JOHN CRANE DIAMOND ™ MATERIAL

SEAL FACE SURFACE TREATMENT: 8189

Technical Data Sheet

Product Description

John Crane Diamond™ is a proven, next-generation technology applied to a mechanical seal face, available for multiple seal types. Through a patented process, the pure diamond film is grown via chemical vapor deposition (CVD) on the seal face, creating a chemical-resistant surface that stands up to abrasive media and harsh conditions such as intermittent dry running. This technology reduces seal wear, increases rotating equipment reliability, and cuts operating and lifecycle costs.

Performance Capabilities

This seal face technology adds robustness to the selected mechanical seal, enhancing the expected performance given the seal's design parameters.

- Temperature: -40 to 204 C (400F)
- Pressure: 0 to 140 barg (2030 psig)
- Size: Maximum overall Ring OD nominally 305 mm (12 inch)
- Speed: normally 46 m/s (150 ft/s)
- Fluid viscosity: 0.2 to 5,000 cP
- Fluid specific gravity: 0.4 to 2.0
- Seal type: Various
- Applications: slurries, abrasives, poor lubricating conditions, intermittent dry running, entrained gases, multiphase, transfer pumping, hot water

Design Features

- Low coefficient of friction yields cooler-running face temperatures, requiring less auxiliary cooling
- Extreme chemical resistance stands up to acids and bases
- Higher wear resistance increases equipment reliability
- Reduced power consumption cuts operational costs
- Extended seal life cuts lifecycle costs

Material Properties

Note that this is an engineered surface created on high-purity self-sintered silicon carbide. The mechanical properties below are those of the 8189 diamond treatment; this treatment does not change the overall mechanical properties of the silicon carbide ring. Also note that this is a pure-phase diamond material. Because diamond is the standard to which other materials are often compared, the absolute value is not as critical as the comparative value to other materials.

Comparative Surface Properties

- Surface hardness: 10,000 – 12,000 HV (98 – 118 GPa)
- Coefficient of friction: nominally 0.018
- Chemical resistance: Excellent in acids and bases
- Temperature limits: diamond treatment oxidization begins at nominally 500°C (932°F)

Other Properties

- Treatment thickness: 6 – 10um (236 – 394 u-inch)
- Thermal conductivity (3ω method): 26 to 550 W/mK
- Thermal shock resistance: Limited by the base material
- Young's modulus: 967 to 1140 GPa
- Compressive strength: 110,000 MPa

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