

Cable Sheath Materials

The following materials are typically used for cable inner (bedding) and outer sheaths:

Thermoplastic

Thermoplastic compounds are materials that go soft when heated and harden when cooled:

- PVC (Polyvinyl Chloride) – as a sheath material, PVC is used extensively because of its low cost and good overall properties – high physical strength, good moisture resistance, adequate oil resistance, good flame resistance and excellent resistance to weathering and to soil environments. PVC contains halogens which produces thick, black toxic smoke when burnt. Most commonly used sheath material for LV cables.
- PE (Polyethylene) – is usually categorized under three different densities – 1) Low density (0.91 – 0.925 g/cm³), 2) Medium density (0.926 – 0.94 g/cm³), and 3) High density (0.941 – 0.965 g/cm³). PE sheaths have good physical strength, excellent moisture resistance, good ageing properties, but poor flame resistance. Like PVC, PE will melt at high temperatures. Does not contain halogens.
- CPE (Chlorinated Polyethylene) – similar to PVC, but with better high temperature properties. Contains halogens.

- TPE (Thermoplastic Elastomer) – provides flame resistance, good low temperature performance, good abrasion resistance and good physical strength. Does not contain halogens.
- Nylon – provides good physical strength, reasonable abrasion resistance, very low friction when in contact with conduit materials which aids in pulling cables. Excellent resistance to oils and organic solvents, but very sensitive to strong acids and oxidizing agents.

Thermosetting

Thermosetting compounds are polymer resins that are irreversibly cured (e.g. by heat in the vulcanization process) to form a plastic or rubber:

- XLPE (Cross-Linked Polyethylene) – provides a tough, moisture, chemical and weather resistant sheath material. Used mainly as an outer sheath material for “rugged” cables.
- PCP (Polychloroprene) or trade name "Neoprene" – provides good heat resistance, flame resistance, resistance to oil, sunlight and weathering, low temperature resistance and abrasion resistance. Due to its ruggedness, neoprene is used widely in the mining industry. Does not deform with high temperatures and does not contain halogens.
- CSP (Chloro-sulphanated Polyethylene) – similar properties to neoprene, though superior in resistance to heat, oxidizing chemicals, ozone and moisture, and has better dielectric properties. However CSP contains halogens.

- EPR (Ethylene Propylene Rubber) – not commonly used as a sheath material, but can be useful if increased cable flexibility is required (especially in low temperature applications).

Source:

http://www.openelectrical.org/wiki/index.php?title=Cable_Sheath_Materials