

Polyvinyl Chloride (Pvc) Encyclopedia Article

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Contents

Polyvinyl Chloride (Pvc) Encyclopedia Article.....	1
Contents.....	2
Polyvinyl Chloride (Pvc).....	3

Polyvinyl Chloride (Pvc)

Polyvinyl chloride (PVC) is a **macromolecule** that results from the free-radical polymerization of **vinyl** chloride. First discovered in the early 1870s, PVC has become widely distributed second only to **polyethylene** in annual production **volume**. It has many desirable characteristics finding use as a construction material, packaging resin, and textiles coating.

The discovery of PVC was first described in 1872. It was found when a container of vinyl chloride was exposed to sunlight and a white solid was produced. This material was of interest because it was resistant to degradation by **potassium** hydroxide or **water**. From 1912 to 1926 German scientists attempted to process PVC into more usable products. In 1926, it was found that when PVC was boiled in tricresyl **phosphate** it became elastic. This new reaction made PVC an important material and produced the first thermoplastic elastomer.

Depending on the grade required, PVC can be produced by a variety of techniques including **suspension**, **emulsion**, **solution**, microsuspension, and **mass** polymerization. Suspension polymerization is the most often used procedure. It involves the suspension of **monomer** particles in water. Stabilizers prevent coalescence while the polymerization reaction proceeds. After 80-90% of the reaction is complete, excess monomer and water is removed and the polymer is dried with hot air.

The bulk properties of PVC depend on the production method. It can be produced as droplets suspended in water, a thin membrane, a powder or crystals. To improve the workability of PVC resin various ingredients are added to the resin including stabilizers, impact modifiers, lubricants, plasticizers, biocides and flame retardants.

PVC is employed in a variety of applications. The principle market for PVC is as a base material for pipes and fittings. It is also used as a weathering material because it is less damaged by exposure to sunlight. PVC makes an excellent resin for clear bottles that hold consumer products. In addition, PVC is used as an insulating material for cables and wires.