

INTEGRATED GROUP

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CABLES & ITS ACCESSORIES



INTEGRATED MARKETING INC.

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CABLES & ACCESSORIES

Integrated Marketing Inc. deals with both overhead transmission lines and also Electric cables. As overhead Lines cannot be installed at all applications due to environment & space requirement, hence **Electrical cables are required which** comprise of copper or aluminum conductor with layers of insulating materials and other protection as armour, protecting sheath, etc over the conductor. Cable comes in standard lengths ranging from 250m to 1000m, keeping in view the transportation, site requirements and handling aspects.

The above length depends on the type and unit weight (kg/m) of the cable. In case our requirement for cable exceeds such standard length, we have to use an additional length of cable, to complete our work. Here comes the need for joints.

Cable joint as the name implies, join the tail end of the first cable and the head end of the second cable. Also termination kits are required to terminate the cable at source / utility end. The termination & jointing job requires skilled technicians. The cables can be further classified according to voltage levels, insulation medium.

Various types of cables:

We can classify cables according to their Insulation medium. They are:

- Polyvinyl Chloride (PVC) insulated cables(generally up to 11kV)
- Cross linked polyethylene (XLPE) cables (1.1 kV- 400 kV)
- Paper insulated cables (Now-obsolete)
- Elastomeric Cables (generally up to 33 kV)

Cables can also be classified according to the voltage grades, such as low voltage cables, medium voltage cables, high voltage (HV) cables and extra high voltage (EHV) cables, which in turn is decided on the system voltage. In fact, the type of insulation discussed above is very much dependent on the voltage grade of the cable. The voltage grade based classification can however vary between different countries as no uniform classification is followed internationally, we would learn more about the construction and use of these various cables. While MV and HV cables are very common in industrial plant applications, use of EHV cables is almost restricted only to utilities and that too in transmission circuits.

Power cables are also grouped according to the number of cores: such as single core, 2-core, 3-core and so on. Multi-core cables are commonly used only up to MV / HV levels. EHV cables are always of single core type.

Need for Cable Jointing (splicing) & Terminations:

In the case of cable failure in an existing installation, it would be prudent to go in for removal of the damaged portion and replace this section with a new length by jointing with the healthy portions of the cables. Every user would like to install their cables without joints but due to inevitable reasons, cable joints become a necessity. In general, users feel that a cable joint is a weak point in the distribution chain. On the contrary, jointing kit manufacturers vouch that a properly made joint is as good as the original cable. In addition, joints are required when two cables of dissimilar construction are to be jointed. This happens when an expansion takes place in an existing factory. Likewise, Heat Shrink, Cold Shrink, Elastimold & Epoxy type jointing kits & terminations are used depending upon the requirements. We can group the various types of joints broadly as:

- Straight through
- Indoor
- Outdoor
- Transition
- T joints (generally applicable in LT cable)

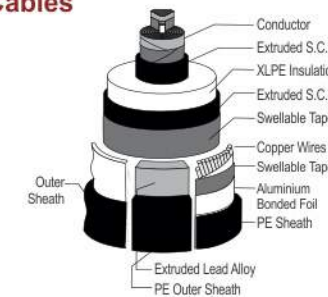
Depending on the type of insulation of the cable under use, there are further variations in the above types. Also sometimes distinction is made on the location where the joints are made, namely, Indoor type or Outdoor type.

Integrated Marketing Inc. also deals with required peripherals for laying of Cables, Jointing, Termination such as Cable link box, Cable trays, DWC Pipe, Cable glands, Cable tie, Lugs, Ferules, Connectors, Heat Shrinkable Sleeves, Right Angle Boots, End Caps, Cable Repair Sleeves, HT/LT Electrical Tapes and AB Cable accessories.

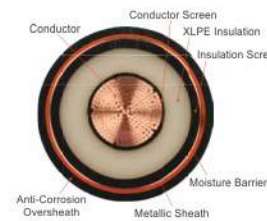
Services : Integrated Marketing Inc. also undertake services for Cable Fault locating, Hipot and route locating with cable jointing & termination with team of trained jointers. IMI provides services 24x7 at the defined locations.

EHV CABLE AND ACCESSORIES

EHV Cables



Cross Section View



EHV, XLPE-66/110/132/220/400kV for underground alternate solution to O/H power transmission.

Conductor Material : Aluminum/ Copper

Conductor Shape : Compacted / Segmental Circular

Screen : Extruded Semiconducting XLPE compound

Insulation : Dry Cured super clean XLPE

Ins. Screen : extruded semiconducting compound

Axial Water Barrier : Semicon (water sealable tape)

Radial water Barrier / Metallic Screen : Cu. wire screen / polyalide tape / Polyethylene / PVC inner sheath

Types of water Barrier : Lead Alloy Sheath / Corrugated Al. Sheath (CAS).

Also copper wire screen may be required to cater earth fault current.

Sheathing - The outer jacket shall consist of thermoplastic compound (PVC, PE or similar materials) extruded continuously over the metallic layer or moisture barrier Conductive layer(either extruded or applied by semicon paint) is also applied over outer jacket to facilitate voltage testing of jacket to check its integrity.

Conductor Size : Al. circular compacted up to 1000 sq. mm & Segmental conductor (Miliken) size above 1000 sq. mm Cu. circular compacted up to 800 sq. mm & Segmental 1000 sq. mm & above

IEC Code 60228-60840/62067/IS-7098(Part III&IV)

66KV to 400KV Termination for



Extra-high voltage outdoor

Suitable for Rated voltage:

- 38/66kV** : Cable cross section 95-2500 sq. mm
- 64/110kV** : Cable cross section 150-2500 sq. mm
- 76/132kV** : Cable cross section 185-2500 sq. mm
- 127/220kV** : Cable cross section 400-2500 sq. mm
- 230/400kV** : Cable cross section 630-2500 sq. mm

Application : EHV Tower / Gas Insulated Switchgear

EHV Straight through Cable Jointing Kit



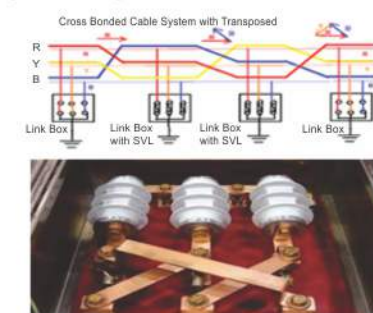
Extra-high Voltage Straight Joint

The silicone rubber joint body with integrated geometrical stress control provides proven electrical function. The joint components combine electrical performance, stress control and moisture sealing to provide the important functions required for all High Voltage products.

Pre-moulded ST Joint in one piece, Easy Push on installation, wide range suitable for 72.5 kV to 400 kV for Cu./Al. conductor up to 2500 sq. mm,

Pre-moulded ST joint in 3 piece design, Stress Control System with Silicone rubber, TTC-IEC 60840/62067, suitable for 132 to 400 kV, Cu. conductor up to 2500 sq. mm cables.

Cable Link Box



Link Box is electrically & mechanically one of the integral accessories of HV underground / above ground cable bonding system, associated with HV XLPE power cable systems. Link boxes are used with cable joints and terminations to provide easy access to shield breaks for testing purpose and to limit voltage build-up on the sheath.

Cross Bonding for EHV cables lightning, fault currents and switching operations can cause over voltages on the cable sheath. The link box optimizes loss management in the cable shield on cables grounded both sides

Sheath Voltage Limiters (SVL) (Surge Arrestors): is protective device to limit induce voltages appearing on the bonded cable system. It is necessary to fit SVL's between the metallic screen and ground inside the link box. The screen separation of power cable joint (insulated joint) will be protected against possible damages as a result of induced voltages caused by earth fault currents.

HT CABLES

HT Cables



Voltage Grade : 3.3/11/22/33 kV grade (E & UE)
No. of Cores : Single or Three Core
Cross Sectional Area : 25 sq. mm to 1000 sq. mm
Conductor : Copper/ Aluminum
Conductor Screen : By Semi conducting compound
Insulation : XLPE

Screen :
 Non Metallic Part : By Semi conducting Compound
 Metallic Part : Copper Tape
Inner Sheath : PVC tape wrapped / PVC extruded

Armouring

For Multi Core Cables

Material : Galvanised Steel
 Type : Round Wire / Flat Strip

For Single Core Cables

Material : Hard Drawn Aluminum
 Type: Round Wire / Flat Strip

Outer Sheath : Extruded PVC/FR/FRLS/Zero Halogen (LSZH)

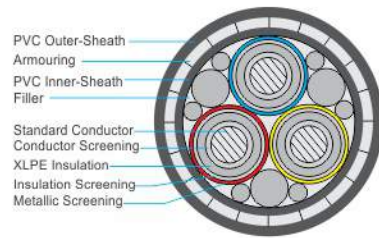
Core Identification : By coloured tapes
 Single Core cables generally up to 1000 sq.mm,

Three Core cables generally up to 400 sq.mm,

Drum Length : 250 / 500 m or as desired by customer

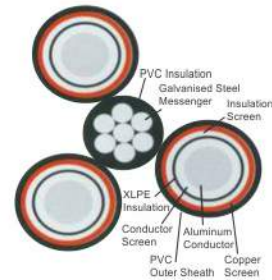
Relevant Standards : IS 7098 / Part-2 / 2011 or IEC 60502-02 & BS 6622

Cross Sectional View

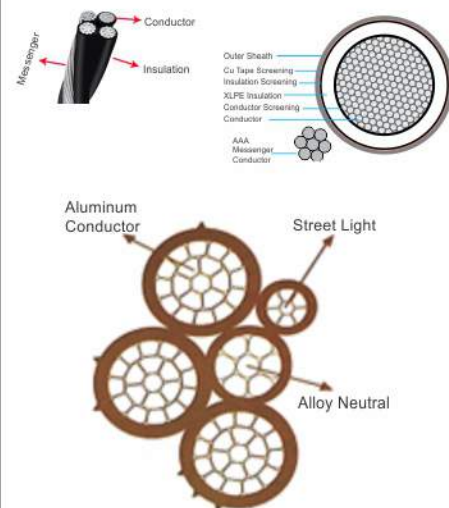


Aerial Bunch Cable

ABC HT Cross Section



ABC LT Cross Section



HT Aerial Bunched Cable : XLPE insulated for overhead lines is the composite cable which comprises of three single-core cables twisted around a bare aluminum alloy messenger wire, which will carry the weight of the cable. The rated voltage of the cables shall be 6.6kV up to 33kV

Examples of HT AB Cables

Designation	Overall dia. (approx.) mm	Designation	Overall dia. (approx.) mm
3C x 35 + 70 sq. mm	53	3C x 95 + 80 sq. mm	62.5
3C x 70 + 70 sq. mm	59	3C x 120 + 100 sq. mm	67.0

LT Aerial Bunch Cable : XLPE/HDPE insulated power conductors of Aluminum (Neutral conductor and street lighting conductor if and when necessary) are laid together (twisted) around a high tensile standard and galvanized steel (Aluminum Alloy may be used) insulated or bare messenger wire to form the Aerial Bunched Cable.

LV-ABC Lines with (Bare / Insulated Neutral Messenger):

It is also known as "Finnish system" consists of 3 insulated aluminum phase conductors and 1 neutral messenger made of aluminum alloy (with or without insulation). The system can incorporate 1 or 2 additional insulated aluminum conductors with cross sections of 16 sq. mm or 25 sq. mm as pilot wires or for street lighting. The mechanical strength and nominal cross section of the 3 phase conductors are identical. The neutral conductor acts as the suspension wire and has a higher mechanical strength.

Linked polyethylene insulated cables with aluminum conductors twisted over central bare/insulated alloy messenger wire IS - 14255- 1995

Conductor : All Aluminum /Alloy as per IS : 398 (Part - IV) - 1979

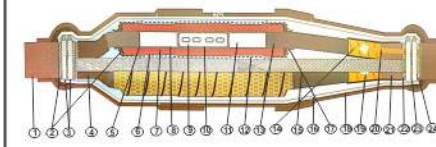
Insulation : XLPE / HDPE as per IS : 7098 (Part-II) - 1985

Examples of LT AB Cables

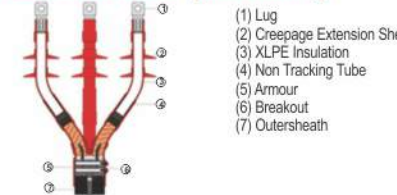
Designation	Overall dia. (approx.) mm	Designation	Overall dia. (approx.) mm
3x16+16+25	19	3x70+16+50	34
3x25+16+25	22	3x95+16+70	39
3x35+16+25	24	3x120+16+70	42
3x50+16+35	32		

HT CABLE ACCESSORIES

3 Core HT XLPE Straight through Jointing Kit [Heat Shrink]



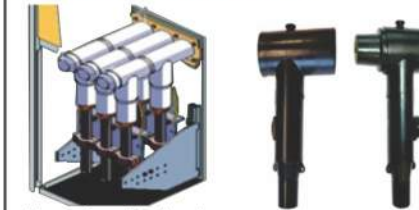
HT End Termination [Heat Shrink]



Elastimold + Cold Shrink Termination



TOUCH PROOF Termination For RMU's : Screened Separable 630 A Deadbreak Bolted Tee connector up to 33 Kv



Mounting Method

H.T Aerial Bunch Straight Through Jointing Kit



Heat Shrinkable Outdoor Termination Kit Suitable for A.B. Cable



The Straight Through Heat Shrinkable Jointing Kit consists of -

Resistivity : $1 \times 10^{12} \Omega \cdot \text{cm}$
 Dielectric Strength : 10kV/mm
 Dielectric Constant : 5 (Max.)

For XLPE 50 to 630 sq. mm for 3 core and 70 to 1000 sq. mm for 1 core

3 Core/ 1 core indoor /outdoor termination suitable for XLPE / PVC cables up to 33 kV

1- Cable outer sheath	2- Black Mastic	3-G.I. Hose clips	4-Breakout
5-Stress Grading Mastic	6-Semi Conductive Tube	7-Insulating Tubes	8-Stress Control Tube
9-Connector	10-Stress Grading Mastic	11-XLPE Insulation	12-Tinned Copper Wire Mesh
13-Semicon	14-Copper Tape Screen	15-Tinned Copper Braid	16-Wire Cannister
17-Water Sealing Sleeve	18-Corrosion Protection Tube	19-Solder Tack	20-Bare Copper Braid
21-Cable Inner Sheath	22-Armour Support Ring	23-Tinned Copper Wire Mesh	24-Armour

Heat Shrinkable Termination System for XLPE Cables up to 33kV incorporates special conductive breakout to prevent electrical discharges in between core at trifurcating point - suitable for cable up to 400 sq. mm
 Type : Indoor & Outdoor End Termination

Elastimold Termination Kit:

- Maximum Reliability with control of known factor, Computer designed and Applicable for superior temperature and stress management
- Superior Stress Management and Temperature Profile: Operates cooler than the cable conductor, Constant stress control configuration.
- Tests: Meets the requirement of international standards, IEEE 48, IEC 60502-4 and VDE 0278.

The Cold Shrink joint features a silicone rubber body, which provides excellent electrical properties & superior low temperature handling.

No Heat flames or special installations tools required. Allows transitioning of different size cables. Silicone body provides excellent electrical performance & superior low temperature handling one piece joint body design.

Body is made of a screened insulation with conductive outer screen including a faraday cage for the lug barrel

Technical Data :

Qualification requirement in accordance to CENELEC HD 629.S2 passed at IPH Berlin.

- System voltage (Um): 24 kV
- Basic impulse level: 125 kV
- AC voltage withstand (5 min.): 54 kV
- Continuous Current: 630 A
- Overload (8 hr. Max.): 900 A
- Thermal short circuit (3 sec): 43,2 kA
- Short circuit withstand 1 sec: 35 kA

Application: For connection of polymeric cable to transformer, switchgear, motors and other equipment with a pre-moulded separable connector for indoor & outdoor installations.

Relevant Std. : Meet the requirement of IEC 60502-4 and CENELEC HD629.1 S2

Specifications :

Volume Resistivity : $1 \times 10^{12} \Omega \cdot \text{cm}$
 Dielectric Strength : 10kV/mm,
 Dielectric constant : 5 (Max.) 25 to 120 sq. mm,
 Applicable for voltage : 1.1kV to 33 kV range

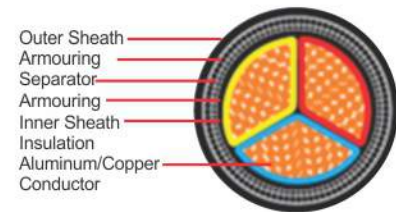
11kV (E) 3 CORE Outdoor Termination kit suitable for AB Cable: are designed to provide the basic important function required for medium voltage.

Salient features:

- Simple-and-Fast Installation.
- Fits a wide dimensional range reducing inventories. High tracking resistance in harsh environmental conditions.
- Repeatable results unlimited shelf life.
- Excellent weather & UV resistance.
- Immediate operational on completion.
- Exceptional insulation & stress control properties.
- Weight addition to cable negligible

MINING CABLES & TRAILING CABLES

HT & LT Mining Cable



Mining Cable is a known fact that cables used underground at collieries have to withstand unfavorable conditions, being exposed to falls of roof, dampness and other potential causes of damage. Mining cables must therefore be robustly made to withstand the rough use they receive. Further, constant maintenance is required to ensure their safety and reliability. In fact, reliable and robust cables are most essential for efficient reeling & unreeling operations in mines & industries.

Moreover, these mining cables should conform to the earthing regulations, namely, that the conductance of the earthing conductor should be at least 50 per cent of that of one of the power conductors.

Conductor : Circular Shaped –Copper, **Insulation** : PVC, **Armouring** : Round wire

Additional Options : Normally double wire armoured with Tinned Copper wire conductivity not less than 75 % of phase conductor 1.1/3.3/ 6.6 kV as per IS.

Sizes: Multi core up to 400 sq. mm, **Application** : Mining usage

BIS Standard as per DGMS : IS-1554 part-I & II / IS-7098 Part I & II / IS-9968 part-I & II / IS-2593 / IS-14494 where in PVC insulated (heavy duty) electric cables voltages upto and including 1.1 kV upto 11 kV / cross linked polythelene insulated thermoplastic sheathed cable from 1.1 kV upto 33 kV / Elastomeric insulated cables from from 1.1 kV to 11 kV / Flexible cables / Elastomeric insulated flex.cables for mines from 1.1, 3.3, 3.8/6.6 & 6.35/ 11 kV respectively.

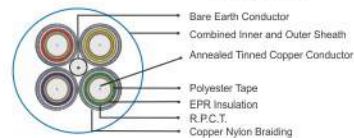
Trailing CABLES (DGMS Approved)



Cable Elastomer Insulated 5 Core, 1.1 KV Grade Flexible Trailing Cable Type FT-7 Confirming to IS : 14494-1998 for use in Coal Mines.

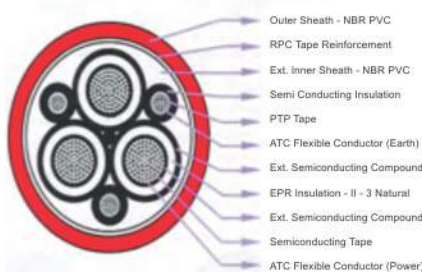
CONSTRUCTION :

1. Annealed Tinned Copper Conductor as per IS : 8130/84
2. Polyester separator tape over the conductor as per IS : 14494/98
3. EPR Insulation Type I E, of IS : 6380/84
4. R.P.C.T over the Core as per IS : 14494/98
5. A.T.C. Conductor Nylon Braided / Screen as per IS : 14494/98
6. Inner & Outer Sheath Type SE, and SE, Type of IS : 6380/84.



High Voltage Elastomer Cables up to 33kV

HT Flexible Trailing Cable



Conductor	: Composed of annealed tinned copper wires complying with IS 8130/84.
Tape	: PROOFED TAPE - shall be closely woven textile without selvage proofed with rubber. <ul style="list-style-type: none"> • Polyethylene Terephalate (PTEP) or Polyethylene Base Tape • Any other suitable tape based on glass, textile composite or other synthetic Material
Insulation	: Elastomer Compound conforming to type IE2 of IS 6380 for voltage grade up to and including 11 kV and type 1E, of IS 6380 for voltage grade 3.3/6.6 and 11 kV
Semiconducting Tape	: The semi-conducting compound shall be so formulated as to be suitable for the operating temperature of the cable both during sustained operation and during short circuit & shall have no deleterious effect on the cable insulation.
Screen	: The screening shall consist of one or more of the following as specified. <ul style="list-style-type: none"> • Non-metallic semi-conducting tape. • Non-metallic semi-conducting compound, and • Annealed tinned copper wires
Centre	: Consist of Elastomeric compound or fibrous material suitable for the operating temperature of the cable and shall have no deleterious effect on the components of the cable.
Fillers	: The fillers shall consist of jute or similar roving, rubber compounds (including regenerated and un-vulcanized rubber) or polymeric compounds and shall have no deleterious effect on the components of the cable.
Cradle Separator:	The cradle separator shall consist of Elastomeric compound suitable for the operating temperature of cable and shall have no deleterious effect on the insulating material.

Description	Is 14494 Cable specification :
Extreme temp. range	(-40°C to 105°C) can withstand the extremes of environments
IS : 14494 Cable range	0GA, 2GA, 4GA, 6GA, 8GA, 10GA, 12GA, 14GA, 15GA, 16GA, 18GA, 20GA and ultra classic strands
Conductor Type	Stranded 99.99% OFC (oxygen free copper), and tin plated copper, copper coated Al.
Material	Env. friendly, quality, glossy material Tinned, Si/Ni plated Cu etc.
IS : 14494 Cable Colour	Customized
Reinforcement	TAPE - Tapes shall be according IS 14494/98. • CORDS / YARNS reinforcement shall be of cotton or synthetic material
Sheath	Inner Sheath - Elastomeric compound complying - of type SE3, IS 6380 heavy duty sheath type SE3/SE4 of IS 6380-1984 & Outer Sheath - Elastomeric compound - type SE4 of IS 6380.
Armour	Strands of galvanized steel, wires, individual wires as IS: 3975.
Core Identification	Coloured insulation, Nos. PE tape, Coloured proofed tape, Nos. printing

MINING CABLE & TRAILING CABLE ACCESSORIES

Mining Splice / Jointing Kit



Mining Couplers



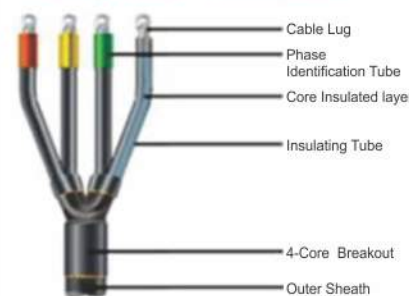
Mining Cable Termination Kit



Mining Resin Cable Joint



Trailing Cable Termination



Ease of installation: the connector insulating sleeves and outer joint sleeve are made of tough, flexible polymers specially developed and cross-linked to give them an 'elastic memory'. When positioned over the joint and heated, each component shrinks to a predetermined diameter tightly fitting the cable and automatically providing the correct insulation thickness in one operation.

Moisture sealing: the components of the joint are supplied internally pre-coated with special adhesives. The heat of installation causes the adhesive to melt and flow under the shrinking action, bonding to the cable insulation and making a robust seal against water and chemicals. Heat-sensitive paint on the outer joint sleeve provides the installer with an additional check that he has applied sufficient heat to activate the adhesive.

Flexible and abrasion resistant: tough, pliable materials and a small overall diameter make flexible joints suitable for use on trailing cables. Their resistance to the stress and strain of repeated winding onto take-up reels has been confirmed by a rigorous test programme and reliable service in demanding field conditions.

Splice is suitable upto 1.1 kV cables.

Mining couplers can also be one way of jointing the cables during failures and are suitable upto 11 kV.

Specifications

- Quick Cable Preparation
- Suitable for all types of conductors and connection shapes
- Environmental sealing by specially developed sealants
- Effective and reliable stress control
- Compact dimensions
- Immediate operation possible

The Heat shrinkable Terminations & Joints are available for complete range of low voltage cables i.e. XLPE/PVC Cables from 1.1 kV up to 33 kV voltage ratings, These termination & joints are designed and developed to meet various system requirements.

Resin cable joints specially modified and are most suitable for Mines and Quarries - 3 core rated upto 6.6 / 11 kV.

• Straight/Inline • Branch (T or Y) • Multi-Service • Transition • Pot-end

Hazardous area resin cable joints are surrounded within a specialized joint shell once the joint has been completed electrically, which is flame retardant, hydrocarbon resistant and halogen free.

The cable joint is then filled with a 1402FR polyurethane resin which has been highly modified by chemical additives which make the resin flame retardant, halogen free and virtually unaffected by immersion in either hydro-carbons or chemical solvents.

Cable resin is quick to mix and pour using a Closed Pour delivery systems of the resin into the cable joint shell – specialist cable jointing resins include hydrocarbon resistant, low smoke zero halogen, fire resistant and flame retardant.

The resin bag is designed to remove any chance of skin contact and reduce vapour inhalation from the resin itself, giving the user superb control over the resin mixing and pouring process and avoiding unnecessary spills and wastage.

For safety in underground systems requiring frequent movement. High capacity to withstand mechanical and thermal stresses

Volume Resistivity : $1 \times 10^{12} \Omega - \text{cm}$

Dielectric Strength : 10kV/mm,

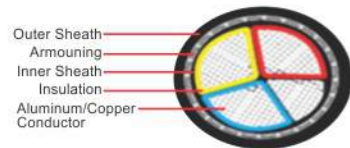
Dielectric constant : 5 (Max.),

Test : No failure by tracking or erosion up to 3.3kV for 20 min. 1.1 kV / 3.3kV up to 33 kV suitable for Trailing & Mining Cables.

The Heat shrinkable Terminations & Joints are available for complete range of low voltage cables i.e. XLPE/PVC Cables from 1.1 kV up to 33 kV voltage ratings, These termination & joints are designed and developed to meet various system requirements.

LT CABLES

LT POWER CABLE / Control Cable- XLPE/ PVC



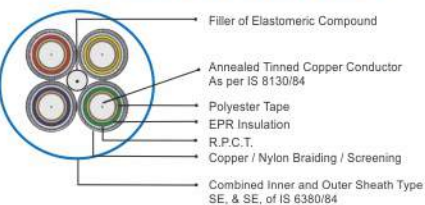
Core : Single / Multi core cables
 Single core cables up to 1000 sq. mm
Voltage grade: 650 / 1100 V
 Cross sectional area: Single core cables – up to 1000 sq. mm
Control cables : 1.5 & 2.5 sq. mm (can be either solid or stranded) up to 61 core
 Four core - 4 sq. mm to 630 sq. mm
Conductor: Copper / Aluminum
Insulation: HRPVC / PVC / XLPE / Halogen free
Inner Sheath: Tapped / Extruded with suitable material
Armour : Galvanized Steel
Type: Round Wire / Flat Strip
Outer Sheath: Extruded PVC / FR / FRLS / Zero Halogen (LSZH)(ST-1) or (ST-2)
Drum Length: 250 / 500 / 1000 m

Relevant Standards: IS 7098 / Part-I / 1988, IS:1554 / Part-I/1988, IEC 60502 and BS 5467

Elastomeric Cable



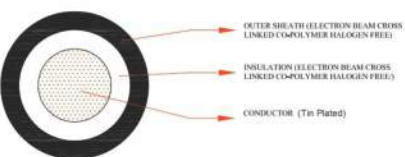
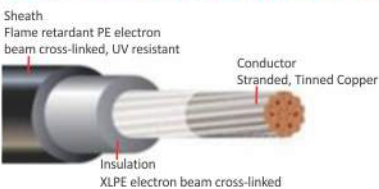
Cable Copper Conductor Elastomer Insulated 4 Core screening individually and overall CSP sheathing as per IS 9968 PI-III



Conductor- Annealed tinned copper, flexible class-5 conductors
Insulation - Ethylene Propylene Rubber (EPR)
Range: Single Core: up to 400 sq. mm
 Multi Core - 1.5 sq. mm & 2.5 sq. mm up to 61 core
 4 sq. mm – 10 sq. mm up to 7 core
 10 sq. mm – 300 sq. mm up to 4 core or as desired by the customer.
Sheath: Black heavy duty elastomer
Max Cond. Temp up to +90° C for EPR and silicone rubber for higher temp up to 150° C
Colour Coding: 1-5 core coded as Green/Yellow, Blue, Brown, Black, Grey or coloured rubberish cotton tapes. 6 core or more with numbered cores and earth core of Green / Yellow.
Application : Ideal for power & control, material handling equipments (Crane),
 • Used in generators, heavy machineries, portable power tools and equipment, moving machinery in wet, hot, oily environments and in open cast mines.
 • Railway ship wiring, heavy industries, oil exploration &
 • Suitable for trailing cables for reeling / unreeling operations in mines.

Relevant Standards: Elastomeric covering of IE-4 type insulation. (CSP based) RDSO : SPEC/E-14/01 (PART-I) Rev II, Mining Cable: IS 1026, IS 9968, IS 14494 VDE 0250

E Beam Irradiated Solar PV Cables



Construction: Annealed Electro-Tinned fine copper strands (bunched to meet class 5 flexibility as per IEC 60228, VDE-0295) insulated and sheathed with polyolefin Co-polymer(XLPO), Electron Beam cross-linked

Sheath Colour: RED or Black, Black with Red stripe(Black recommended)
Voltage rating : up to 600/1000 V AC and 1000/1800kV DC Tested: 6.5 kV; 50 Hz or 15kV DC for 5 min.)

Dual Wall Electron Beam irradiation insulated for Photovoltaic power applications for connection from PV Cell to Junction Box / Inverter in dry, damp & wet conditions

Advantages : Electron beam cross-linked XLPO has – Continuous operating temp. up to 120°C, hence higher current carrying capacity

- Better UV & Ozone resistance and improved weather resistance
- Improved oil & chemical resistance, improved crack resistance, Halogen free.

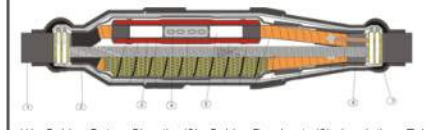
Fire Survival Cable



Conductor: Annealed/ Multi Stranded Cu. bunched conductors
Tape: Two layers of special Fire Retardant tape over conductor, doesn't allow fire to spread and retains dielectric strength
Insulation: Low Smoke Zero Halogen(LSZH) compound helps in reducing emission harmful toxic gasses & minimize smoke emission levels
 As per BS7846 and tested as per BS 6387&8491, pass through stringent quality test(F120) to ensure min damage to life and property, caused during fire breakouts

LT CABLE ACCESSORIES

LT Straight through Jointing kit



(1) Cable Outer Sheath (2) Cable Breakout (3) Insulating Tubes (4) Connector (5) XLPE Insulation (6) Cable Inner Sheath (7) Armour

Heat Shrinkable L.V Termination



Epoxy Jointing Kit



Rubber Cables ST Jointing



End Termination Kit For Elastomer Cables



In LV multi-core cable joints, individual connectors are insulated by shrinkable tubes. Galvanized Steel Casing provides mechanical protection against dig-in damages. Corrosion and moisture protection is achieved in the same way as in HT joints.

- Quick cable preparation,
- Covers all types of conductors and connection shapes,
- Compact dimensions,
- Heat shrinkable type insulating tubes.

Suitable for Sealing & insulating XLPE Indoor / Outdoor from 16 sq. mm to 1000 sq. mm

Features :

- Water Proof, Good Mech. Strength,
- Wide Cross section range,
- Good Resistance against UV radiation,
- Alkaline earths & chemical agents, Compact design,
- High Electrical insulation values.

All cast resin joints shall be suitable for under ground cables in the systems.

Rubber Cables ST Jointing- Straight joints for screened rubber insulated cables (with three service cores and three protection cores) - 3.3 kV up to 11 kV **Tinned Mining** connectors are used for joining service cores and protection cores.

Screens (made of rubber semiconducting on service cores) and their insulation are re-constructed on protection cores with the use of semiconducting self-bond tapes.

End Termination Kit For Elastomer Cables :

Designed for both indoor and out-door use in all climate conditions, Covers applications on single core and multi core cables up to 33 kV.

Right Angle & Inline Cold Boots



Right Angle Cold Boots are used to insulate the bushings in cable termination boxes upto 33 kV, specially when the clearance between phase to phase and phase to earth is less than the normal air clearance. These boots provide protection against flashovers in the event of high humidity, rodent menace and surge impulse. The boots are made from thermally stabilized, cross linked, insulating and weather resistant polymeric material.

Physical Properties :

Specific Gravity : 1.10 ± 0.2 g/cm³; Tensile Strength : 8 N/mm² (min.)
 Ultimate Elongation: 600% (min.);

Thermal:

Tensile strength: 8 N/mm² (min.); Ultimate Elongation: 200% (min.);
 Operating temperature range: - 30°C, + 135°C; Low temperature flexibility: - 40°C;

Electrical:

Volume resistivity: 1013 Ω - cm (min.); Dielectric strength: 20 kV/mm. (min.);
 Dielectric constant: 5 (Max.); Resistance to fungus & Decay Rate: 1.

LT Cable Repair Sleeve



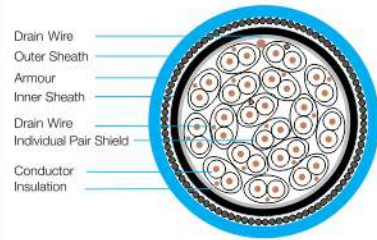
Wrap-around heat shrinkable sleeves provide a quick and permanent field repair system to damaged outer sheath of cables.

Resistant hot melt adhesive, protecting the inner metallic armour & sheath from corrosion, which would otherwise affect the life and performance of cables.

Tensile Strength : 17.5 N/sq. mm,
Ultimate Elongation : 300%,
Dielectric Strength : 12kV/mm, Water Absorption : 1% ,
Sizes (in mm) : 42/8, 52/10, 76/22, 100/30, 122/38, 139/38, 160/55, 200/60.

INSTRUMENTATION CABLES

Instrumentation /Signal Cables



Cores. Paired, Triades etc. with aluminum Mylar Tape for individual & overall sheilding up to pairs general PVC / heat resistance PVC insulated.

Voltage Grade : 300 / 500 V

Cross Sectional Area : 0.5 sq. mm to 2.5 sq. mm

Type of Conductor : Copper

Type of Insulation : PVC / HR PVC

Inner Sheath : Extruded PVC (ST-1) or (ST-2)

Outer Sheath : Extruded PVC / FR / FRLS / Zero Halogen (LSZH) (ST-1) or (ST-2)

Shield is provided to prevent harmful electrostatic interface. There are three basic reasons for providing an electrostatic shield in a cable.

1. Need to keep external electrical disturbances from affecting the signal in the cable.
2. To prevent the signal in the cable from being detectable at location other than at the cable ends.
3. Elimination of unwanted transfer of signal between circuits in the same cable.

Application- Instrumentation cable plays a vital role in measurement and control.

Relevant Standards: PVC Sheathed 225/ 650 / 1100 V grade cables as per BS : 5308 / DIN VDE0815 & 816 / IS : 1554 / IEC : 189



SINGLE CORE WIRES
(0.5 sq. mm to 240 sq. mm)



FLEXIBLE POWER / CONTROL CABLES
(up to 100 core)



FLEXIBLE ARMoured CABLE



EMC COMPLIANT POWER / CONTROL CABLE



PENDANT APPLICATION CABLE



DRUM REELING & UNREELING CABLE



HEAT RESISTANT CABLES



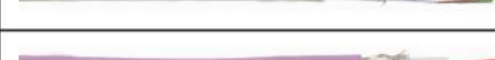
INSTRUMENTATION CABLES
(Size : 0.5 to 1.5 sq. mm) (Pairs : up to 24) (Triad : up to 16)



COMPENSATING CABLE
(Range of Temp : 70°C to 200°C)



DATA CABLE
(up to 50 core)



BUS CABLES
MODBUS / PROFIBUS / CAN BUS etc



SERVO CABLES
Drag Chain cables
Lan cables
Optical Fibre cables etc.

OTHER CABLE ACCESSORIES

DWC Pipe ROUND + HALF ROUND



Areas of concern buried Electrical Cable- during laying :

- Heavy machinery pulling through crossings handled by 50-100 labour for each km laid.
- Trench has to remain open & cable is laid.
- Public inconvenience.
- Chances of damage and pilferage of cable.

Areas of concern buried Electrical Cable – during Life of Project :

- Digging damages.
- Re-routing results in loss of cable.
- Repairs are done by a separate cable piece & require two splice joints wherever a cut occurs.
- Future upgrade leads to new civil work and loss of old cable.

Hence, **Double Wall Corrugated** High Density Polyethylene (HDPE) ducts with outer corrugated wall of HDPE & Inner smooth wall of HDPE can be used with following advantages :

- Light weight and therefore easy to transport, handle and install.
- Excellent mechanical properties and ability to take heavy loads.
- Chemically inert and therefore suitable for use in saline/coastal area
- No sharp edges and therefore safe use for cable installations
- High flexibility to take bends and curves around obstacles.

Applications Replacement of GI/RCC/PVC Pipes.

- Across Rail / Road crossing
- Across Culverts / Nallahs
- Along Bridges
- Both in long haul and city network.
- Protection for cables in local access networks.
- Provision for future upgrades.
- Used as main duct / sub-duct networks design.
- Used as casing duct for direct installation of copper cables and Fibre optic cable in city network.

AB Cable Accessories



AB accessories assembly is directly strung on to distribution pole / towers by means of standard hardware available in the market, but care shall be taken to render the messenger wire completely insulated from earthing at any point of distribution in case of HTABC.

Suspension Clamp, Dead Clamp, Piercing Connectors, MS Hook are such accessories which are always required in any AB cable.

Instrumentation Connectors



Rectangular & Circular connectors used in instrumentation cables.

Ex. **PROFIBUS** connectors,

CANBUS connectors,

Size : M8 & M12 connectors

Signaling Connectors



Cable Glands



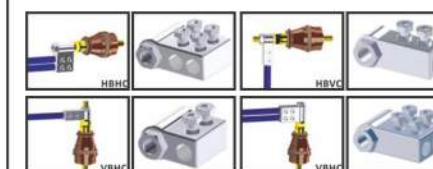
Cable glands - SKINTOP type of different sizes as per the requirement

Polyamide / Brass Nickel Plated



Brass cable glands in single and double compression type

Energy Efficient connectors :






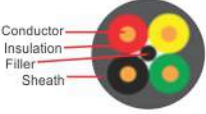


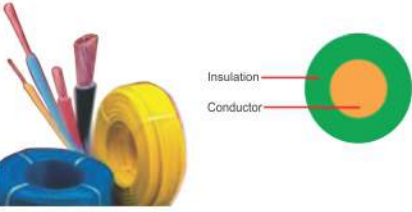
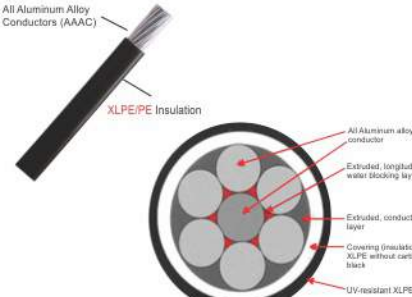
Energy Efficient connectors of various types :

Horizontal Bushing Vertical Cable (HBVC), Vertical Bushing Horizontal Cable (VBHC), Horizontal Bushing Horizontal Cable (HBHC), Vertical Bushing Vertical Cable (VBVC) used in Distribution & Power transformers, Suitable for Cu / Al Cables.

- No crimping, or crimping tool / die needed.
- Torque Controlled Shear Bolt for eliminating human error.
- Simple & full proof installation with Ratchet Spanner.
- Special customized surface treatment and finishing.

Application: Generators, ACB's, SWGR's Transformers, Motors, etc.

FLEXIBLE CABLES

<p>Jelly Filled Cable</p>   <p>Labels: Insulated Copper Conductor, Core Filling Compound, Core Wrapping, Flooding Compound, Moisture Barrier, Inner Sheath, Screening & Protection, Intermediate Sheath, Armour, Jacketing, Filler</p>	<p>Centre Conductor: Solid bare Copper Insulation : Foam PE/ PVC Outer Conductor : 1st Shield- Al-Foil Bonded, 2nd Shield –Al. Alloy Braiding Flooding Compound : Jelly (Petroleum jelly prevents ingress of moisture and water inside the core in the event of any damages to the cable.) Jacket : PVC Black Size : 0.45/ 0.50 / 0.6 / 0.7 / 0.8 / 0.9 mm dia conductors available in 1 pair up to 50 pair Application : <ul style="list-style-type: none"> • For telecom data transmission, • Intercoms, EPBX, Fax, • Close circuit security system, • Residential/ industrial telephone line. Standard : TEC Specification G/WIR06/02</p>
<p>Flexible Multi core Cable</p>   <p>Labels: Conductor, Insulation, Filler, Sheath</p>	<p>As the name indicates, flexible multicore cables comes with higher flexibility. It is due to the number of strands in the conductors. It makes these cables for wiring of machine tools, control panels. Conductor : Multi Stranded Plain / Tinned Insulation : PVC / XLPE / HR PVC / FR / FRLS / Zero Halogen Sheathed : PVC / HR PVC / FR / FRLS / Zero Halogen Sizes : Two, Three or Four core up to 24 core. Application : In various electrical installations in small machines and in any type of Industry / Hotel / Malls / Hospitals, etc.</p>
<p>Flat Cable</p>  <p>Cross Sectional View</p>  <p>Labels: Insulation, Conductor, Sheath</p>	<p>Conductor : Stranded bare annealed electrolytic grade copper Insulation : Specially formulated PVC (Type A) Outer Sheath : Specially formulated PVC (ST-1) Water proof / Weather proof Sizes : 1.5 to 95 sq. mm, 3 core, Flat & Shape (round submersible cable can specially be asked for) Application : Submersible flat cable has its use in winding / rewinding submersible pump motors. Due to PVC insulation these cables can work continuously under water for a long time. Standard : 1.1 kV PVC insulated multistranded annealed bare Cu, Flat 3 core, PVC Insulated & sheathed as per IS : 694</p>
<p>House Wires</p>  <p>Labels: Insulation, Conductor</p>	<p>Wires are preferred for house, public places (hotels, hospitals, railway station) and in chemical industries. Single core up to 1000 sq. mm, Multicore up to 150 sq. mm Voltage grade : 450 / 600 V No. of Core : Single or Multicore Cross sectional area : 0.5 sq. mm to 1000 sq. mm Type of Conductor : Copper Flexible Type of Insulation : PVC Sheath (Applicable for Multicore cable) : Extruded PVC / FR / FRLS / Zero Halogen (LSZH) (ST-1) Standard : 1100V Multi strand Flexible, PVC Cables as per IS : 694</p>
<p>Covered Conductor</p>  <p>Labels: All Aluminum Alloy Conductors (AAAC), XLPE/PE Insulation, All Aluminum alloy conductor, Extruded, longitudinal water blocking layer, Extruded, conductive layer, Covering (insulation) of XLPE without carbon black, UV-resistant XLPE</p>	<p>Conductor : Multistranded round compacted hard drawn Al-Mg-Si conforming to EN50182. Outer Insulation - Track resistant UV stabilized (weather resistant) XLPE Inner Insulation - XLPE This dual wall insulation shall conform to EN 50397. The covering is extruded so as to provide a uniform thickness throughout the length of the conductor. Water Blocking : Suitable water blocking material & method is incorporated between the conductor and the covering during the extrusion process to prevent the migration of water along the conductor. Solid water blocking is ensured as Slippage Factor of 1 as per EN 50397. The water blocking material does not affect the inter-strand conduction and also not affect the adhesion between the conductor and the XLPE cover. Water blocking material is stable at maximum operating temperature.</p>

CABLE ACCESSORIES

<p>Jelly Filled Straight Through Jointing Kit</p> 	<p>It acts as the Jointing of all sizes of Telephone cable (Jelly Filled Cables) underground as well as overhead applications</p>
<p>Cable End Caps</p> 	<p>Heat shrinkable cable end caps are used to seal the ends of all types of cables and protect them from ingress of water / moisture. The caps are made from thermally stabilized cross linked polymeric material. The caps are internally coated with hot melt adhesive and can also be supplied with valves Specific gravity : 1.19 ± 0.2; Water absorption : 1 % (Max.); Tensile strength : 10 N/mm² (min.); Ultimate elongation : 300% (min.); Hardness : 45 shore D ± 3; Volume resistivity : 10¹² Ω - cm. (min.); Dielectric strength : 10 kV/mm. (min); Dielectric constant : 5 (Max.).</p>
<p>Mechanical Shear Bolt Cable Ferrules</p> 	<p>Shear Bolt Cable Ferrules are suitable for high voltage range - 11 kV up to 33 kV. Used for cable jointing of Copper & Aluminum conductors.</p>
<p>Lugs</p>  <p>Labels: Aluminum Lugs, Aluminum Clamping terminals, Clamping lugs</p>	<p>AL & Cu Plain / Insulated Ring Type, Pin Type, Flat Lugs Al. Lugs from 25 sq. mm up to 630 sq. mm Cu. Ring Type / Pin Type from 1.0 to 10 sq. mm as required Make : Dowels & Comet.</p>
<p>Cabinet Feed through Seals</p> 	<p>Cabinet Feed through seals are ideal for moisture sealing applications where cable enters enclosures like cabinets or connection boxes. The molded part is pre-coated with thermoplastic adhesive that seals around the entering of cable</p>
<p>Polyamide Conduit / Flexible Metal Conduit</p> 	<p>Polyamide / Flexible conduits are used in house, buildings, multiplexes, offices specially in False Ceiling Dia - 1/2 inch to 3/4 inch / 3/8 inch to 4 inch</p>
<p>Cable Tags</p>  <p>Labels: CABLE TAGS, 5317, 1324-FIT4002PW, 40564, FED FROM 0823</p>	<p>Cable Tags are used for nomenclature of Various Cables / Wires, Easy Identification of cable routes to & from in various control system applications.</p>
<p>Cable Ties</p> 	<p>Cable Ties are used for tying bunch of cables together. Mostly used in breakers, panels for control cables. Wires are grouped together as per requirements.</p>
<p>MV Copper Lugs</p> 	<p>MV Copper Lugs used as terminal lugs designed for use for applications up to 33kV. Manufactured from high purity copper tube, annealed and tin plated. Suitable for use upto 19/33kV</p>
<p>Cable Trays</p>  <p>Labels: Ladder Type, Perforated Type</p>	<p>Moderate ventilation with added cable support advantage Plain type : Thickness 1.2mm to 2.0mm, Width: 50mm – 400 mm, Rung-50 mm for Trucking, Duct, Race Way Perforated type : Thickness 1.2-2.0 mm, Width: 350-600 mm, Rung-50 mm for Power/ Control cable laying Ladder type : Thickness: 1.6-3.0 mm Width: 100-1000 mm, Rung-50-100 mm for Power cable laying Cable Trays shall be Pre galvanized / HDGI, Powder coated with cover and without cover with Couplers (Hardware)</p>

HT & LT ELECTRICAL TAPES

PRODUCT NAME	DESCRIPTION	USES	DETAILS
High & Low Voltage Insulation Rubber Tape 	Is highly conformable self fusing Ethylene Propylene rubber (EPR) based, high insulating voltage tape. has a 'Snake-skin' liner that is easily removed as the tape is applied	<ol style="list-style-type: none"> 1. Insulation of all electrical system 2. High voltage cable joints. 3. Repairs on cable 4. Bird Faults 5. Insulation on Bus Bar 6. Insulation on Insulators 7. Space in conductor 8. Insulation of transformer bushing 9. Lug sealing 10. Moisture sealing ele. connections 	Size : 3/4" x 30' 1" x 30' 1 1/2" x 30' Thickness : 30 mil Temp. Rating continuous 90°C / 194°F Short Term. 130°C / 266°F kV Class : Primary Insulation up to 69 kV
Arc & Track Resistance & Insulating Self Fusing Silicone Rubber Tape 	Silicone Rubber electrical tape is suitable for high temperature, Arc & Track resistant tape composed of self fusing, inorganic silicone rubber with an easy tear & easy strip liner	<ol style="list-style-type: none"> 1. Insulation of all Electrical System high temperature H Class 2. High voltage cable joints 3. Repairs on cable 4. Bird Faults 5. Insulation on Bus Bar 6. Insulation on Insulators 7. Space in conductor 8. Insulation of transformer bushing 9. Lug sealing 10. Repairs on outdoor termination 	Size : 1" x 30' Thickness : 12 mil Temp. Rating : 180°C / 356°F kV Class : Primary Insulation upto 69 kV
Rubber Mastic Tape 	Rubber Mastic tape is conformable self fusing rubber electrical insulating & sealing tape. It consists of Ethylene Propylene Rubber (EPR) back coated with strong, temperature stable mastic adhesive. It is self fusing rubber based compound bonded to a moisture sealing mastic, all weather application.	<ol style="list-style-type: none"> 1. Low voltage bus bar insulation 2. High voltage cable jacket repair 3. Moisture proofing on cables 4. Moisture proofing on electrical systems 5. Sealing termination box 6. Sealing of panel 7. Cable end sealing 8. Insulation and moisture sealing of L.T. Joints. 	Size : 2" x 10' Thickness : 65 mil Temp. Rating 90°C / 194°F emergency overload of 130°C / 266°F kV class : cable - 33kV Bus Bar 1.1 kV
Electric Arc Proofing Tape 	Fire Retardant Electric Arc Proofing tape is designed to use on cables in vicinity of other high voltage cables or exposed to other high energy cables. Its unique formulation expands in fire to form a thick char build up between the flame barrier, thus protecting the cables & accessories.	<ol style="list-style-type: none"> 1. Fire Proofing on non FRLS cables 2. Protects cable from arcs and fire until limiting devices can interrupt faulted circuit. 	Size : 1 1/2" x 20' Thickness : 30 mil Class B
PVC Vinyl Tape 	Highland PVC Vinyl tape is flexible, conformable general purpose flame retardant tape	<ol style="list-style-type: none"> 1. General purpose insulation tape. 	Size : 3/4" x 60' Thickness : 7 mil Temp. Rating 80°C / 176°F kV Class : 1.1 kV
Semi Conducting Tape 	Rubber tape, Semi conductive compatible with cable semi-conducting jackets	<ol style="list-style-type: none"> 1. Provide cable shield continuation 2. In cable jointing kits 	Size : 3/4" x 15' Thickness : 30 mil Temp. Rating continuous : 90°C / 194°F Short term : 130°C / 266°F
Glass Cloth Tape 	Woven insulating glass cloth; high temperature resistance; high mechanical strength. UL Recognized	<ol style="list-style-type: none"> 1. Heat-stable insulation for furnace & oven controls, motor leads & switches. 	Size : 1/2" X 66', 3/4" X 66' Thickness : 7 mil, 7.5 mil Temp. Rating Class B temp - 130°C/266°F Class H temp- 180°C/356°F

SERVICES

Under One Roof Integrated Marketing Inc. provides following services :

- Cable fault finding
- High Pot testing
- Cable Jointing & Termination

In Brief Services are as below :

Fault location in underground LT/HT power cables.

Hi pot testing for HT cables up to 33KV grade with calibrated instrument, (calibration traceable to National standards)

Identification of particular cable from bunch of cables

Route tracing of buried power cable upto 10 km.

Supply of cable joint & jointing services.

Post jointing Hi-Pot Test.

Regular Hi-Pot testing of cables on contract basis.



The CABLE FAULT LOCATOR has most of the essential instruments mounted in it. It consists the Shock Discharge Generator suitable for locating faults in all LT / HT cables ranging from 1.1kV, 11kV up to 33kV. It is equipped to locate the fault with a highly sensitive seismic receiver. It also has a Hi-Pot tester for cables up to 33kV as per IS.

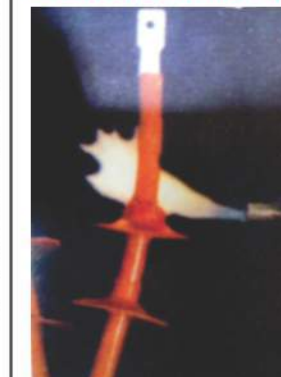


Fixing of Straight Through Joints by specialized jointers team available 24 x 7 for customers



For fixing of straight through jointing kits : After pin pointing the fault under the ground, the customer should ensure to mark the exact location of fault on ground and keep the site ready by excavating of earth at the exact location of cable fault. Our jointer will be deputed once we receive the order / confirmed mail.

Supply & Fixing of End Termination Indoor & Outdoor Jointing Kits



After pin pointing fault, we supply cable jointing kits Indoor type. Outdoor type, Straight Through joint & Transition Joint. We provide both Heat Shrink and Cold Shrink technology for 1.1 kV up to 33 kV grade cables / as per requirement.

For all types of cables : HT / LT / PILC to XLPE, etc service can be provided 24 x 7