

Wires & Cables – A Productive View

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ABSTRACT

This paper has a brief overview of how the Wires & Cables are manufactured. The manufacturing procedure of Wires and Cables are hardly known to anyone. Only people working in this field can explain the Procedure.

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INTRODUCTION

Wires & Cables are the most commonly used & are assumed to be the secured ways of transmitting telecommunication or electrical signals these days. This is the main reason why the Wiring & Cabling Industry has advanced during this age of Urbanization.

But to know in detail about Wires & Cables, first of all we need to differentiate between the two because hardly anyone, other than those people in these fields know about what the actual difference between the two is. Even I did not know about this until I entered into this huge and still growing Cabling Field.

Generally, a Wire is a single conductor or group of conductor sheathed into an insulation jacket to prevent them from making unwanted contacts. A Cable is generally two or more wires twisted or braided together. They are generally sheathed together into a jacket of insulation known as the process of Sheathing.

Wires

A wire is a conductor that makes up (along with other wires) a cable. All the conductors are made of a common material: Copper or Aluminium. These materials are used to make conductors of wires so as to assure low Conductor Resistance as well as low cost. So as wire is made up of a conductor, it is measured by the Conductor Diameter. The diameter can be measured by instruments like Micrometer, Vernier Caliper etc. The diameter of the conductor is given certain limits below which or above which, it is not accepted & is assumed to not work as desired. The diameter value must be within the Specified limits, so as to consider it to work properly.

Also, the Resistance offered by these conductors is also considered to play a major role in the transmission through these wires. Just like diameter, the Conductor Resistance is also given a specific value (as per Indian Standards) at room temperature above which it is considered to be not assisting the transmission properly. There are some instruments like milliohm meter that give the exact value for Conductor Resistance of wire.

After a conductor or group of conductors is insulated to form a wire, at this stage, there are also some of the testing procedures that are to be carried out. First of all, it is to be checked that the material of insulation is as per desired. Materials like PVC, Polythene & their further types are used as insulating materials. Then, the Resistance offered by Insulation called the Insulation Resistance is to be checked, also having a standard value (As per Indian Standards). If the conductor is a bunched conductor, then we also have to check the Lay Length. It is checked to determine that the bunching is done properly.

A wire in general is used for transmitting electrical or telecommunication signals; sometimes it can also be used for mechanical loads.

Cables

A Cable in general is two or more wires running together, twisted or braided together. They are insulated together into a jacket of insulation known as process of Sheathing.

Process of Manufacturing of Cables:

1. Raw Material
2. Wire Drawing

3. Insulation
4. Laying
5. Inner Sheathing
6. Armoring
7. Outer Sheathing

After each stage in Manufacturing of Cables, there is a Testing Procedure to be carried out. This is called Inprocess Quality Control.

Raw Material generally includes Copper or Aluminium Rod which is further drawn to form a conductor. During Laying or after laying, sometimes taping is done on the cable so formed. The Insulation & Sheathing materials have their own testing procedure. Each material is to be checked for its % Elongation & Tensile strength having standard minimum value. These include Aluminum Mylar tape (for screening), Polyester tape, Poly-al tape etc. These are required to have desired width and size. Also after taping, overlap of the tapes is to be checked which also have a standard minimum value. As per the Armoring material is concerned, they have testing processes as per standards. These are all tested on the basis of Indian Standard 10810 (Part 1 – 64).

Sheathing is generally used to provide a jacket to the entire cable, so that it does not interfere with external signals. Armoring is done to provide Mechanical Strength to the

cables which have to go through severe twisting or bending throughout their lifetime.

After Cable is finally prepared, there are some testing steps which ensure Final Quality Control. Tests like Insulation Resistance, Continuity Test, and High Voltage test etc. fall under Final Testing.

Cables are of various types twisted like twisted pair cable, coaxial cable, multi-conductor cable, and fiber optic cables. Cables are largely employed in power transmission, and to carry electrical and telecommunications signals.

Conclusion

Concluding with what has been a productive journey about Wires & Cables, I just want to say that no one (other than people in the Cabling field) know that small things like Cable or Wire which are very essential sources for data transmission have to go through lots of stages before they are said to be finalized and ready to be installed. My only motive behind taking this topic as a Research was to highlight the Productive life of Cables.

References

- [1] Indian Standards: IS 10810, IS 5831, IS 8130, etc.
- [2] Wikipedia.

