductor of 1.5mm² Conf. to IS:7098 (P-I)

No. of Cores X Area	Thick. of XPLE Insulation (Nom)	Thick. of Linner Sheath (Min)	Dimension of Armour		Thickness of PVC Outer Sheath		Approx. Overall Diameter		Approx. Net Wt. of Cable		Max.D.C. Resistance at 20°C	Approx. A.C. Resistance at Opt. Temp.70°C	Approx. Reactance at 50Hz.	Current Rating			Short Circuit Rating for 1 Sec.		
			Wire	Strip	Arm	Un-Arm	Arm	Un-Arm	Armoured	Unarmoured				kg / km	kg / km	Ohm / km		Ohm / km	Direct in Ground
No X mm ²	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg / km	kg / km	Ohm / km	Ohm / km	Amps	Amps	Amps	kA(rms)
2 X 1.5	0.7	0.3	1.4	-	1.24	1.8	13	11	365	150	12.1	15.43	0.106	30	24	27	0.215		
3 X 1.5	0.7	0.3	1.4	-	1.24	1.8	14	12	400	170	12.1	15.43	0.106	22	20	23	0.215		
4 X 1.5	0.7	0.3	1.4	-	1.24	1.8	15	12	440	200	12.1	15.43	0.106	22	20	23	0.215		
5 X 1.5	0.7	0.3	1.4	-	1.24	1.8	15	13	510	225	12.1	15.43	0.106	22	20	23	0.215		
6 X 1.5	0.7	0.3	1.4	-	1.24	1.8	16	14	570	250	12.1	15.43	0.106	20	16	18	0.215		
7 X 1.5	0.7	0.3	1.4	-	1.24	1.8	16	14	585	275	12.1	15.43	0.106	19	15	17	0.215		
10 X 1.5	0.7	0.3	1.4	-	1.24	1.8	19	17	750	360	12.1	15.43	0.106	17	13	15	0.215		
12 X 1.5	0.7	0.3	1.4	-	1.24	1.8	20	18	800	400	12.1	15.43	0.106	16	13	14	0.215		
14 X 1.5	0.7	0.3	1.4	-	1.40	1.8	21	19	900	450	12.1	15.43	0.106	15	12	13	0.215		
16 X 1.5	0.7	0.3	-	4 X 0.8	1.40	1.8	21	19	790	500	12.1	15.43	0.106	14	11	12	0.215		
19 X 1.5	0.7	0.3	-	4 X 0.8	1.40	2.0	22	20	880	575	12.1	15.43	0.106	13	11	12	0.215		
24 X 1.5	0.7	0.3	-	4 X 0.8	1.40	2.0	25	24	1060	725	12.1	15.43	0.106	12	10	11	0.215		
27 X 1.5	0.7	0.3	-	4 X 0.8	1.40	2.0	26	24	1125	780	12.1	15.43	0.106	11	9	10	0.215		
30 X 1.5	0.7	0.3	-	4 X 0.8	1.40	2.0	27	25	1200	850	12.1	15.43	0.106	11	9	10	0.215		
37 X 1.5	0.7	0.3	-	4 X 0.8	1.40	2.0	28	27	1375	1000	12.1	15.43	0.106	10	8	9	0.215		
44 X 1.5	0.7	0.3	-	4 X 0.8	1.40	2.0	32	30	1600	1110	12.1	15.43	0.106	9	7	9	0.215		
52 X 1.5	0.7	0.3	-	4 X 0.8	1.56	2.2	33	31	1800	1350	12.1	15.43	0.106	9	7	8	0.215		
61 X 1.5	0.7	0.4	-	4 X 0.8	1.56	2.2	35	34	2070	1600	12.1	15.43	0.106	8	7	8	0.215		

• The above data is indicative & may be changed without prior information. • Conductor up to 16 mm² will be non-compacted. • Above 16 mm² compacted sector conductor. • Cables can be supplied in multiples of 500/1000 mtrs per customers requirement. Operating Conditions : • Ambient Air temp. 40°C • Ground temp. 30°C • Depth of laying. 75cm • Thermal resistivity of soil. 150°C-cm/W

Table - 7 : XPLE Insulated armoured & unarmoured Control cable with Copper Conductor of 2.5mm² Conf. to IS:7098 (P-I)

No. of Cores X Area	Thick. of XPLE Insulation (Nom)	Thick. of Linner Sheath (Min)	Dimension of Armour		Thickness of PVC Outer Sheath		Approx. Overall Diameter		Approx. Net Wt. of Cable		Max.D.C. Resistance at 20°C	Approx. A.C. Resistance at Opt. Temp.70°C	Approx. Reactance at 50Hz.	Current Rating			Short Circuit Rating for 1 Sec.		
			Wire	Strip	Arm	Un-Arm	Arm	Un-Arm	Armoured	Unarmoured				kg / km	kg / km	Ohm / km		Ohm / km	Direct in Ground
No X mm ²	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg / km	kg / km	Ohm / km	Ohm / km	Amps	Amps	Amps	kA(rms)
2 X 2.5	0.7	0.3	1.4	-	1.24	1.8	14	12	405	185	7.41	9.45	0.099	38	32	36	0.358		
3 X 2.5	0.7	0.3	1.4	-	1.24	1.8	15	13	465	215	7.41	9.45	0.099	29	27	31	0.358		
4 X 2.5	0.7	0.3	1.4	-	1.24	1.8	16	14	515	250	7.41	9.45	0.099	22	20	23	0.358		
5 X 2.5	0.7	0.3	1.4	-	1.24	1.8	17	14	600	295	7.41	9.45	0.099	22	20	23	0.358		
6 X 2.5	0.7	0.3	1.4	-	1.24	1.8	18	15	660	325	7.41	9.45	0.099	25	21	24	0.358		
7 X 2.5	0.7	0.3	1.4	-	1.24	1.8	18	15	700	350	7.41	9.45	0.099	24	20	23	0.358		
10 X 2.5	0.7	0.3	-	4 X 0.8	1.24	1.8	19	19	750	480	7.41	9.45	0.099	21	18	20	0.358		
12 X 2.5	0.7	0.3	-	4 X 0.8	1.40	1.8	21	20	825	550	7.41	9.45	0.099	20	17	19	0.358		
14 X 2.5	0.7	0.3	-	4 X 0.8	1.40	1.8	22	20	925	600	7.41	9.45	0.099	19	16	17	0.358		
16 X 2.5	0.7	0.3	-	4 X 0.8	1.40	1.8	23	22	1000	700	7.41	9.45	0.099	18	15	16	0.358		
19 X 2.5	0.7	0.3	-	4 X 0.8	1.40	2.0	24	23	1100	800	7.41	9.45	0.099	17	14	15	0.358		
24 X 2.5	0.7	0.3	-	4 X 0.8	1.40	2.0	28	26	1350	1000	7.41	9.45	0.099	16	13	15	0.358		
27 X 2.5	0.7	0.3	-	4 X 0.8	1.40	2.0	28	27	1450	1060	7.41	9.45	0.099	14	12	13	0.358		
30 X 2.5	0.7	0.3	-	4 X 0.8	1.40	2.0	29	28	1550	1150	7.41	9.45	0.099	14	12	13	0.358		
37 X 2.5	0.7	0.3	-	4 X 0.8	1.40	2.0	31	30	1825	1400	7.41	9.45	0.099	13	11	12	0.358		
44 X 2.5	0.7	0.4	-	4 X 0.8	1.56	2.0	35	34	2150	1700	7.41	9.45	0.099	12	10	12	0.358		
52 X 2.5	0.7	0.4	-	4 X 0.8	1.56	2.2	37	36	2450	1950	7.41	9.45	0.099	12	10	11	0.358		
61 X 2.5	0.7	0.4	-	4 X 0.8	1.56	2.2	39	38	2750	2220	7.41	9.45	0.099	11	9	11	0.358		

• The above data is indicative & may be changed without prior information. • Conductor up to 16 mm² will be non-compacted. • Above 16 mm² compacted sector conductor. • Cables can be supplied in multiples of 500/1000 mtrs per customers requirement. Operating Conditions : • Ambient Air temp. 40°C • Ground temp. 30°C • Depth of laying. 75cm • Thermal resistivity of soil. 150°C-cm/W

Group Rating Factors for Circuits for Three Single Core Cables in Trefoil formation

Table 8A : Touching Horizontal Formation laid Direct in Ground

No. of Circuits	Spacing (Between Centres of Circuits)				
	Touching	15 cm	30 cm	45 cm	60 cm
2	0.78	0.81	0.85	0.88	0.90
3	0.68	0.71	0.77	0.81	0.83
4	0.61	0.65	0.72	0.76	0.79
5	0.56	0.61	0.68	0.73	0.78

Table 8B : Cables laid in Trefoil Ducts in horizontal formation

No. of Circuits	Spacing (Between Centres of Circuits)		
	Touching	45 cm	60 cm
2	0.87	0.90	0.91
3	0.79	0.83	0.86
4	0.74	0.79	0.82
5	0.71	0.76	0.79

Table 8C : Cables laid on Racks/Trays in covered trench with removable covers where air circulation is restricted. Trefoils are separated by two cable dia horizontally and the trays are in tiers with 30 cm. Ga between them.

No. of Racks / Trays in tiers	No. of Trefoils in horizontal formation		
	1	2	3
1	0.95	0.96	0.88
2	0.9	0.85	0.83
3	0.88	0.83	0.81
6	0.86	0.81	0.79

Table 8D : Cables laid as in 'C' but open air

No. of Racks	No. of Cables per Rack		
	1	2	3
1	1	0.98	0.96
2	1	0.95	0.93
3	1	0.94	0.92
6	1	0.93	0.90

Group Rating Factors for Circuits for Multi-core Cables

Table 9A : Cables laid inside concrete trench with removable covers, on cable trays where air circulation is restricted. The cables spaced by one cable diameter and trays in tiers by 300mm. The clearance of the cable from the wall is 25 mm.

No. of Cable trays in Tier	Number of Cables				
	1	2	3	6	9
1	0.95	0.9	0.88	0.85	0.84
2	0.9	0.85	0.83	0.81	0.8
3	0.88	0.83	0.81	0.79	0.78
6	0.86	0.81	0.79	0.77	0.76

Table 9B : Cables laid on cable trays exposed to air, the cables spaced by one cable diameter & trays in tiers by 300 mm. The clearance between the wall & the cable is 25 mm.

No. of Cable trays in Tier	No. of Cables per Rack			
	2	3	6	9
1	0.98	0.96	0.93	0.92
2	0.95	0.93	0.9	0.89
3	0.94	0.92	0.89	0.88
6	0.93	0.9	0.87	0.86

Table 9C : Cables laid on cable trays exposed to air, the cables are touching & trays in tiers by 300 mm. The clearance between the wall & the cable is 25 mm.

No. of Cable trays in Tier	No. of Cables per Rack			
	2	3	6	9
1	0.84	0.8	0.75	0.73
2	0.8	0.76	0.71	0.69
3	0.78	0.74	0.7	0.68
6	0.76	0.72	0.68	0.66

Table 9D : Cables laid Direct in Ground in horizontal formation

No. of Cable in Group	Spacing of Cables			
	Touching	15 cm	30 cm	45 cm
2	0.79	0.82	0.87	0.90
3	0.69	0.75	0.79	0.83
4	0.62	0.69	0.74	0.79
5	0.58	0.65	0.72	0.76
6	0.54	0.61	0.69	0.75

Table 9E : Cables laid Direct in Single Way ducts/pipes in horizontal formation.

No. of Cable in Group	Spacing of Cables			
	Touching	30 cm	45 cm	60 cm
2	0.88	0.9	0.92	0.94
3	0.82	0.84	0.87	0.89
4	0.77	0.8	0.84	0.87
5	0.74	0.78	0.82	0.85
6	0.71	0.76	0.81	0.84

Table 10 : Rating Factors for Variation in Depth of laying in Ground

Dept. of Laying (cm)	75	90	105	120	150	180 & Above
Rating Factor upto 25 mm ²	1	0.99	0.98	0.97	0.96	0.95
Rating Factor above 25 mm ² and upto 300 mm ²	1	0.98	0.97	0.96	0.94	0.93
Rating Factor above 300 mm ²	1	0.97	0.96	0.95	0.92	0.91

Table 11 : Rating Factors for Variation in Ambient Air Temperature

Air temp. °C	15	20	25	30	35	40	45	50	55
Rating Factor	1.22	1.18	1.14	1.1	1.05	1.0	0.95	0.89	0.84

Table 12 : Rating Factors for Variation in Ground Temperature

Group temp. °C	15	20	25	30	35	40	45	50	55
Rating Factor	1.12	1.08	1.04	1.0	0.96	0.91	0.87	0.82	0.76

Table 13 : Rating Factors for Variation in thermal resistivity of soil (multicore cables laid Direct in Ground)

Nominal area of conductor mm ²	For values thermal resistivity of soil in °C-cm/W					
	100	120	150	200	250	300
1.5	1.10	1.05	1.0	0.92	0.86	0.81
2.5	1.10	1.05	1.0	0.92	0.86	0.81
4	1.10	1.05	1.0	0.92	0.86	0.81
6	1.10	1.05	1.0	0.92	0.86	0.81
10	1.10	1.06	1.0	0.92	0.85	0.8
16	1.12	1.06	1.0	0.91	0.84	0.79
25	1.14	1.08	1.0	0.91	0.84	0.78
35	1.15	1.08	1.0	0.91	0.84	0.77
50	1.15	1.08	1.0	0.91	0.84	0.77
70	1.15	1.08	1.0	0.9	0.83	0.76
95	1.15	1.08	1.0	0.9	0.83	0.76
120	1.17	1.09	1.0	0.9	0.82	0.76
150	1.17	1.09	1.0	0.9	0.82	0.76
185	1.18	1.09	1.0	0.89	0.81	0.75
240	1.18	1.09	1.0	0.89	0.81	0.75
300	1.18	1.09	1.0	0.89	0.81	0.75
400	1.19	1.1	1.0	0.89	0.81	0.75
500	1.21	1.1	1.0	0.88	0.80	0.74
630	1.22	1.1	1.0	0.88	0.80	0.74

Table 14 : Rating Factors for Variation in thermal resistivity of soil, three single core cables laid Direct in the Ground (three cables in cable in trefoil touching).

Nominal area of conductor mm ²	For values thermal resistivity of soil in °C-cm/W					
	100	120	150	200	250	300
1.5	1.18	1.09	1.0	0.90	0.82	0.76
2.5	1.18	1.09	1.0	0.90	0.82	0.76
4	1.18	1.09	1.0	0.90	0.82	0.76
6	1.18	1.09	1.0	0.90	0.82	0.76
10	1.18	1.09	1.0	0.89	0.81	0.75
16	1.19	1.09	1.0	0.89	0.81	0.74
25	1.19	1.09	1.0	0.88	0.80	0.74
35	1.2	1.09	1.0	0.88	0.80	0.74
50	1.2	1.09	1.0	0.88	0.80	0.74
70	1.21	1.1	1.0	0.88	0.80	0.74
95	1.22	1.1	1.0	0.88	0.80	0.74
120	1.22	1.1	1.0	0.88	0.79	0.74
150	1.22	1.1	1.0	0.88	0.79	0.73
185	1.22	1.1	1.0	0.88	0.79	0.73
240	1.22	1.1	1.0	0.88	0.79	0.73
300	1.22	1.1	1.0	0.88	0.79	0.72
400	1.24	1.11	1.0	0.88	0.79	0.72
500	1.24	1.11	1.0	0.88	0.79	0.72
630	1.24	1.11	1.0	0.88	0.79	0.72



COMPARATIVE CHART FOR NORMAL / FR / FRLS / LSZH / FS CABLES

S. No	Component	Normal PVC Cable	Fire Retardant (FR) Cable	Fire Retardant Low Smoke (FRLS) Cable	Low Smoke Zero Halogen (LSZH) Cables	Fire Survival (FS) Cables
1	CONDUCTOR	Cu/Al	Cu/Al	Cu/Al	Cu/Al	Cu/Al
2	INSULATION & ITS PROPERTIES	PVC	PVC/XLPE	PVC/XLPE	PVC/XLPE/ Special Polymer	XLPE
a	INSULATION PROPERTY	Good	Good/Excellent	Good/Excellent	Good/Excellent/ Very Good	Excellent
b	TEMPERATURE RATING	70°C	70/90°C	70/90°C	70/90/90°C	90°C
c	THERMAL STABILITY	Good	Good/Excellent	Good/Excellent	Good/Excellent/ Very good	Excellent
d	FLAME RETARDANCY	Average	Good	Very good	Better than FRLS	Excellent
e	SAFETY DURING BURNING	Average	Fairly Good	Good	Very Good	Excellent
f	HALOGEN CONTENT DURING BURNING (%)	30 to 37	<20	<20	<2	<2
3	FIRE BARRIER OVER INSULATION	No	No	No	No	Yes
4	INNER SHEATH	Normal PVC FR PVC	Normal/ FRLS PVC	Normal/ Special Polymer	FR/FRLS/ Polymer	Special
5	ARMOURING	Normal	Normal	Normal	Normal	Special
6	FIRE BARRIER	No	No	No	No	Yes
7	FINAL SHEATHING PVC	Normal	FR PVC	FRLS PVC Polymer	Special Polymer	Special

FIRE PROPERTIES OF FINISHED CABLE

1	OXYGEN INDEX OF OUTERSHEATH	21 to 24	29 to 32	29 to 32	32 to 36	32 to 36
2	FLAME RETARDANCY	Average	Good	Good	Very Good	Excellent
3	TEMPERATURE REQUIRED TO CATCH FIRE (WITH 21% OXYGEN)	Room Temp.	>250°C	>250°C	>300°C	>3000°C
4	VISIBILITY DURING BURNING (%)	5 to 10	5 to 10	>40	>95	>95
5	ACID GAS GENERATE BY WEIGHT	30 to 37	30 to 37	<18	<0.5	<0.5
6	CIRCUIT INTEGRITY AT 950°C FOR THREE HRS. (BS:6387)	No	No	No	No	Yes
7	TOXIC INDEX (NEC 713)	>50	>50	>40	<5	<5

PV-NEOCAB Cables for Photovoltaics

SOLAR ENERGY

The recent growth of the renewable energy market applies to both wind energy as well as to solar energy. In many countries this growth is supported by governmental subsidies. Outdoor applications in renewal energy plants demand high thermal and mechanical requirements from cables and other components.

We are aware of this task and already combines technology, innovation and ecological awreens today. "Environmentally compatible manufacture for environmentally compatible enery production through renewable energy" : That is our motto.

Our solar Cables uses only high quality insulation and outer sheath compounds to ensure that the products will survive the harshest of conditions. Neocab solar Neocab Cables are tested and certified to national and international approvals not only by our own laboratory but also by independent testing institutes. The many benefits of our cables make them popular with installers, as not only they are UV resistant, but also resistant to extreme weather and temperature conditions.

PROPERTIES :

- * Lasts up to 35 years under tough conditions.
- * Equipped with UV Resistance.
- * HFLS -Halogen free, Low smoke Emission and low tox
- * Flame and Fire Retardent.
- * Easy Installation : with color identification.
- * TUV certified.* Used in extreme weather conditions



TECHNICAL DATA

Manufacturer	Neocab An ISO 9001:2008 Mangal Group company
Trademark	Neocab
Type designation	PV-DCPL
Approvals	Requirements for cables for PV systems, DKE/VDE AK 411.2.3 VDE Reg.No. 7985 TÜV 2 PfG 1169/08.2007 Cert.No. R 60013989*
Application	Neocab Solar cables are intended for use in photovoltaic power supply systems and similar applications as free movable, free hanging, fixed installation and buried in ground in constructional covered systems. The cables can be used indoor, outdoor, in explosion hazard areas, in industry and agriculture. They are suitable for applications in/at equipment with protective insulation (protecting class II). In other respects IEC 61215 and 61646, IEC 60364-7712:2002 and DIN VDE 0100 part 520 applies.

ELECTRICAL PARAMETERS

Rated voltage	AC 0.6/1.0 kV
Maximum PVSystem voltage	DC up to 2.0 kV possible
Maximum permissible operating voltages in AC systems	0.7/1.2 kV
Maximum permissible operating voltages in DC systems	0.9/1.8 kV
Test voltage	AC 6 kV / DC 10 kV (15 min.)
Ampacity	According to Requirements for cables for PV systems, DKE/VDE AK 411.2.3
Tests	According to HD 22.2 conductor resistance, test voltages AC and DC, electric strength, surface resistance, spark test on insulation, insulation resistance at 20°C and 90°C in water and at 120°C in air. EN 50305 Part 6 DCstability (10 days, 85°C, salt water, 1.5 kV DC)

THARMAL PARAMETERS

Maximum permissible ambient temperature	+90°C (stationary and in motion)
Minimum permissible temperature	40°C (stationary and in motion)
Maximum permissible operating temperature of the conductor.	+120°C~ Interpretation according to IEC 60216: permanent temperature 120°C for 20.000 h (= 2.3 years), at max. 90°C permanent temperature (= 30 years)
Short circuit temperature	+250°C (at the conductor max. 5 sec.)
Resistance to cold	Bending test at low temperature according to DIN EN 6081114 Impact test similar to DIN EN 50305
Damp Heat Test	According to EN 60068278 1.000h at 90°C and 85 humidity

MECHANICAL PARAMETERS

Tensile load	15 N/mm ² in operation, 50 N/mm ² during installation
Minimum bending radii	see selection and ordering data
Abrasion	According to DIN EN 53516: against abrasive paper Sheath against sheath (internal testing) Sheath against metal (internal testing) Sheath against plastics (internal testing)
Shrinkage test	According to EN 6081113
Pressure test at high temperature	According to EN 6081131
Dynamic penetration test	According to Requirements for cables for PV systems, DKE/VDE 411.2.3
Shore hardness	85 according to DIN EN 53505
Gnawer resistance	An optimum safety can be reached with protective hoses and by use of special cable types with metallic coating such as spinning or braid.

CHEMICAL PARAMETERS

Mineral oil resistance	24h, 100°C according to DIN VDE 047381121, DIN EN 6081121
Acid and alkaline resistance	According to EN 6081121 7 days, 23°C (NOxalic acid, NSodium hydroxide)
Ammonia resistance	30 days in saturated ammonia atmosphere (internal testing)
Weather resistance	Ozone resistance according to DIN EN 50396 test type B, HD 22.2 test type B UVresistance according to UL 1581 (XenoTest), ISO 48922 (Method A) and HD506/A12.4.20 Absorption of water (gravimetric) according to DIN VDE 047381113, DIN EN 6081113
Behaviour in case of fire	Flame propagation Single cable according to DIN VDE 0482 Part 33212, DIN EN 6033212 Multiple cable according to DIN VDE 0482 Part 26625, DIN EN 503059 Low smoke emission according to DIN VDE 0482 Part 2682, DIN EN 502682 -light transmittance > 70 Corrosivity according to DIN EN 5026722 Toxicity according to DIN EN 50305, ITCindex < 3
Ecological innocuousness	TECSUN (PV) cables are in accordance with the codes 2000/53/EG, 2002/96/EG, 2003/11/EG and exempt from metallic lead, mercury, hexavalent chromium und bromine containing compounds. RoHS conform.

DESIGN FEATURES

Type designation	PV-DCPL
Conductor	Electrolytic copper, tinned, Class 5 according to IEC 60228 (DIN VDE 0295)
Insulation	HEPR 120°C similar to IEC 605021 (compound type EI6 / EI8)
Core identification	Natural colour bright
Sheath	EVA 120 °C based on DIN VDE 0282 part 1, HD 22.1 (compound type EM4 / EM8) Insulation and sheath are connected solidly (Twolayerinsulation)
Sheathcolours	black, blue, red
Marking	DYNAMIC CABLES(DCPV) PV-DCPL (crosssection) 0.6/1 KV (VDEREG./ TÜV)

Selection and ordering data

Nominal cross-section and colour	Order No.	Conductor diameter	Overall diameter of cable		Approx. weight [kg/km]	Min. bending radius [mm]	max. permissible tensile load [N]	current carrying capacity at 60°C ambient temperature (free in air) [A]	Permissible short circuit current [kA]
			Min.value	Max. value					
			[mm]	[mm]					
1,5mm ² black	15B	1,6	4,4	4,8	29	14,4	23	29	0,19
1,5mm ² blue	15BL	1,6	4,4	4,8	29	14,4	23	29	0,19
1,5mm ² red	15R	1,6	4,4	4,8	29	14,4	23	29	0,19
2,5mm ² black	25B	1,9	4,7	5,1	43	15,3	38	41	0,32
2,5mm ² blue	25BL	1,9	4,7	5,1	43	15,3	38	41	0,32
2,5mm ² red	25R	1,9	4,7	5,1	43	15,3	38	41	0,32
4,0mm ² black	4B	2,4	5,2	5,6	58	16,8	60	55	0,50
4,0mm ² blue	4BL	2,4	5,2	5,6	58	16,8	60	55	0,50
4,0mm ² red	4R	2,4	5,2	5,6	58	16,8	60	55	0,50
6,0mm ² black	6B	2,9	5,7	6,1	76	18,3	90	70	0,76
6,0mm ² blue	6BL	2,9	5,7	6,1	76	18,3	90	70	0,76
6,0mm ² red	6R	2,9	5,7	6,1	76	18,3	90	70	0,76
10mm ² black	10B	4,0	6,8	7,2	120	21,6	150	98	1,26
16mm ² black	16B	5,5	8,3	9,0	178	36	240	132	2,01
25mm ² black	25B	6,4	10,0	10,7	273	43	375	176	3,15
35mm ² black	35B	7,5	11,1	11,8	364	47	525	218	4,41
50mm ² black	50B	9,0	12,6	13,3	500	53	750	276	6,30
70mm ² black	70B	10,8	14,4	15,2	686	61	1.05	347	8,82
95mm ² black	95B	12,6	16,2	17,0	899	68	1.425	416	12,0
120mm ² black	120B	14,3	17,7	18,7	1.131	75	1.8	488	15,1
150mm ² black	150B	15,9	19,7	20,7	1.382	83	2.25	566	18,9
185mm ² black	185B	17,5	21,3	22,3	1.669	89	2.775	644	23,3
240mm ² black	240B	20,5	24,2	25,5	2.208	102	3.6	775	30,4



ACSR, AAA & AA CONDUCTORS

Looking to the need greater strength to weight ratio ACSR is first choice of designers and therefore the use of ACSR has gone up consistently. Experiments have proved that stranding of high purity Aluminium conducting portion around a steel core produce better results.

The Aluminium Conductor Steel Reinforced (ACSR) is a conductor, combining the light weight high current capacity of aluminium with high strength of a galvanized steel core wire. The Aluminium members are standard around the galvanized steel core, the core may be solid or stranded and the Aluminium may be arranged in one or more layers depending on the size and strength of conductor required.

ACSR Conductor Advantage

- High Conductivity
- High Strength/Weight Ratio
- Lightness
- Resistance to Atmospheric Attack and very low Maintenance
- Better behavior in contact with other materials
- Economy & Long life.

The use of AAAC is increasing fast for transmission and distribution purposes and is now gradually replacing AAC/ACSR due to its various advantages over traditional AAC/ACSR Conductors. The main features of AAAC are reduced line losses, increased span. Longer life, homogeneous character and its anticorrosion properties.

AAA Conductors is a new concept for energy conservation.

AAA Conductor Advantage

- AAAC exhibits excellent corrosion resistance especially in sea coast areas and in polluted industrial areas due to absence of steel core.
- Since AAAC is homogeneous (with strands of Aluminium Alloy) with no steel component the resistance of AAAC is lower as compared to ACSR.
- AAAC can carry at least 15-20% extra current as compared to ACSR of equal size.
- Experience in foreign countries shows that All Aluminium Alloy Conductors are in service for over 60 years, which is about double the life of ACSR Conductors.
- The surface hardness of AAAC is 80 BHN as compared to 35 BHN of ACSR. This reduces the damage to surface during handling and therefore leading to lesser corona losses and ratio interference at EHV.
- AAAC are stable up to 90 °C against ACSR conductors which are stable up to 75 °C.
- Since AAAC has higher strength to weight ratio, span can be increased from 2 to 15% as in case of ACSR resulting in overall reduction of cost in towers supports and other accessories in transmission line system.

AA Conductor Advantage

- High Conductivity
- Very high degree of corrosion Resistance.
- Excellent conductor of heat & Electricity

Physical Properties of AAA Conductor

Melting Temperature	652°C
Density	2.7 kg/mm ³
Coefficient of linear Expansion per °C	23 X 10 ⁻⁶
Brittle Hardness	80 BHN
Elongation (percent in 200 mm)	4.5 to 5.5%
Electrical conductivity at 200 °C	52.2
Typical Electrical Resistivity at 20°C	53.5
Standard	0.0325
Typical	0.0320
Ultimate Tensile	30 kg/mm ²
Modulus of Elasticity in kg/mm ²	
Initial	5200 to 5600
Final	6250 to 6450

Basic Data Assumed for Calculation

1. Sag tension

Conductor Type	Construction (AL + ST) / AAA Wire Nos. / Nos.	Mod. of Elasticity Kg/sq. cm	Co-Effi. of liner expansion per °C
ACSR & AAC	6 + 1	0.8055 X 10 ⁹	19.1 X 10 ⁻⁶
	6 + 7	0.7750 X 10 ⁹	19.8 X 10 ⁻⁶
	26 + 7	0.8158 X 10 ⁹	18.9 X 10 ⁻⁶
	30 + 7	0.8158 X 10 ⁹	17.8 X 10 ⁻⁶
	42 + 7	0.7546 X 10 ⁹	21.5 X 10 ⁻⁶
	54 + 7	0.7036 X 10 ⁹	19.3 X 10 ⁻⁶
AAAC & ACSR	3	B) 0.6500 X 10 ⁹	23.0 X 10 ⁻⁶
	7	A) 0.6000 X 10 ⁹	23.0 X 10 ⁻⁶
	7	B) 0.6324 X 10 ⁹	23.0 X 10 ⁻⁶
	19	A) 0.5700 X 10 ⁹	23.0 X 10 ⁻⁶
	37	A) 0.5700 X 10 ⁹	23.0 X 10 ⁻⁶
	37	B) 0.5814 X 10 ⁹	23.0 X 10 ⁻⁶
	61	A) 0.5500 X 10 ⁹	23.0 X 10 ⁻⁶
	61	B) 0.5508 X 10 ⁹	23.0 X 10 ⁻⁶

(A) AAAC to IS 398 ((Part 4 1979) (Second Revision) & ACSR
(B) AAAC to IS 398 ((Part 4 1974) (Third Revision)

2. Current Carrying Capacity:

Solar Absorption Constant A = 0.5
Emissivity Constant E = 0.5
Solar Irradiation S = 985 Watts /Sq. m.
Wind Velocity V = 2200 M / Hr.
Ambient Temperature Ta = 40 X C
Height MSL

ACSR CONDUCTOR

Table 1 : Construction for Aluminium Conductor Steel Reinforced as per IS:398(Part-II)

No. of wire in Conductor	Construction	Lay Ratio for each Layer							
		6 Wire (ST)	6 Wire (Al)	8 Wire (Al)	12 Wire (Al)	14 Wire (Al)	18 Wire (Al)	20 Wire (Al)	24 Wire (Al)
7	1 + 6	-	10 to 14	-	-	-	-	-	-
13	1 + 6 + 6	13 to 28	10 to 14	-	-	-	-	-	-
37	1 + 6 + 12 + 18	13 to 28	-	-	10 to 16	-	10 to 14	-	-
49	1 + 6 + 8 + 14 + 20	13 to 28	-	10 to 17	-	10 to 16	-	10 to 14	-
61	1 + 6 + 12 + 18 + 24	13 to 28	-	-	10 to 17	-	10 to 16	-	10 to 14

Table 2 : Basic data for Aluminium Conductors Steel Reinforced as per IS:398 (Part-II)

Code Word	Aluminium Area		Total Sectional Area	Stranding and Wire Diameter				Overall Diameter (approx)	Weight		Mass	Resistance at 20°C (Max)	Ultimate Breaking Load
	Nominal Area	Sectional Area		Aluminium		Steel			Aluminium	Steel			
	(Sq.mm)	(Sq.mm)	(Sq.mm)	No.	Dia (mm)	No.	Dia (mm)	(mm)	Kg/Km	Kg/Km	Kg/Km	Ohm/Km	KN
MOLE	10	10.60	12.37	6	1.50	1	1.50	4.50	29	14	43	2.780	3.97
ROSE	18	18.10	21.12	6	1.96	1	1.96	5.88	49.5	23.5	73	1.618	6.74
SURREL	20	20.98	24.48	6	2.11	1	2.11	6.33	58	27	85	1.394	7.61
WEASEL	30	31.61	36.88	6	2.59	1	2.59	7.77	87	41	128	0.9289	11.12
RABBIT	50	52.88	61.70	6	3.35	1	3.53	10.05	145	69	214	0.5524	18.25
RACCOON	80	78.83	91.97	6	4.09	1	4.09	12.27	215	103	318	0.3712	26.91
DOG	100	105.0	118.5	6	4.72	7	1.57	14.15	288.3	105.7	394	0.2792	32.41
WOLF	150	158.1	194.9	30	2.59	7	2.59	18.13	438	289	727	0.1871	67.34
PANTHER	200	212.1	261.5	30	3.00	7	3.00	21.00	588.5	387.5	976	0.1390	89.67
KUNDAH	400	404.1	425.2	42	3.50	7	1.96	26.88	1119	163	1282	0.07311	88.79
ZEBRA	420	428.9	484.5	54	3.18	7	3.18	28.62	1182	439	1621	0.06868	130.32
MOOSE	520	528.5	597.0	54	3.53	7	3.53	31.77	1463	535	1998	0.05595	159.60
MORCULLA	560	562.7	591.7	42	4.13	7	2.30	31.68	1553	228	1781	0.05231	120.16

Table 3 : Basic data for ACSR Conductors as per IS:398 (Part-II)

Code Word	Nominal Equivalent Copper Area	Sectional Aluminium Area	Total Sectional Area	Stranding and Wire Diameter				Overall Diameter (approx)	Weight			Resistance at 20°C (Max)	Ultimate Breaking Load
				Aluminium		Steel			Aluminium	Steel	Net		
	(Sq.mm)	(Sq.mm)	(Sq.mm)	No.	Dia (mm)	No.	Dia (mm)	(mm)	Kg/Km	Kg/Km	Kg/Km	Ohm/Km	Kgf
GOPHER	16	25.90	30.62	6	2.36	1	2.36	7.08	72	34	106	1.0980	952
FERRET	25	41.87	49.98	6	3.00	1	3.00	9.00	116	55	171	0.6795	1503
MINK	40	63.32	73.65	6	3.66	1	3.66	10.98	173	82	255	0.4565	2207
HORSE	42	71.58	116.20	12	2.75	7	2.79	13.95	204	338	542	0.3977	6108
BEAVER	45	74.07	87.53	6	3.99	1	3.99	11.97	205	98	303	0.3841	2613
OTTER	50	82.85	97.91	6	4.22	1	4.22	12.66	230	109	339	0.3434	2923
CAT	55	94.21	111.30	6	4.50	7	4.50	13.50	261	124	385	0.3020	3324
LEOPARD	80	129.70	148.40	6	5.28	7	1.76	15.48	360	133	493	0.2193	4137
COYOTE	80	128.50	151.60	26	2.54	7	1.90	15.86	365	156	521	0.2214	4638
TIGER	80	128.10	161.80	30	2.36	7	2.36	16.52	363	241	604	0.2221	5758
LYNX	110	179.00	226.20	30	2.79	7	2.79	19.53	506	338	844	0.1589	7950
LION	140	232.50	293.90	30	3.18	7	3.18	22.26	659	438	1097	0.1223	10210
BEAR	160	258.10	326.10	30	3.35	7	3.35	23.45	734	485	1219	0.1102	11310
GOAT	185	316.50	400.00	30	3.71	7	3.71	25.97	896	596	1492	0.0898	13780
SHEEP	225	366.10	462.60	30	3.99	7	3.99	27.93	1036	690	1726	0.0777	15910
DEER	260	419.30	529.80	30	4.27	7	4.27	29.89	1188	789	1977	0.0678	18230
FLK	300	465.70	588.40	30	4.50	7	4.50	31.50	1320	876	2196	0.0611	20240
CAMEL	300	464.50	537.70	54	3.35	7	3.35	30.15	1318	486	1804	0.0612	14750
SPARROW	20	33.16	39.22	6	2.67	7	2.67	8.01	92	43	135	0.8578	1208
FOX	22	36.21	42.92	6	2.79	7	2.79	8.37	101	48	149	0.7857	1313
GUINEA	49	78.56	127.20	12	2.92	7	2.92	14.60	224	366	590	0.3620	6664
LARK	125	196.10	247.80	30	2.92	7	2.92	20.44	556	366	922	0.1451	8559

AAA CONDUCTOR

Table 4 : Construction for All Aluminium Alloy Conductor as per IS:398(Part IV)

No. of wire in Conductor	Construction	Lay Ratio for each Layer				
		3 Wire	6 Wire	12 Wire	18 Wire	24 Wire
3	3	10 to 14	-	-	-	-
7	1 + 6	-	10 to 14	-	-	-
19	1 + 6 + 12	-	10 to 16	10 to 14	-	-
37	1 + 6 + 12 + 18	-	10 to 17	10 to 16	10 to 14	-
61	1 + 6 + 12 + 18 + 24	-	10 to 17	10 to 16	10 to 15	10 to 14

Table 5 : Basic Data for AAAC Conductor As per IS : 398 (Part IV)

AAAC Code Word	Actual Area (Sq.mm)	Stranding and Wire Diameter		Overall Diameter (Approx) (mm)	Mass (Approx) Kg/Km	Resistance at 20°C (Max) Ohm/Km	Ultimate Breaking Load KN
		No.	Dia. (mm)				
MOIE	15	3	2.50	5.39	40.15	2.3040	4.33
SQUIRREL	22	7	2.00	6.00	60.16	1.5410	6.45
WEASEL	34	7	2.50	7.50	94.00	0.9900	10.11
RABBIT	55	7	3.15	9.45	149.20	0.6210	16.03
RACCOON	80	7	3.81	11.43	218.26	0.4250	23.41
DOG	100	7	4.26	12.78	272.86	0.3390	29.26
DOG (UP)	125	19	2.89	14.45	342.51	0.2735	36.64
COYOTE	148	19	3.15	15.75	406.91	0.2290	43.50
WOLF	173	19	3.40	17.00	474.02	0.1969	50.54
WOLF(UP)	200	19	3.66	18.30	549.40	0.1710	58.66
PANTHER	232	19	3.94	19.70	636.67	0.1471	68.05
PANTHER (UP)	288	37	3.15	22.05	794.05	0.1182	84.71
PANTHER (UPP)	346	37	3.45	24.15	952.56	0.0984	101.58
KUNDAH	400	37	3.71	25.97	1101.63	0.0829	117.40
ZEBRA	465	37	4.00	28.00	1280.50	0.0734	136.38
ZEBRA (UP)	525	61	3.31	29.79	1448.39	0.0651	146.03
MOOSE	570	61	3.45	31.05	1573.71	0.0598	158.66
MORCULLA	604	61	3.55	31.95	1666.00	0.0568	167.99
MOOSE (UP)	642	61	3.66	32.94	1771.36	0.0534	178.43
MORCULLA (UP)	695	61	3.81	34.29	1919.13	0.0492	193.25
BERSIMIS	767	61	4.00	36.00	2115.54	0.0446	213.01



AA CONDUCTOR

Table 6 : Basic Data for Lay Ratio

No. of wire in Conductor	Construction	Lay Ratio for each Layer		
		6 Wire	12 Wire	18 Wire
7	1 + 6	10 to 14	-	-
19	1 + 6 + 12	10 to 16	10 to 14	-
37	1 + 6 + 12 + 18	10 to 17	10 to 16	10 to 14

Table 7: Basic Data for AAC Conductor as per IS:398 (Part - I)

Code Word	Aluminium Area	Total Sectional Area	Stranding and Wire Diameter		Overall Diameter (Approx)	Mass (Approx)	Resistance at 20°C (Max)	Ultimate Breaking Load
	(Sq.mm)	(Sq.mm)	No.	Dia (mm)	(mm)	(Kg/Km)	(Ohm/Km)	(KN)
GNAT	25	26.85	7	2.21	6.63	74	1.096	4.52
ANT	50	52.83	7	3.10	9.30	145	0.5525	8.25
WASP	100	106.00	7	4.39	13.17	290	0.2752	15.96
SPECIAL	150	150.90	19	3.18	15.90	415	0.1942	23.28
SPIDER	240	237.60	19	3.99	19.95	654	0.1235	35.74
BUTTERFLY	300	322.70	19	4.65	23.25	888	0.09107	48.74

Table 8: Basic Data for AAC Conductor as per IS:398 (Part - I)

Code Word	Aluminium Area	Total Sectional Area	Stranding and Wire Diameter		Overall Diameter (Approx)	Mass (Approx)	Resistance at 20°C (Max)	Ultimate Breaking Load
	(Sq.mm)	(Sq.mm)	No.	Dia (mm)	(mm)	(Kg/Km)	(Ohm/Km)	(Kgf)
ROSE	20.89	21.12	7	1.96	5.88	58	1.362	385
LADY BIRD	42.33	42.80	7	2.79	8.37	117	0.6721	737
FLY	62.86	63.65	7	3.40	10.20	174	0.4526	1051
BLUE BOTTLE	72.84	73.65	7	3.66	10.95	201	0.3936	1203
EARWIG	77.70	78.55	7	3.78	11.34	215	0.3662	1272
GRASS HOPPER	83.13	84.05	7	3.91	11.73	230	0.3422	1356
CLEGG	94.56	95.60	7	4.17	12.51	261	0.3009	1523
CATERPILLAR	183.00	186.00	19	3.53	17.65	511	0.1555	2985
CHAFFER	209.90	213.20	19	3.78	18.90	586	0.1356	3381
COCKROACH	261.50	265.80	19	4.22	21.10	730	0.1088	4144
MOTH	367.20	373.10	19	5.00	25.00	1025	0.0774	5695
LOCUST	421.90	428.70	19	5.36	26.80	1176	0.0674	6516
MAY BUG	473.60	486.10	37	4.09	28.63	1343	0.0598	7289
SCORPION	518.40	529.80	37	4.27	29.89	1464	0.0548	7878
IRIS	33.45	33.81	7	2.48	7.44	92	0.8506	582
PANSY	42.02	42.49	7	2.78	8.34	116	0.6770	730

Handling & Laying Instructions

Handling Instructions

Cables should be installed and stored according to international regulation by trained persons with good engineering practice. Cable are supplied on heavy wooden/steel drum and handling these drums can constitute real hazardous. Indicated some of the common mistake can be committed during the handling, care should be taken during loading and unloading.



Lifting Cable Drums



Don't lay drums flat on their sides, use proper stops to prevent drums rolling



Lift Drums on Fork Trucks



Secure drums adequately before moving



Roll in the direction shown by the arrow

NEOCAB®

Wires & Cables

Registered Office:

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