

Tribological characteristics of high temperature aged FKM O-rings under abrasive conditions

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FKM rubber seals are critical and vulnerable parts of downhole drilling tools under the influence of high temperature and abrasive grains in deep & ultra-deep well drilling. In this study, high temperature aged FKM O-rings were tested under abrasive conditions to research the effect of the age temperature on the tribological characteristics through comparison of mechanical performance variations of specimens before tests and analysis of friction coefficients, particle debris and wear worn after tests. The results indicated that wear surfaces were transformed from scratches into pits as high age temperature lowered the tear strength of rubber. Such changes in frictional pattern resulted in a difference in the force of the abrasive particles in the sealing interface which leads to variations of coefficients of friction. Results from the research aim to guard against and minimize the possibilities of future failures of FKM rubber seals.

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