

High Temperature Lubricants for Power Connectors Operating at Extreme Conditions

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Abstract – A number of high temperature (PFPE) lubricants were evaluated on the basis of their effect on the performance of bolted power connections under current-cycling conditions, ability to protect the contact zone of rider-on-flat contacts against fretting and thermal stability under long-term exposure to high temperature. Thermo-gravimetric analysis of these lubricants was also determined. The results of current cycling tests showed that all lubricants had beneficial effect on the performance of bolted joints as manifested by the stable operation. Fretting tests showed that at low loads none of the lubricants could protect the contact zone against fretting, but increasing the contact loads improved significantly the lubricant protective ability. This improvement was observed in copper-to-copper and copper-to-tin plated copper contacts, but not in the case of aluminum fretting against aluminum since none of the lubricants tested had the ability to suppress the effect of fretting. Long-term exposure to high temperature showed that some lubricants were susceptible to cracking.