How Chlorinated Polyethylene is Made

Chlorinated Polyethylene (CPE) is a chlorinated polymer first synthesized in 1921 by Michael Szwarc and Vladimir Loseff. Because of its properties, CPE has found use in various applications. CPE is a synthetic polymer and belongs to the class of linear polychloroprenes, otherwise known as chlorinated polymers. This article will learn about the history and principles of chlorinated polyethylene production. Let's get started!

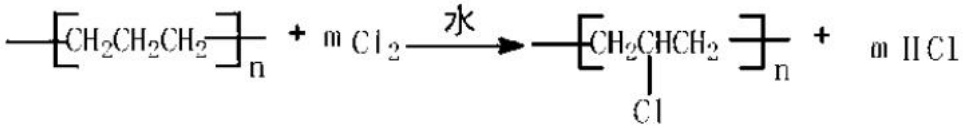
1. History of Chlorinated Polyethylene

Chlorinated Polyethylene, commonly known as CPE, was discovered in the 1950s. Dr. James Barry of Dow Chemical noted that its properties make it effective in chemical and industrial applications, especially flexible tubing. The first chlorinated polymers were created by Dr. William Schockley, the co-inventor of the transistor. These materials were used in medical applications such as blood bags and dialysis machine parts to reduce the risk of bacterial infection exchanging bacteria with these materials would have on patients.

2. Production process of Chlorinated Polyethylene (CPE)

Chlorinated Polyethylene (CPE) is a chlorinated plastic with good heat and chemical resistance. It has been widely used in producing pipes, containers, and other industrial products.

At present, the industrial chlorinated polyethylene (CPE) production plants that have been built in China generally use the aqueous phase production process, in which polyethylene (PE) powder is dispersed in the aqueous phase medium, and chlorine gas is introduced to chlorinate the modified polyethylene to produce CPE products. The reaction process is as follows.



From the above reaction principle, it can be seen that in the production process of the aqueous phase method, hydrogen chloride products are generated, and hydrochloric acid is formed in the aqueous phase system. The CPE generated is in a porous elastomeric polymer material, resulting in a large amount of hydrochloric acid adsorbed on the surface and inside the CPE material. The hydrochloric acid harms the CPE itself during processing and use, so the aqueous phase must have a deacidification kettle with a filter hood (deacidification process) to remove the mother liquor and to wash the material. To remove the adsorbed acid inside the CPE material, it is necessary to add a neutralization kettle in the aqueous process and add an alkaline neutralizer such as sodium hydroxide in the neutralization kettle further to remove the adsorbed acid inside the CPE material, resulting in a large amount of dilute hydrochloric acid wastewater with low concentration, which is costly to recycle. In actual industrial production, the wastewater is discharged by neutralization, a major

environmental problem, and has large discharge wastewater.

The conventional production method is as follows.

In the chlorination reactor, water is added according to the required solid/liquid ratio, stirring is started, and the raw material polyethylene and various auxiliaries are added and heated up according to the proportional measurement.

When the temperature of the kettle liquid rises to a predetermined value, the liquid chlorine is vaporized by the gasifier and then passed to the kettle at a certain flow rate, and the chlorination reaction starts.

Since the chlorination reaction is exothermic, cooling water is supplied to the reactor jacket immediately after the reaction starts to keep the reaction at a controlled temperature. When the accumulated chlorine flow reaches a certain value, the chlorine addition to the kettle is stopped. The material temperature is lowered, the pressure is reduced, and the air is blown into the kettle to remove unreacted chlorine gas.

The reacted material is then sent to the de-acidification kettle to filter out the hydrochloric acid of about 8% by-product concentration. The de-acidified material is then washed. The dilute acid wastewater is discharged into a wastewater pond. After that, the CPE resin is washed several times, and the wastewater is discharged to the wastewater pond.

After washing, water is added to the CPE to form a suspension and sent to the neutralization kettle, where the residual acid is neutralized with sodium hydroxide. After neutralization, the CPE resin is de-liquefied and washed by a centrifuge.

The wet material is first dried in an air dryer and then dried in a boiling dryer. The dried CPE is ground and sieved by a grinder and sent to the silo for metering and packaging to obtain the finished CPE product.

Latest method for the preparation of Chlorinated Polyethylene (CPE).

The reaction of chlorination occurs in the presence of emulsifier, dispersant, initiator and chlorine gas, during which calcium oxide is added in batches of 5-7 parts by mass, and the rate of calcium oxide addition is controlled at pH 7.0-8.5 to produce chlorinated polyethylene. polyethylene resin and calcium chloride aqueous solution; the resulting chlorinated polyethylene resin is centrifuged and dried to obtain the product chlorinated polyethylene; calcium chloride aqueous solution is concentrated and dried to obtain the by-product calcium chloride; the total amount of chlorine gas introduced is 11-22 parts by mass.

The main features are:

1. said emulsifier is an anionic emulsifier and non-ionic emulsifier, the addition amount of 1-10% of the mass of high-density polyethylene ○
2. anionic emulsifier is an alkyl sulfonate emulsifier or alkyl alcohol sulfate emulsifier
3. dispersant is one or more hydroxy cellulose, polyolefin pyrrolidone, reactive silica, and polyvinyl alcohol, added at 5-8% of the mass of high-density polyethylene.
4. initiator is an oil-soluble initiator; the addition amount is 1. 0-5. 0% of the mass of high-density polyethylene.
5. The initiator is benzoyl peroxide, lauryl peroxide, or azo diisobutyronitrile.
6. The reaction temperature of the chlorination reaction is 80-135°C, and the reaction time is 2-5 hours.

The price of Chlorinated Polyvinyl Chloride will be uniformed. Just remember the above process, increase production and you can get this kind of products. Hope that can help you and thanks for reading,