



Pump Users
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Technical Paper

New technology for SiC components for mechanical seals and seal less pumps

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Polycrystalline Diamond Coatings for Extreme Tribological Applications in Sealless Pumps

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Summary

The dry running capability of sealless pumps with bearings made of sintered silicon carbide (SSiC) can be improved by applying a coating with a low coefficient of friction under dry running conditions - for example, a crystalline diamond coating. Laboratory tests resembling real pump applications were carried out with diamond coatings in the product-lubricated state and under pure dry running conditions. The tests involved severe tribological conditions of insufficient lubrication and dry running. An additional pump test simulated the combined operational demands of tribology and wear due to abrasive solids.

The results demonstrate that diamond coatings can be useful in particularly extreme applications, above and beyond the already excellent performance of monolithic SSiC. The eminently good tribological performance of diamond coatings can be further improved by use of a ceramic substrate material with a higher failure tolerance than that of SSiC, e.g., a ceramic with an interpenetrating network of silicon carbide and carbon with small silicon inclusions.