

## Sulfur and Resistors

Within the past 10 years sulfur has become a large issue with in the electronics industry. Sulfur and thick film chip resistors do not mix. The sulfur reacts with the inner electrode – mainly the silver – and creates Flowers of Sulfur or Silver Sulfide growth. This growth creates an open condition on the resistor.

Facts about Sulfur and Resistors:

- KOA's standard RK73 series are the only standard thick film parts in the industry which passes the ASTM-B-809 Flowers of Sulfur test.
- The ASTM-B-809 test is an industry standard test where parts are soaked in a chamber of sulfur gasses for 20 days. A silver coupon is also placed in the chamber as a control sample.
- Even though the RK73 series can pass the ASTM-B-809 testing there are several applications where the sulfur concentrations are higher than that of the ASTM test. Based on this KOA decided to develop an even stronger Anti-sulfur part. This is the RK73-RT and SG73-RT series of parts.
- The RK73-RT and SG73-RT parts have about 500 times the sulfur resistance of the standard parts. Parts are 100% sulfur proof due to KOA's original high sulfuration proof inner electrode.
- To have a completely sulfur proof part requires the removal of the silver on the inner electrode. This then required gold flash to be used which is very expensive. (Note: The RN73 series is silver sulfide proof as it does not contain silver on the inner electrode).
- Some competitors do use gold flash and others have similar anti-sulfur parts like the RK73-RT and the SG73-RT.
- Key applications for the anti-sulfur parts: winery equipment, farm equipment, automotive application especially those around vulcanized rubbers, factory process equipment and controls, mining equipment, etc. (We have found that the winery and tire plants – vulcanization of rubbers – are key areas.)
- Photos of Flowers of Sulfur – Silver Sulfide Growth

