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POLYMERIC INSULATORS AS SPECIAL DESIGNS FOR HIGH VOLTAGE EQUIPMENT OF SUBSTATIONS

Electrical insulators are very important parts of sub-stations and distribution and transmission lines within the electric power system. In the early days, insulators were made of ceramic and glass materials. The first non-ceramic materials were used for insulation and the very first polymer insulators were developed to improve performance where ceramics did not perform well [1, 2].

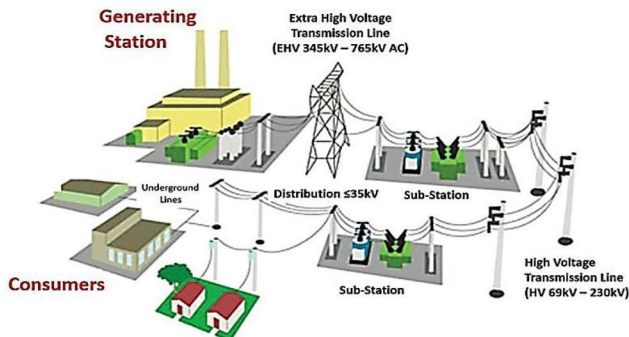


Figure 1 – Substations and power distribution lines in the power system

A polymeric insulator consists of a fiberglass core rod covered by rubber housing and weather-sheds of polymer such as silicone rubber, polytetrafluoroethylene, EPDM (ethylene propylene diene monomer) and equipped with metal end fittings. Polymers, sometimes called composite insulators, are made of at least two insulating parts – a core and housing equipped with end fittings [2,

4]. Polymeric insulators have many advantages over ceramic and glass insulators: good performance in contaminated environments, lightweight, vandal resistant, easy to handle, and maintenance free. Because of these properties, they gained popularity worldwide and sparked a series of manufacturing and design improvements that led to the polymer insulators of today. Polymer transitioned from a premium high-cost insulator to today's lower cost insulator when compared to porcelain or glass [3, 4].

MacLean Power Polymer (Reliable) insulators from the German company Rosenthal contain MPS Rosenthal "Blue" silicone compound. This silicone has been tested by the longest field and laboratory compound tests in the industry and remains the main line of MPS insulators to this day. For many years, MPS has been a leader in technological advancement and manufacturing improvement (Smart Fit Corona Rings, PST Seal, CR E-Glass and Stacked Sheds). The advanced features and benefits of the APEX Generation insulator, along with support for MPS applications, promise even greater performance [4].



Figure 2 – Design of MPS Insulator [4]

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