



Pump Users
International Forum 2008

Technical Paper

New technology for SIC components for mechanical seals and sealless pumps

Session 16-1

Diamond Coating for Mechanical Seals in Bad-actor applications – Pumping Gas-containing fluids and slurry

Author:

Martin Kirchhof
Research and Development
Burgmann Industries GmbH & Co. KG
82515 Wolfratshausen, Germany

Co-Author 1:

Michael Rieger
Research and Development
Burgmann Industries GmbH & Co. KG
82515 Wolfratshausen, Germany

Co-Author 2:

Dr. Andreas Schrüfer
Research and Development
Burgmann Industries GmbH & Co. KG
82515 Wolfratshausen, Germany



Pump Users
International Forum 2008

Summary

Mechanical seals are used in various industrial rotating equipment, in particular pumps and compressors. The choice of the sliding materials depends on the specific operating conditions. Typically for high pressures and abrasive media (slurry), respectively, hard/hard sliding material combinations are applied to prevent deformation and reduce abrasive wear of the sliding rings. However, common hard/hard material combinations may not be used for dry running conditions and only have limited poor lubrication and slurry capabilities. Diamond is the hardest material known and is used as polycrystalline diamond coating (DiamondFaces®) on SiC sliding rings to enhance life time under such critical operating conditions, so-called bad-actor applications. In pumps dry running and poor lubrication at the sliding rings often occurs due to gas content in the pumping medium. The effect of different gas contents is investigated showing that even low gas contents in the range of some percent may cause failure of common uncoated hard/hard combinations. In contrast, diamond coated rings can be even operated in the range of gas contents commonly leading to a breakdown of the pump delivery flow. In addition, slurry applications are presented where the life time of the sliding rings has been enhanced by factors between 8 and 25 using the diamond coating. Hence, in both applications, gas containing media and slurry, the running safety and pump availability and therefore plant availability dramatically is enhanced by applying diamond coatings.