Abstract

A “combi-cured” fluoroelastomer (FKM) rubber formulation was designed to yield 100% cohesive rubber failure when cured to cold-rolled steel with derivatives of polymeric silane adhesives. Three different categories of adhesives were tested: Unsaturated Polymeric Silane with Phosphonium Salt (UPSP-D), Unsaturated Polymeric Silane (UPS-L), and Saturated Polymeric Silane (SPS-L). Adhesion Inserts molded using ASTM Method D429 Method C all consistently yielded 100% cohesive rubber failure and showed adhesion strength in the range of 700 to 800 psi after being pulled at 2” per minute until break. After obtaining consistent 100% rubber failure, a design of experiment (DOE) was implemented to determine optimum metal pretreatment conditions as well as optimal rubber ingredients to yield maximum rubber retention and adhesion strength. A method was also developed to determine the locus of failure when the failure occurred at an interface using Attenuated Total Reflectance Fourier Transform Infrared Spectroscopy (ATR FT-IR).