

Project Summary:

Temperature-Humidity Test Specification for Solenoid Valves

DfR Solutions was asked to assess accelerated testing methods for a major solenoid valve manufacturer. A test that allowed time compression and accelerated failure mechanism relevant to the field environment was desired as opposed to previous testing which had only proposed an extreme situation of failure analysis. Humidity effects and climatic environmental data were used to propose a physics of failure test model that would satisfy the testing specification. Two military standard tests were also suggested and analyzed to qualify operating environment failure. With this new knowledge, the client was able to understand an accelerated testing model that would provide a better analysis of failures.

Keywords: temperature-humidity test, silicone potting, part qualification, failure mechanisms, water, physical effects, chemical effects, oxidation, galvanization, electrochemical breakdown, friction coefficients, physical strength, insulation, elasticity change, plasticity change, corrosion, internal volume, hydrophilic, silicone interference, tropical environments, humid environments, temperature cycling, connector failures, flux residues