

## Polymer Insulators

Elbroc polymer insulators have been ergonomically designed and shaped to make use of the environment and its changing conditions to create insulators that are:

**Self washing**  
**Light weight**  
**Easy to use**

There are more of this design of composite insulators in service than all other makes combined.

Elbroc polymer insulators were first installed in SA on a 132kV line in the Nelspruit area in 1979. Some of these were subsequently taken down for examination and testing, and were found to be in perfect working order. Random checking over the years has confirmed the reliability of Elbroc polymer insulators.

This reliability helps you to satisfy your customer's need for uninterrupted power supply.

Field use has proved that Elbroc composite insulators are the cost effective, high performance solution to the ongoing maintenance and construction problems encountered in the distribution of power.

Elbroc polymer insulators, which are marketed under the trade name "Thiel-Lite", are manufactured under licence to the world-renown Ohio Brass Company of America who are leaders in polymer technology. Our licence agreement ensures that all new product developments are immediately incorporated into the local product.

Our manufacturing and marketing policy includes a quality assurance programme that is in accordance with our listing in terms of SABS ISO 9001 code of practice, ensuring that our products conform to the high standards demanded by the industry we serve.

More than 500 000 units sold in the first 14 years.

### Basic Construction

The insulators consist of three basic components:

1. Weathersheds
2. Fibreglass rod
3. Metal end-fittings

The weathersheds are assembled over the fibreglass rod, the centre hole in the weathersheds being smaller than the rod to ensure a tight fit. The inner surface of the weathersheds hole forms two O-rings per centimetre and the reservoirs between these O-rings are filled with a special silicone grease to produce a continuous, permanent "living" seal.

The end fittings are attached by crimping them to the fibreglass rod.

When assembled, the end-fittings maintain the entire stack of weathersheds under axial compression, which adequately compensates for the slight elongation of the fibreglass rod under tension or when temperature changes occur.

A wide range of products for 11 to 765kV are available to fit all existing hardware. Applications stretch from the sub-zero temperatures of Alaska to the harsh UV conditions of the Namibian desert.

Local manufacture gives you:

- Custom design. We manufacture to your needs (all configurations from 11 to 20mm socket/ball and clevis/tongue).
- Better deliveries because there are no long shipping times.
- Superior local knowledge of polymer insulator design and construction.
- Price flexibility.
- Production flexibility.
- Direct replacements for existing strings.
- No change in ground clearances.
- Reduced down time and fewer outages.
- Less fault tracing.
- Cheaper transportation.
- Improved productivity.
- No repetitive line inspections. Once a McWade insulator is installed you never need worry again. "Put it up and leave it".
- Maintenance down time is costly. McWade polymer insulators help you save money.

Forged steel end-fittings	<ul style="list-style-type: none"><li>• Superior quality</li><li>• Consistent strength</li></ul>
Hot dip galvanized	<ul style="list-style-type: none"><li>• Non-corrosive</li><li>• Long lasting</li></ul>
Weathersheds	<ul style="list-style-type: none"><li>• Specially formulated silicone alloy material</li><li>• Hydrophobicity of silicone</li><li>• Strength and electrical superiority of EPDM</li><li>• Surface water breaks up into droplets</li></ul>
Hydrophobicity	<ul style="list-style-type: none"><li>• Broken conductive pathways</li><li>• Reduced leakage currents</li><li>• Sediment forms on insulator, silicone molecules migrate through sediment causing water film to break up into droplets and so break conductive path</li></ul>
Pollution	
Smooth aerodynamic profile	<ul style="list-style-type: none"><li>• Allows for wind cleaning and water run-off</li><li>• Suitable for vertical and horizontal installation</li></ul>
Vandalism	<ul style="list-style-type: none"><li>• Silicone alloy weathersheds - no breakages</li><li>• High mechanical strength</li><li>• Absorbs impact</li><li>• Flexible weathersheds combat vandalism</li></ul>
Compact design	<ul style="list-style-type: none"><li>• Allows for increased creepage without increasing the coupling length</li></ul>
O-rings	<ul style="list-style-type: none"><li>• Filled with silicone grease, forming a continuous seal along the insulator</li><li>• Eliminates the risk of puncture</li></ul>
High strength fibreglass ring	<ul style="list-style-type: none"><li>• Glass content exceeds 70 per cent</li><li>• Continuous strands of fibre</li><li>• As strong as 070M55 (En9) steel</li></ul>
Integral corona ring	<ul style="list-style-type: none"><li>• Prevents corona on rubber surface</li><li>• Insulators are RIV and corona free up to 161kV</li></ul>
Long rod style insulator (class A type)	<ul style="list-style-type: none"><li>• No metal between end-fittings</li><li>• Longer creepage</li><li>• Less chance of flashover</li><li>• Puncture-proof</li></ul>

### Section Lengths Available

McWade strain and suspension insulators are available in lengths appropriate for 11kV through 132kV. Longer or shorter lengths can be produced for special projects. Length increments are approximately 38mm.

### Insulation Co-ordination

The operating performance of a transmission line depends on its insulation level. It must not flash over under practically any operating condition. Several methods of co-ordination of line and station insulation have been proposed. Generally, the best method is to establish a definite common insulation level for all the station insulation and then match that level with the line insulation. With this approach, the task is limited to three fundamental requirements:

1. selection of Basic Insulation Level (BIL),
2. specification of insulation with flashover characteristics equal to or greater than the selected BIL and
3. the application of suitable over voltage surge protection.

Satisfactory performance is generally achieved with an insulator which has a dry 60Hz flash over of three to five times the phase-to-ground voltage and a leakage distance approximately twice the shortest air gap (strike) distance.

### Corona Performance

McWade suspension and strain insulators are RIV and corona free through 132kV, by the use of integral Stress Distribution Disk (SDD). The table below details the rings necessary for voltages equal to or exceeding that listed in the column header.

Insulator	Orientation	SDD Up to 66kV	66kV - 132kV
Strain/ Suspension	Top	None	None
	Bottom	None	SDD
Line Post	Top	None	None
	Bottom	None	None