

Insulations

Insulation around a conductor (or group of conductors) ensures that the electrical current is contained. It keeps the electricity in and everything else out. Insulation in a refrigerator is no different--keep the cold in and the heat out. In electric cables, though, insulations perform a few tasks:

- Keeps people and equipment nearby safe.
- Limits physical damage to the conductor from outside forces.
- Blocks interference from neighboring circuits.
- Contains heat build-up.

Insulations are broadly grouped into two categories, thermoplastic and thermoset.

- Thermoplastic insulations, the most common being PVC, melt and can be extruded over conductors. Upon more heat, they may melt again. They have great plasticity, thus they are called thermoplastic.
- Thermoset insulations, the most common being rubber, become chemically cross-linked and will not melt ever again. Heat has set them, thus they are thermoset.

Examples of thermoplastic insulations: PVC (polyvinyl chloride), PE (polyethylene), PP (polypropylene), and TPE (thermoplastic elastomer), Nylon, Teflons.

- Easily extruded over conductors.
- Generally inexpensive.
- Recyclable. Once extruded, material may be ground and used again.
- Good abrasion resistance.
- Generally available up to 105C applications.

Examples of thermoset insulations: SBR (styrene butadiene Rubber), XLPE (cross-linked polyethylene), EPR (ethylene propylene rubber), CPE (chlorinated polyethylene), and Silicone rubber.

- Excellent heat characteristics.
- Generally more expensive than Thermoplastics.
- Generally good low temperature characteristics.
- Abrasion resistance varies widely. XLPE is very resistant. Silicone has poor scuff resistance.
- Not easily recycled.