

Material Effect on Glowing Contact Properties

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Abstract - Little research is available about glowing contacts. Interest in glowing contacts stems from their potential to initiate fires in electrical wiring. Recent work has shown how series breaks in copper wire, with carbonization, can lead to series arcs and ignition of volatile gases emitted from the plastic wire insulation, in particular PVC. Glowing connections were shown to be one cause of the overheating of the wire insulation. In an electrical system, in particular a residential distribution system, the conductor materials can be made from materials other than copper. In addition to copper other materials can be brass, bronze, steel, and aluminum. Many of these materials are found in outlets, switches, and receptacles. For example, a loose screw, consisting of brass plated steel, that normally holds down the copper wire at an outlet can lead to a glowing connection in mixed combinations of materials - copper wire and the plated steel screw. This work will present some of the properties of glowing contacts for various types and combinations of conductor materials. Methods of creating glows under practical circuit conditions are reported along with current, voltage and power waveforms that result from the glowing connections. This work may be useful for improving electrical fire safety.

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