Diamond-Coated Seal Faces

Material solutions for challenging applications

Upgrade to diamond coatings for superior performance advancements over all other hard seal face materials.

Extend mechanical seal reliability and life

Seal face materials have always been challenged to provide reliable operation in low-lubricity fluids. In the past, this challenge was addressed by lubricating seal faces with a cool, clean external fluid. Although effective, this solution adds operating costs throughout the life of the seal. Alternatively, dual seals operating on clean barrier fluid offer longevity with lower operating costs, but higher initial cost for the required support system. The ideal solution is to have the mechanical seal faces lubricated by the process fluid. Pure, crystalline diamond grown onto a seal face through a rigorous treatment process, including chemical vapor deposition, enables Flowserve to offer improved reliability in poor lubricating fluids without additional controls.

Features and benefits

- The lowest friction of any seal face material provides cool-running seal faces in poor-lubricity fluids such as hot water.
- Bonding the hardest known material to the seal face's running surface gives maximum resistance to abrasive particle damage.
- The highest chemical resistance of all seal face materials enables its use in aggressive acids, alkalines and caustics.
- High wear resistance brings forgiveness for off-design operation such as intermittent dry running.
- Fine grain diamond coatings can run against all common mating face materials, including silicon carbide, tungsten carbide and itself.

Applications

Diamond-coated seal faces offer performance benefits in a wide range of mechanical seal applications, including:

Upstream oil and gas

- Produced water
- Crude oil pipeline
- Multiphase pumps

Refinery and petrochemical

- Dirty hydrocarbons
- Light hydrocarbons
- Caustics

Mining

- Abrasive slurries

Power

- FGD slurries
- Boiler feed water
- Cooling water

Chemical

- Loading and unloading pumps
- Fluids with entrained gases
- Dissolved or hard solids

General industry

- Batch processes
- Fibrous slurries

Availability

Most Flowserve seals are available with diamond-coated seal faces, including:

- QB series
- U series
- SLM
- PSS 4
- BX series
- D series
- HSH
- Pac-Seal®
- ISC2 series
- SLC

Consult your local Flowserve representative for information on diamond coating availability in other mechanical seals.

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3D analysis and photographic image of the seal face surface reveals no damage to the diamond-coated silicon carbide (right) after more than 4,000 hours of operation in hot water. The pitting damage on the uncoated silicon carbide face (left) was evident after just 200 hours under the same conditions.

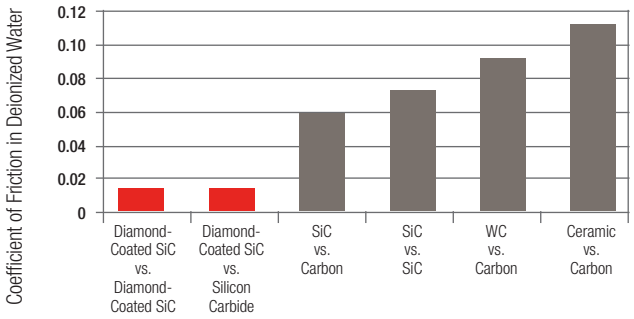
Material properties

Young's Modulus	960 GPa
Fracture Strength	2.9 to 5.3 GPa
Thermal Conductivity	550 to 1,800 W/mK
Hardness	10,000 HV

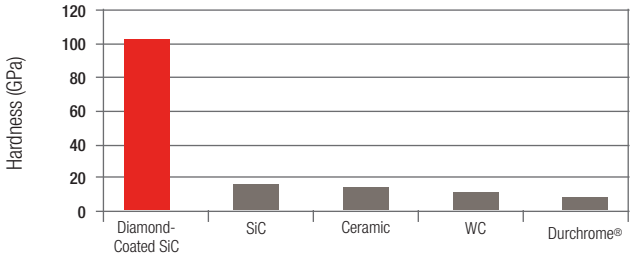
Operating parameters

Pressure	0 to 140 barg (2,030 psi)
Temperature	-40°C to 204°C (-40°F to 400°F)
Speed	up to 46 m/s (150 fps)
Shaft Sizes	12.7 to 241.3 mm (0.500 to 9.500 in)
Viscosity	0.2 to 5,000 cP
Specific Gravity	0.4 to 2.0

Flowserve diamond-coated seal faces offer the lowest coefficient of friction for cool operation.



Flowserve diamond-coated silicon carbide provides the highest hardness for excellent wear resistance.



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