

Master 2016

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Simulation of Strain Gauges in Rubber O-Rings for Condition Monitoring.

ABSTRACT - Masterthesis

The aim of this thesis is to observe the state of the art and significance of embedding a strain gauge into a rubber O-ring for condition monitoring with the aid of COMSOL simulation. In the simulations, the 5 μm polyimide sensor embedded into the gasket which monitors the O-ring condition. This miniaturized sensor will generate the signal and prevent the damage or failure of gasket during installation.

The embedded sensor measures the strain when the pressure or force is applied on the gasket. The signal which will be received from the sensor offers the opportunity to observe the stability of gasket under different conditions. Thus damages or degradation of gasket which gives rises in creep or shrinkage of the compressed material can be avoided. The response of the gasket has been examined over time at different strain rate in order to calculate its creep or shrinkage behavior. The vertical movement and horizontal elongation of the sensor is also recorded when stress is applied. In one of the simulations, tensile testing has also been done by using a test specimen to check the influence of sensor and record the material elongation.