

LAB-FIELD CORRELATION PROGRAM FOR AUTOMOTIVE ELECTRICAL CONNECTIONS

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Abstract

This paper describes the results to date of an ongoing lab-field correlation program for automotive electrical connections. The goal is to produce an accelerated lab life test that is correlated to vehicle performance. The intention is to establish correlation up to 150,000 miles. The program has three major phases: Junkyard, Lab, and Field. Thousands of samples from ten-year-old vehicles with mileage in excess of 100,000 miles have been measured and classified. Testing is being conducted in design of experiment (DOE) fashion for major interface and crimp factors and significant related vehicle environmental factors are being measured. Custom designed systems collect test sample, vehicle, and environmental measurements daily. Vehicles have completed 24 months and have accumulated 67,000 miles each. Resistance distributions representing thousands of samples and extensive databases of field data representing millions of sample and vehicle measurements have been documented. An accelerated lab life test sequence has been developed that produces resistance distributions greater than corresponding field distributions. Resistance responses associated with major factors are similar in lab testing and vehicle settings. Families of the sequence are being run representing thousands of crimps and interfaces that will permit adaptation to various applications.