L.T. HEAVY DUTY CABLES

These cables are suitable for use on Ac single phase systems for the rated voltage up to and including 1100 Volts. These cables can be used on DC system for rated voltage up to and including 1500 Volts on 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 Shulphur fumes are present . In these conditions tinned copper should be used.

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

CONDUCTOR CONSTRUCTION

The most Economical Construction is solid conductor i.e. conductor is made of one Single Wire as the area of Conductor is increase; Solid conductor becomes more stiff and hence difficult to handle. In this case stranded construction is adopted. Here the conductor is made of numbers 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 conductor are employed in bigger sized cables. Here the strand conductor is shaped in to a segment of a circle so that when all the cores are laid they form a complete circle.

INSULATION

The PVC (Polyvinyl Chloride) covering over conductors is called insulation and is provided by extrusion process only. The insulated conductor is called core. We are using two types of compound for insulation:-

- Insulation with PVC compound which is suitable for 70^{o} C continues operation.
- Insulation with PVC compound which is suitable for 85^{o} C continuous operation.

THE FOLLOWING COLOUR CODES ARE USED FOR IDENTIFICATION

- Single Core : Red, Black, Yellow or Blue
- Two Cores : Red and Black
- Three Cores : Red ,Yellow ,and blue
- Three & Half : Red, Yellow Blue and Reduced Neutral Black
- Four Core : Red , Yellow, Blue, and Black
- Five Core : Red , Yellow, Blue , Black and Grey.
- Six Core : Two adjacent cores Blue and Yellow (Counting and direction Core) & remaining Grey in each layer.

OUTERSHEATH

The PVC covering on Armouring in case of Armoured Cable and over the inner sheath in case and over the Inner Sheath in case of Unarmoured Cables is called Outer Sheath.

- Outer Sheath with PVC compound which is suitable for 70 degree continuous operation
- Outer Sheath with PVC compound which is suitable for 80 degree continuous operation.

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

DELIVERY LENGTH

The cables are generally delivered in 100 Mtrs. Coils wrapped with Polyethylene / Hessian. The bigger size cables are supplied on wooden frames.

L.T. HEAVY DUTY CABLES FOR FIXED WIRING AND CABLE OPERATION

These cables are suitable for use on AC single phase or three phase systems for rated voltage of upto or including 1100 Volts. These cables can be used on DC systems for rated voltage of upto or including 1500 volts.

CONDUCTOR

The most acceptable metals for conductors are copper and alumimnium due to there higher conductivity and ductility.As copper has higher affinity for Sulphur it corrodes in atmosphere where Sulphur fumes are present.In such cases tinned Copper must be used.

CONDUCTOR CONSTRUCTION

The most economical construction for conductors is solid conductor's i.e conductor is made of one single wire. As the area of the conductor increases, solid conductor becomes more stiff and difficult to handle. In this case use stranded in rope construction is used for cables. Where crimping of lugs is required the conductor has to be stranded or bunched construction only.

As per the international convention the size of the cable is decided by its resistance only. The constructions of the conductor mentioned in the table are only for guidance and as per market convention.

INSULATION

The PVC (Poly Vinyl Chloride) covering over the conductor is called insulation and is provided by extrusion process. The insulated conductor is called the core. The insulation is suitable for 70 degree Celsius.

The following colour codes are used for identification

CORE	CABLE FOR FIXED WIRING	FLEXIBLE CABLES
1 Core	Red, Black, Yellow, Blue, White or Grey	Red, Black, Yellow, White or Grey
2 Core	Red and Black	Red and Black
3 Core	Red, Yellow & Blue	Red, Yellow & Blue
4 Core	Red, Yellow, Blue & Black	Red, Yellow, Green & Blue
5 Core	Red, Yellow, Blue, Black & Grey	Red, Yellow, Blue, Black & Green
6 Core	2 adjacent cores Blue and Yellow (counting and direction cores) and remaining Grey in each layer	-

LAYING UP

The cables are laid up with suitable lay. The final layer always has a right hand lay i.e. if you look along the cables the cores moves to right hand.

INNER SHEATH

Inner sheath is provided over the laid up cores. It is provided to give circular shape to the cable and it provides bedding and Armouring. The International Standards permit following two methods of applying the Inner Sheath of any Thermoplastic Material i.e. PVC Polythene etc.

EXTRUDED INNER SHEATH

Here the inner sheath is provided by extrusion of thermoplastic over the laid cores. This type of the inner sheath is generally provided in cables having round cores i.e. in control cables and power cables upto10 mm^2 size.

This type of Inner Sheath also acts as a water barrier between the cores and Outer Sheath. In case of any Puncture the water cannot reach the Inner Cores and hence, we recommend that cables for outdoor underground uses should uses should have extruded Inner Sheath.

TAPPED INNER SHEATH
Here the Inner Sheath is provided by wrapping a Thermoplastic Tape over the laid up cores. It is generally employed in the cables having sector cores i.e. Muticore cables of 16 mm^2 and above. This method saves a process and hence manufacturing always provides this type of Inner Sheath unless the purchase specification ask for extruded Inner Sheath.

ARMOURING
In case of Armoured Cables, generally Galvanised steel wires / strip Armouring is provided over the Inner Sheath in Multicore Cables and the insulation in the single core cables. It provides mechanical protection to inside cores and it carries earth return current in case of a short circuit of a core with Armoured. The round wire Armouring is provided in cable where calculated diameter under Armour is upto 13 mm^2. Above this, the Armouring is either with the round wire or strip of size 4 mm x 0.80 mm. As strip construction is economical, the manufacturer always provides steel strip Armouing is specially specified.

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 some times 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 be more than twice the resistance of main core for safety reasons. To achieve this, sometimes tinned hard drawn copper wire are required to used alongwith galvanised steel wire. Sometimes two layers of steel are provided to give extra protection.

In case of single core Armoured cables for use in DC circuit , 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 current in magnetic Armouring and hence Armouring will become hot, and this may lead to the failure of the cable. Generally hard draw Aluminium wire / strip are used for Armouring in this case.

LAYING UP
In case of multi core cables the cores are laid up with suitable lay.

SHEATH
The PVC coating on core in case of single core cable and laid up cores in case of multi core cables is Sheath. It is PVC compound suitable for 70^o C continuous operation.

SHEATH COLOUR
The colour of sheath is generally black. We may supply other colour also on request.

DELIVERY LENGTH
The cables are generally delivered in 100 Mtrs Coil wrapped with Poly ethylene/Hessian. The bigger size of cables is supplied on wooden drums.

L.T. HOUSEHOLD WIRE
The cables are suitable for use on AC single phase (earthed or unearthed) systems for rated voltage up to and including 650 Volts.

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 Shulphur. It corrodes in the atmosphere where Sulphur fumes are present . In these conditions tinned copper should be used.

CONDUCTOR CONSTRUCTION
In this types of cables, the stranded and bunch construction of copper is adopted. Here the conductor is made of number of stands. Numbers of stands are as follows:

Size in mm^2	Minimum Number of wire in the conductor CU Al
1.0	3 -
1.5	3 3
2.5	3 3
4.0	7 3
6.0	7 3
10.0	7 7

INSULATION

The PVC (Polyvinyl Chloride) covering over conductor is called insulation and it provided by extrusion process. The insulation is suitable for 70^{o} C continuous operation.

COLOUR OF INSULATION

The insulation is available in many colours like Red Blue ,Black, Yellow, White, Grey etc. Any special colour is also available if specially specified

DELIVERY LENGTH

The cables are delivered in 100 Mtrs Coils wrapped with Polyethylene / Hessian. Wooden drum packing is also available on demand of special length.

PVC INSULATED TELECOMMUNICATION CABLE FOR TELECOM SIGNALS.

The cables are suitable for telephone connection, EPABX or PBX system. The cables are suitable for use on DC battery systems.

CONDUCTOR

The conductor is annealed, tinned electrolytic high conductive copper wire. The conductor is always used in solid condition.

INSULATION

The PVC (Polyvinyl Chloride) covering over the conductor is called insulation and is provided by extrusion process only. The insulated conductor is called core. The insulation is suitable for 70^{o} C continuous operation.

TWINNING (TWISTING)

Two insulated conductors which is called pair is uniformly twisted together with a right hand lay. The twisted pair laid up to form a symmetrical and compact cable, now the pairs stranded and twisted in left hand lay for making a Multipair.

COMMON COVERING

The cable (laid up pair) is tightly lapped with a PVC tape applied with an overlap of 30%. This facility is not available in single pair.

IDENTIFICATION THREAD

A rip cord is laid through out the length of the cable either below the sheath or below the tape.

ARMOURING

In case of Armoured cables, generally Galvanised steel wire/strip Armouring is provided over the laid up pairs (Over the common covering of tape) in the Multipair cables.

SHEATH OR OUTER COVERING

The PVC coating on core in case of single pair cable and on laid up cores in case of multi pair cables is called SHEATH. It is PVC compound suitable for 70o C continuous operation. In case of single pair, The two insulating conductors of the pair are laid side by side and sheathed. In case of multi pair (either Armoured or Unarmoured) is sheathed by Extruded process.

COLOUR OF SHEATH

The colour of the sheath in single pair and in case of Unarmoured Multipaired is grey, but in case of Armoured cables it is available in black colour.

DELIVERY LENGTH

The cables are generally delivered in 100 Mtrs. Coils wrapped with Polyethylene / Hessian . The bigger size cables or cables in bigger length are supplied in wooden drums.