



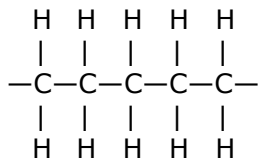
Comparison among insulation materials

XLPE-Insulated MULTIPLEX cables bring benefits such as:

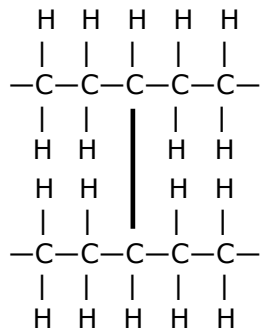
- Higher current conduction capacity;
- Better mechanical resistance against abrasion;
- High insulation stability in the presence of chemical agents when compared with PE-insulated cables.

Cross-linked Polyethylene (XLPE) has properties that distinguish it by superiority when compared with Thermoplastic Polyethylene (PE).

Molecular Structure



- Typically, the thermoplastic polyethylene molecule has around 1,000 to 4,000 carbon atoms within its chain.



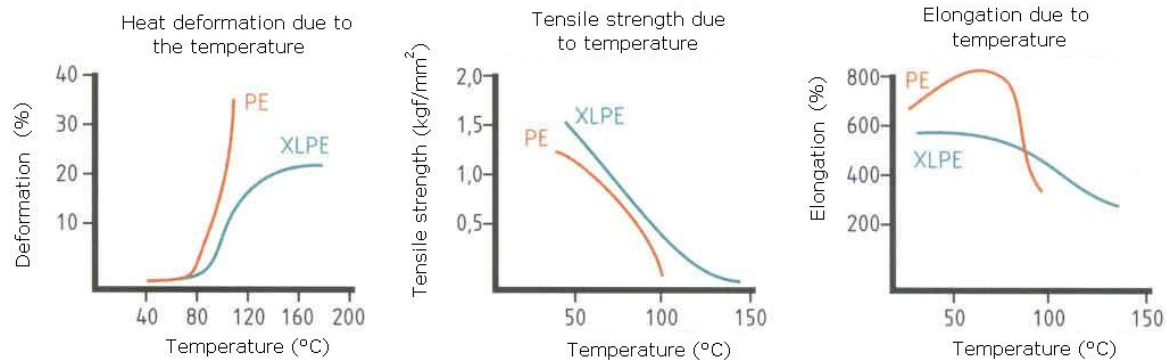
- With reticulation, we can achieve intermediary links among these molecules, forming the XLPE. By these links, we reduce molecule sliding, thus reducing also material deformation in function of temperature increase.

Thermal Properties

While Thermoplastic Polyethylene (PE) melts around 120°C, cross linked Polyethylene (XLPE) does not suffer changes of its molecular chains due to the reticulation.

Mechanical Properties

As we can see in graphs, the mechanical properties for cross linked polyethylene (XLPE) are better than in Thermoplastic Polyethylene (PE).



Electrical Properties

- Breakdown voltage in alternate current:
 - Under high temperatures, the cross linked Polyethylene (XLPE) presents a breakdown voltage higher than Thermoplastic Polyethylene (PE) and it is kept practically equal for low temperatures.
- Breakdown voltage for surges:
 - The breakdown voltage value remains the same for cross linked Polyethylene (XLPE) and Thermoplastic Polyethylene (PE).
- The electric properties of cross linked Polyethylene (XLPE), such as: volumetric resistivity, dielectric Constant and power factor are better or equal to those of Thermoplastic Polyethylene (PE).

Insulation material characteristics

Characteristics	Type of Material	
	PE	XLPE
Specific gravity (g/cm ³)	0,935	0,935
Stress strength (kgf/cm ²)	1,2 to 1,5	1,5 to 2,3
Lengthening (%)	500 to 700	500 to 600
Operational temperature (°C)	70	90
Overload temperature (°C)	90	130
Minimum temperature permitted (°C)	-60	-60
Short-circuit temperature (°C)	130	250
Dielectric rigidity (kV/mm)	35 to 50	35 to 50
Volumetric electrical resistivity (Ω.cm)	10 ¹⁸	10 ¹⁸
Dielectric constant	2,3	2,3
Tang δ (%)	0,03	0,03