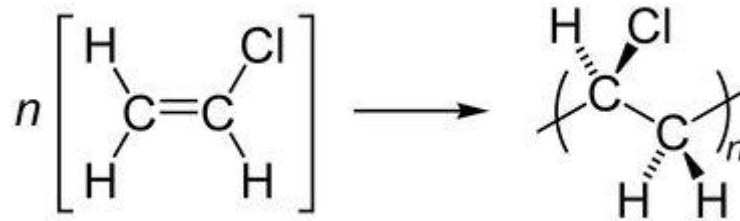


# Thermoplastic & Thermosetting compounds

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## PVC



Basic PVC polymer chain (courtesy of [Wikipedia](#))

Polyvinyl Chloride (PVC) is a [thermoplastic](#) material characterised by a polymer chain comprising of the basic unit in the figure right.

PVC is cheap to produce and quite durable. Many variations of PVC can be formulated for different applications based on the type of [plasticiser](#) that is added to the basic PVC polymer. For example, PVC can be made to be rigid or flexible based on the plasticiser used.

### ***Electrical Applications***

#### **Cables**

PVC is a commonly used material for electrical cable insulation and sheathing. Refer to IEC 60502 for the requirements on PVC (in terms of plasticiser additives) to be regarded suitable as an electric cable insulation and sheathing material. These requirements includes the electric properties of the material such as permittivity, dielectric loss angle, etc.

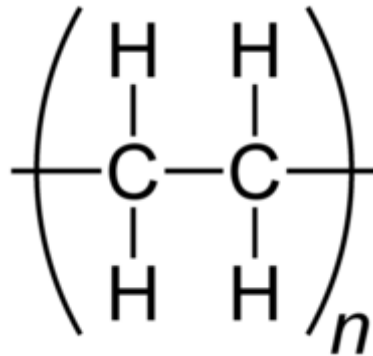
#### **Advantages:**

- Cheap
- Durable
- Widely available

#### **Disadvantages:**

- Highest dielectric losses
- Melts at high temperatures
- Contains halogens
- Not suitable for MV / HV cables

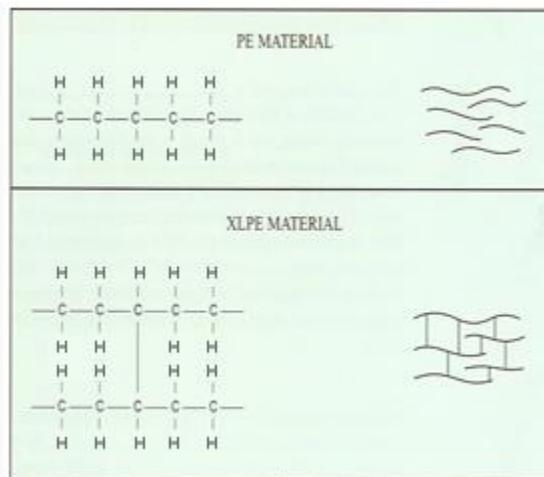
## PE



Basic PE polymer chain (courtesy of [\[1\]](#))

Polyethylene (abbreviated PE) or polythene (IUPAC name polyethene or poly(methylene)) is the most common plastic. The annual production is approximately 80 million metric tons. Its primary use is within packaging (plastic bag, plastic films, geomembranes, containers including bottles, etc.). Many kinds of polyethylene are known, but they almost always have the chemical formula  $(C_2H_4)_n$ . Thus PE is usually a mixture of similar organic compounds that differ in terms of the value of  $n$ .

## XLPE

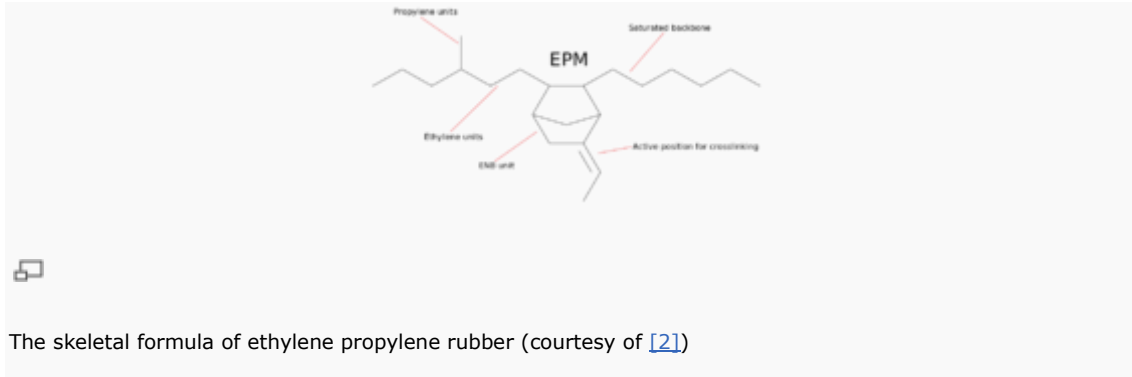


Basic XLPE polymer chain

Cross-linked polyethylene, commonly abbreviated PEX or XLPE, is a form of polyethylene with cross-links. It is formed into tubing, and is used predominantly in building services pipework systems, hydronic radiant heating systems, domestic water piping and insulation for high tension (high voltage) electrical cables. It is also used for natural gas and offshore oil applications, chemical transportation, and transportation of sewage and slurries.

Recently, it has become a viable alternative to polyvinyl chloride (PVC), chlorinated polyvinyl chloride (CPVC) or copper tubing for use as residential water pipes. PEX tubing ranges in size from imperial sizes of 1/4-inch to 4-inch, but 1/2-inch, 3/4-inch, and 1-inch are by far the most widely used. In metric PEX is normally available in 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm and 63 mm sizes.

## EPR



Ethylene propylene rubber (sometimes called EPM, the E refers to ethylene, P to propylene and M refers to its classification in ASTM standard D-1418 since the M class includes rubbers having a saturated chain of the polymethylene type) is a type of synthetic elastomer that is closely related to EPDM rubber (EPM is a copolymer of ethylene and propylene whereas EPDM rubber is a terpolymer of ethylene, propylene and a diene-component). Since it began to be produced in the 1960s, production has increased to 870 metric tons per annum, mostly due to advances in polymerization and catalyst technologies which allow polymers to be designed for specific purposes.

Source:

[http://www.openelectrical.org/wiki/index.php?title=Thermoplastic\\_%26\\_Thermosetting\\_compounds](http://www.openelectrical.org/wiki/index.php?title=Thermoplastic_%26_Thermosetting_compounds)