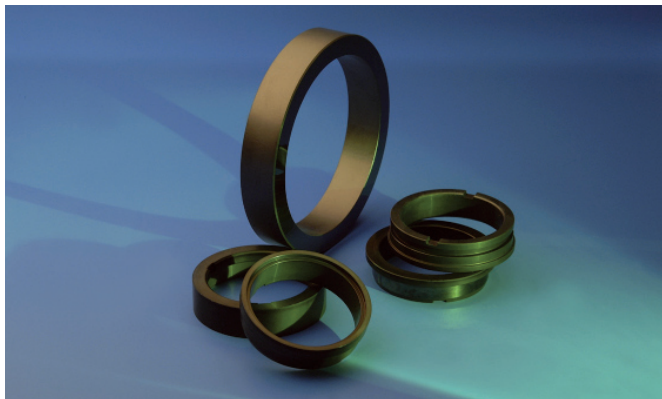


## neoDiam®-Seals Features and descriptions

*neoDiam® coating on mechanical seals is the best choice for improved tribological properties of high-performance pumps.*

NeoCoat offers a high-quality diamond coatings to produce high-performance diamond coated mechanical seals.



### neoDiam® coatings for rotary seals

The pump lifetime in harsh environment such as petroleum industry is a tremendous challenge. The MTBF/MTBR values have to be very high in this industry, because any maintenance operation causes an unacceptable operation interruption. The main cause of pump failure is related to one of the key components, the mechanical seal. Furthermore, the main cause of seal damages come from dry-running.

Generally, the pairing of sliding faces is two hard materials such as silicon carbide or nitride. However, in dry atmosphere and without lubricant, a large wear is observed, that leads to a critical pump leak.

For protecting mechanical seals, a material with chemical inertness, self-lubricating, high hardness properties is required. Polycrystalline diamond coating is thus a suitable solution to fulfill these specifications.

### Substrate data

Typical characteristics of mechanical seals which can be coated with neoDiam®:

Type	Silicon carbide, silicon nitride, cemented carbide
Dimensions	Up to diameter 400mm
Height / thickness	Maximum 80mm

## HFCVD diamond coatings on rotary seals

### neoDiam® coating data

Hardness	up to 10'000 HV
Thickness	from 0.5 to 10µm
Microstructure	Microcrystalline (MCD) or nanocrystalline (NCD)
Friction coefficient with neoDiam® (both counterparts)	0.1

### neoDiam® coating performance

With neoDiam® coating operation time of rotary seals is increased up to 100 times compared to uncoated SiC seals.

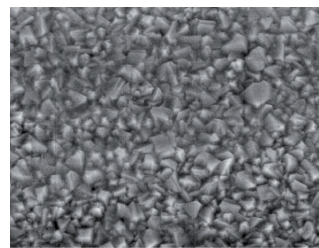
The mechanical seals have been tested on dedicated bench with following conditions:

- DN63 SiC seals
- neoDiam® MCD coating
- Diamond coating thickness: 5µm
- Pressure = 0.2 N/mm<sup>2</sup>
- Speed = 3000 rpm or 4 m/s
- Environment: dry air (<5% humidity rate) at 25°C

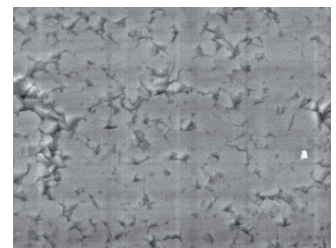
Tribological behavior of mechanical seals are summarized in following table:

Material (both faces)	Friction coefficient
SiC (no coating)	0.75
neoDiam® (diamond coating)	0.10

A polishing process of diamond surface is observed on the sliding face as show by SEM images below. This polished diamond is a stable and long-lasting surface.



As grown neoDiam® MCD film



After sliding operation