Powell Technical Brief #36
Epoxy Bus Bar Insulation

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Powell has recently installed a new process line to coat bus bars with an epoxy insulating material. Currently, this insulation is being used for bus in metal-clad switchgear equipments rated above 15 kV, and for other jobs with special requirements. As more production capability comes on line, its use will be extended to additional equipments. The process consists of preheating the copper bus bar, dipping it in a liquid epoxy mixture, removing the coating from areas where it isn't wanted (contact surfaces, etc.), and curing the coated bar at a high temperature. The coated bars have passed the tests required by ANSI/IEEE C37.20.2-1987, including the **§5.2.1.3 Test for Bus-Bar Insulation** and the **§5.2.7 Flame-Resistance Tests for Applied Insulation**.

While this process is new to Powell, similar materials and processes have been in use in the industry for 20 years or more. It is also similar to the fluid bed application of epoxy to bus bars, which has been used on selected Powell equipments for the past several years. We chose the liquid dip process over the fluidized bed process both because the final coating is more rugged and because the process itself is less subject to interference from the ambient conditions of the factory floor.

Some of the advantages of the epoxy dip process are:

- The insulation is extremely rugged and has excellent dielectric properties.
- Conductors of any size and shape can be coated with equal ease. Using extruded rigid tubing limits the choice of conductor cross-sections to those for which the extruded tubing is available, which may not be the optimum size from a current-carrying or electric field standpoint.
- Already-bent bars can be coated, eliminating the need for tape or boots at bends.
- Unlike some heat-shrink tubings, the insulation conforms to the bar at all angles and bends. Heat-shrink tubing may pull away from the bar at the inside of a bend.
- Since the coating conforms to the surface of the bus, there is no possibility of setting up a partial-discharge cell between the surface of the bus and the insulation. This is especially important at voltages above 15 kV.

We believe that this new insulating process is another step in our process of continuous improvement of Powell switchgear.

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