

 LT POWER &
CONTROL CABLE



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Introduction

Need of ensuring safe operation of critical circuits is essential in today's installations. Normal cables used in such installations render useless in fire incidences. At Havells, your safety is our concern. Havells has now developed special type "Fire Survival Cables" through research. These cables - also known as CIRCUIT INTEGRITY CABLES & are designed to sustain the high temperatures for a defined minimum period of time under direct fire. The construction of these cables is different if compared with ordinary cables. The conductor is manufactured with a specially designed heat barrier and fire resistant insulation which resists the fire to reach conductor surface. The cable continues to remain into operation at high temperatures like 650 °C, 750 °C and 950 °C as per various conditions of operation and applications.

Wires offering same properties are also available.

Specification

These cables are manufactured and tested in accordance with BS 7846, IS 7098(P-1), IEC 69331 and BS 6387 for required temperatures and duration - depending upon the application of cable and site conditions.

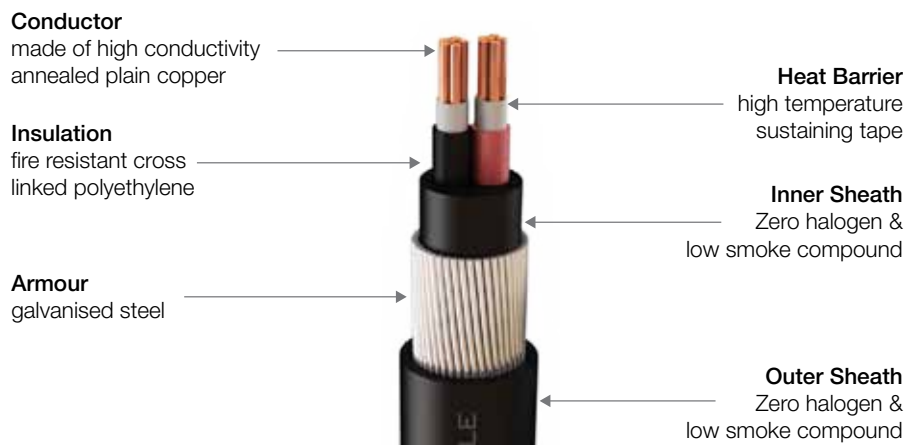
Constituents

HAVELLS FS CABLES are manufactured with the following materials.

1. Annealed Plain Copper Conductor
2. Heat Barrier Over the Conductor
3. Cross Linked Polyethylene
4. Galvanised Steel Armour
5. Zero Halogen & Low Smoke Compound

The ZHLS compound ascertains the least smoke and hence increased light transmission during burning of cables. The circuit integrity of HAVELLS FS cables at high temperatures remains unaltered for the required time period as per the specification defined.

Constructions





Introduction of Xlpe Insulated EHV Cables

XLPE (Cross-Linked Polyethylene) insulated cables have been widely used for electric power Distribution of voltage up to 30 kV grade since they were developed in 1960 to replace the paper Insulated cables and other thermoplastic insulated cables. XLPE cables have many excellent Characteristics, especially for use in higher operating temperature. Generally PE insulated cables can be used in maximum operating temperature of 70 °C and paper insulated cables in 85 °C, but XLPE cables, which have more compact crystallite than PE by cross-linking process, can be used up to 90 °C in normal condition. The major merits of XLPE cables can be illustrated as follows:

- excellent electrical properties
- higher operating temperature, higher current capacity
- excellent physical and mechanical properties
- anti-chemical properties
- ease of jointing, installation and maintenance

The water can be invaded through the polymeric materials in gaseous states and /or contained in insulation materials together with small voids and impurities during extrusion, steam-curing and cooling process. These waters can be concentrated onto weak points due to high electric intensity and repeating switching operation, and eventually formed a tree shaped tunnel from inside to outer surface of insulation. XLPE cables, however, had been scarcely used for extra high voltage exceeding 30 kV grade because of its weakness for water treeing phenomena which occurs in the insulation in long-term operating situation. Water treeing is a phenomenon of gradual insulation destroying due to water concentration onto some weak points in the insulation. But nowadays, with the aid of technical development in cable manufacturing field, water treeing phenomena cannot be an obstacle any more to extent the voltage grade higher. Water invasion from the outside of cable can be prevented by adopting water-proof seamless metal sheath and water contents in insulation during manufacturing process can be practically minimized by adopting dry curing cross-linking process instead of steam-curing method.

Many researches and developments are accomplished in many developed countries including ourselves and it shows excellent operating experiences. 66 kV and 77 kV grade XLPE cables have already been used since early 1970s and now XLPE cables up to and including 230 kV grade are popularly being adopted for power transmission lines. 345 kV grade and 500 kV grade cables are also developed and under operations.

The application of 66 kV Power Cable has gained importance mainly due to urbanization. To transport power to load centers of metropolitan cities and satellite towns underground 66 kV EHV XLPE Power Cables are being heavily favored due to non availability of land for constructing overhead transmission towers.

Continuous Catenary Vulcanization

We adopt CCV system for vulcanizing XLPE insulation that is a continuous vulcanizing and dry curing system using nitrogen gas. This CCV system has been recently developed to produce extra high voltage XLPE cables and it shows excellent function to reduce faults and imperfections in the insulation.

In this system, extruded thermosetting compounds are cured in the curing tube of 200 mm diameter and 140 metre long in “catenary” form by thermal radiation through inert nitrogen gas, therefore there is no opportunity that the compounds can absorb any moisture during vulcanizing process. The insulated core may be cooled by water in the lower part of the tube, but to obtain better quality in the absence of moisture, generally cooled by convection and radiation in nitrogen gas atmosphere.

This system is being wholly controlled by computer so that manufacturing conditions and temperatures are controlled perfectly. These mean that the quality of the insulation is uniform throughout the cross-section and the length. All of the process of this system is perfectly protected from outer atmosphere to prevent the insulation compounds and the insulated core from any contact with moistures, dust, Contaminated air, etc.