

The universal range of mechanical seals for pumps.  
Versatile, economical and efficient.

**EagleBurgmann®**  
Rely on excellence

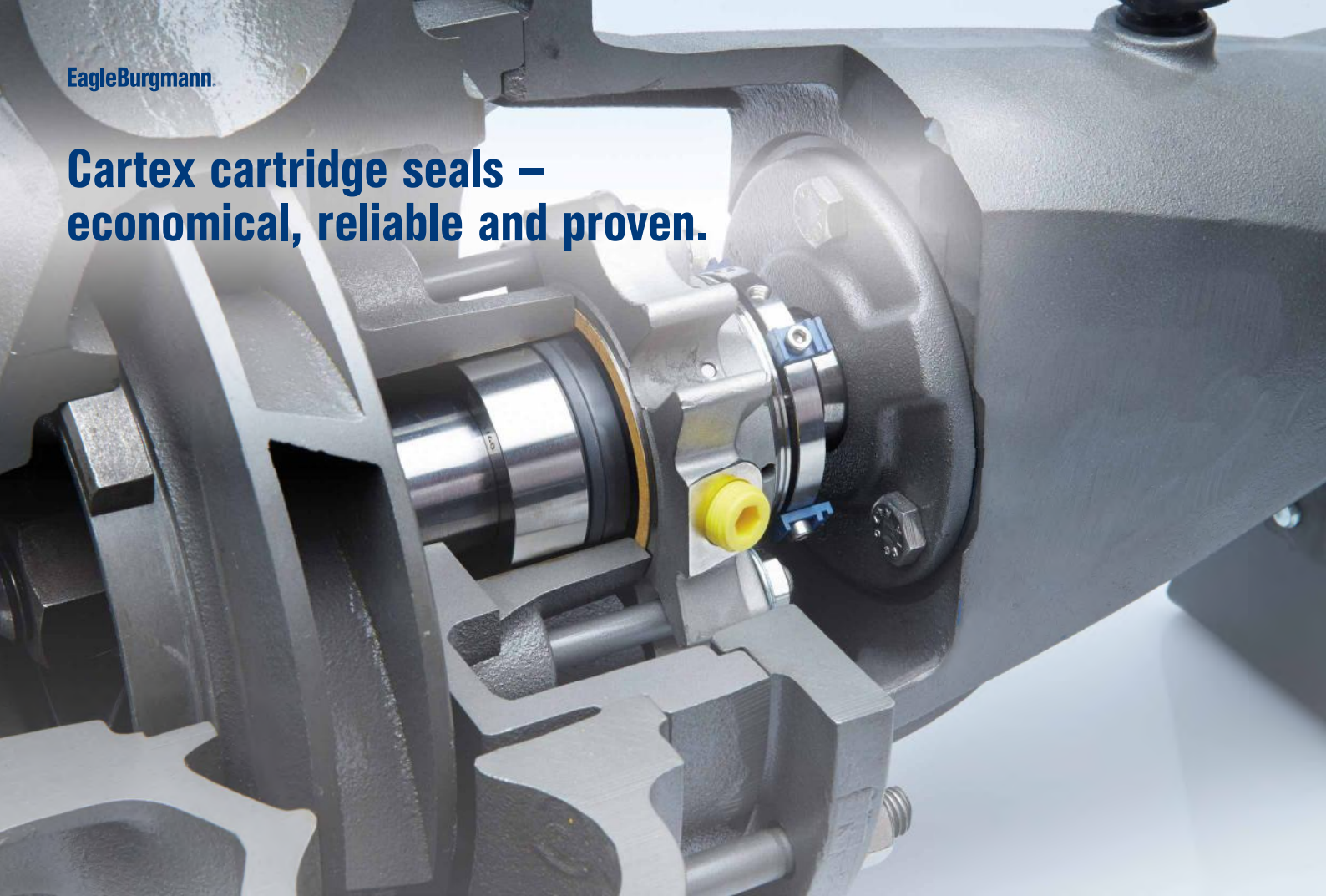
# Cartex Cartridge seals



**> 60 %**  
shorter installation time.

**> 30 %**  
more economical than  
component seals.

## Cartex cartridge seals – economical, reliable and proven.



### The cartridge principle - reliably cost-efficient

EagleBurgmann Cartex cartridge seals are fully pre-assembled and precisely installed component seals incorporated in a cover and shaft sleeve. The seals are installed in pumps in a wide range of industries including chemicals, water supply, paper production, food processing and many other applications. Cartridge seals are easy to fit, and they keep your running costs down.

Over more than twenty years, EagleBurgmann Cartex Cartridge seals have demonstrated a proven track record in sealing applications on all standard pump types. This practical seal design has been successfully established in the market. The Cartex range now includes single and double seal versions for all standard operating modes as well as special versions, for example for sterile applications, installation in positive displacement pumps and with DiamondFace coating of the sealing faces.

### Get the maximum efficiency

- Pre-assembled Cartex units reduce your installation costs.
- Reduce system downtime for installation by 2/3, because there is no need to take measurements to position the seal.
- Protect your pump shaft/sleeve: Cartex seals have their own shaft sleeve and do not have a dynamic O-Ring which could cause damage.
- Reduce your life cycle costs by up to 30 % compared to component seals.
- With Cartex, you extend the average operating life of your seals compared to component seals.
- Problems with harsh operation conditions and/or the medium? Make your pump fit for a trouble-free and efficient service with DiamondFace coated seal faces of the eCartex series.

### Benefit from a straightforward handling

- Cartex mechanical seals are easy to install. Specialist installation is not needed.
- Pre-assembled units enhance operational reliability. No measurement errors or installation errors.
- Eliminate damage to sliding faces and prevent contamination during installation.
- Cartex mechanical seals even fit into very tight seal chambers.

### Meet your standardization goals

- With our QDP:24 program, all standard versions are available on workdays within 24 hours after receipt of your order.
- The broad application spectrum of standard materials offers you an excellent opportunity to increase your level of standardization.
- The seals can be adapted to the specific pump design (pump and seal “from a single mold”).
- Attractively priced customized versions.

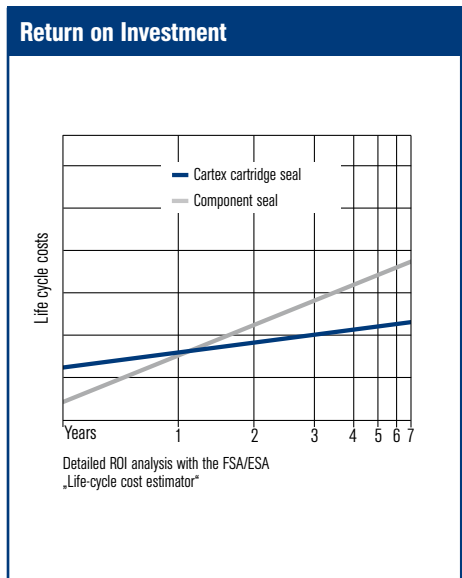
# Achieve sustainable savings with cartridge seals.



## Cost efficiency means

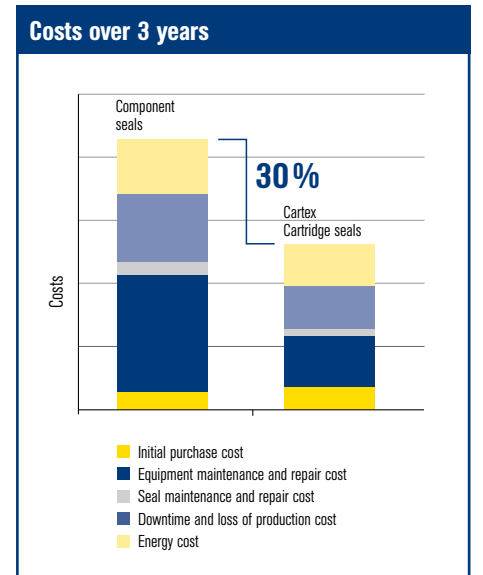
minimizing the lifecycle costs of the sealing system. The goal is to find the optimum balance between the investment in a mechanical seal and the expected service life. Insufficient investment in the mechanical seal system reduces service life compared to other durable system components (e.g. the pump bearing). Excessive investment increases lifecycle costs beyond the optimum level.

Analysis of data collected with EagleBurgmann's SEPRO service program shows clearly that Cartex cartridge seals provide the optimum balance. The results reveal that spare parts consumption is significantly lower on cartridge seals compared to component seals. Cartridge seals clearly have a longer average service life, which reduces downtime and loss of production caused by pump repairs.

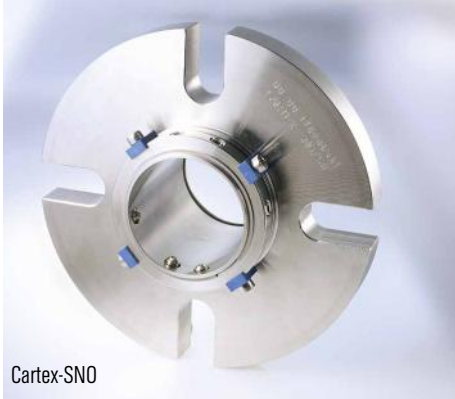


## Cost efficiency also means

a reduction in repair costs and consequential expenses. The total cost of a cartridge seal over a period of three years is 30 % less than the cost of a component seal during the same period. It is therefore evident that the expected reduction in operating, installation and repair costs more than offsets the higher initial purchase cost. A Cartex cartridge seal is an investment that offers a good future payback.



# The EagleBurgmann Cartex range: For all centrifugal pumps and various modes of operation.



Cartex-SNO

## The single seal variants:

### Cartex-SNO

Single seal without connections for dead-end operation.

### Cartex-SN

Single seal with flushing connection.

### Cartex-TN

Single seal, same as Cartex-SN but with throttle ring. The cover has auxiliary connections for flushing and quench. Throttle ring: PTFE carbon-graphite reinforced.

### Cartex-QN

Single seal for operation with unpressurized quench. Same as "-SN" version but with outboard lip seal. The cover has auxiliary connections for flushing and quench. Lip seal: NBR (P), PTFE carbon reinforced (T3).



Cartex-SN

## The solution for ANSI seal chambers:

### Cartex-ANSI

Cartex seals for ANSI pumps. Available for standard (S) and big-bore (B) seal chambers.

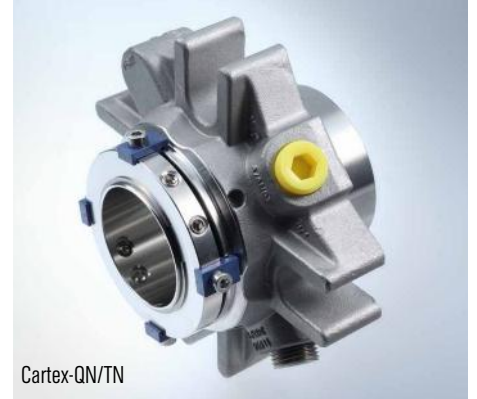
Single seals:

Cartex -ASP / -ABPN (equivalent to -SN)

Cartex-ASTN / -ABTN (equivalent to -TN)

Dual seals:

Cartex-ASDN / -ABDN (equivalent to -DN)



Cartex-QN/TN



Cartex-Vario

## For specialized applications:

### Cartex-Vario

Cartridge seals with modified cover for eccentric screw pumps of various pump manufacturers. Please inquire.

## Operating range

Shaft diameter:

$d_1 = 25 \dots 100 \text{ mm (1.000" } \dots 4.000\text{")}$

Other sizes on request.

Temperature:

$t = -40 \text{ }^\circ\text{C } \dots +220 \text{ }^\circ\text{C (-40 }^\circ\text{F } \dots +428 \text{ }^\circ\text{F)}$

(Check O-Ring resistance)

Sliding face material combination BQ1

Pressure:  $p_1 = 25 \text{ bar (363 PSI)}$

Sliding velocity:  $v_g = 16 \text{ m/s (52 ft/s)}$

Sliding face material combination Q1Q1 or U2Q1

Pressure:  $p_1 = 12 \text{ bar (174 PSI)}$

Sliding velocity:  $v_g = 10 \text{ m/s (33 ft/s)}$

Axial movement:  $\pm 1.0 \text{ mm, } d_1 \geq 75 \text{ mm } \pm 1.5 \text{ mm}$

## The right seal for any challenge

	-SNO	-SN	-QN	-DN	MA...
Dead-end operation	■	■			■
Volatile media with poor lubrication properties			■	■	
Media that react with oxygen			■	■	
Low viscosity media containing no solids	■	■	■		■
Media containing solids		■	■	■	■
Aggressive media				■	
Environmentally hazardous media				■	
Media, not environmentally hazardous	■	■			■



MA290/MA390

**The solution for narrow installation situations:  
MA290/MA390**

Seals of the MA range are outside mounted, have an extremely short profile and are universally applicable. Stationary seal face.

**Operating range**

**MA290 / MA390:**

Pressure:  $p = \dots 16 \text{ bar (232 PSI)}$   
 Temperature:  $t = -20 \text{ °C} \dots +160 \text{ °C}$   
 ( $-4 \text{ °F} \dots +320 \text{ °F}$ ) (oil),  
 $0 \text{ °C} \dots 60 \text{ °C (32 °F} \dots 140 \text{ °F)}$  (water)  
 Sliding velocity:  $v_g = \text{max. } 20 \text{ m/s (66 ft/s)}$   
 Viscosity:  $0.5 \text{ Pa}\cdot\text{s}$   
 Solids content:  $0.3 \%$

**MA291 / MA391:**

Pressure:  $p = \dots 10 \text{ bar (145 PSI)}$   
 Temperature:  $t = -20 \text{ °C} \dots +160 \text{ °C}$   
 ( $-4 \text{ °F} \dots +320 \text{ °F}$ ) (oil),  
 $0 \text{ °C} \dots 60 \text{ °C (32 °F} \dots 140 \text{ °F)}$  (water)  
 Sliding velocity:  $v_g = \text{max. } 20 \text{ m/s (66 ft/s)}$   
 Viscosity:  $3 \text{ Pa}\cdot\text{s}$   
 Solids content:  $10 \%$



Cartex-DN

**The dual seal variant:  
Cartex-DN**

The seal has an integrated pumping device, so there is often no need for a separate barrier fluid circulation pump (see performance diagrams on page 6). Above that, the seal is double-balanced, it remains closed and balanced even in the event of barrier fluid pressure failure or pressure reversal. A barrier fluid system (API Plan 53) is required in pressurized mode (barrier fluid pressure exceeds product pressure). Both seals are internally pressurized in this mode. In tandem operation, the (unpressurized) fluid is used in dead-end (API Plan 51) or flow-through (API Plan 52 or 54) mode, depending on the application. The inboard seal is externally pressurized.

**Operating range**

Shaft diameter:  
 $d_1 = 25 \dots 100 \text{ mm (1,000" } \dots 4,000\text{")}$   
 Other sizes on request.  
 Temperature:  
 $t = -40 \text{ °C} \dots +220 \text{ °C (-40 °F} \dots +428 \text{ °F)}$   
 (Check O-Ring resistance)

Sliding face material combination BQ1  
 Pressure:  $p_1 = 25 \text{ bar (363 PSI)}$   
 Sliding velocity:  $v_g = 16 \text{ m/s (52 ft/s)}$   
 Sliding face material combination Q1Q1 resp. U2Q1  
 Pressure:  $p_1 = 20 \text{ bar (290 PSI)}$   
 Sliding velocity:  $v_g = 10 \text{ m/s (33 ft/s)}$   
 Barrier fluid circulation system:  
 $p_{3\text{max}} = 25 \text{ bar (363 PSI)}$   
 $\Delta p (p_3 - p_1)_{\text{ideal}} = 2 \dots 3 \text{ bar (29} \dots 44 \text{ PSI)}$ ,  
 $7 \text{ bar (102 PSI)}$  for barrier media with poor lubricating properties.  
 Pump startup:  
 $\Delta p (p_3 - p_1)_{\text{max}} = 25 \text{ bar (363 PSI)}$  allowed  
 Recommended supply medium: max. ISO VG 5  
 Axial movement:  
 $\pm 1,0 \text{ mm, from } d_1 = 75 \text{ mm } \pm 1,5 \text{ mm}$



Cartex-GSDN

**The gas-lubricated version:  
Cartex-GSDN**

Double seal for pumps. Based on the HR principle which is also used on liquid-lubricated Cartex seals. High axial tolerance, double balanced, rugged design. Wide seal faces ensure high gas film stability. Product/medium at the seal faces produces continuous self-cleaning effect during ongoing operation.

**Operating range**

Shaft diameter:  
 $d_1 = 30 \dots 100 \text{ mm (1.18" } \dots 3.94\text{")}$   
 Pressure:  $p_1 = 13 \text{ bar (189 PSI)}$ ,  
 $p_3 = 16 \text{ bar (232 PSI)}$   
 with V-grooves (uni-directional)  
 $p_1 = 9 \text{ bar (131 PSI)}$ ,  
 $p_3 = 12 \text{ bar (174 PSI)}$   
 with U-grooves (bi-directional)  
 Differential pressure  $(p_3 - p_1) = \text{min. } 3 \text{ bar (44 PSI)}$   
 Operating temperature limits for:  
 EPDM  $-20 \text{ °C} \dots +140 \text{ °C (-4 °F} \dots +284 \text{ °F)}$   
 FFKM  $-20 \text{ °C} \dots +120 \text{ °C (-4 °F} \dots +248 \text{ °F)}$   
 FKM  $-20 \text{ °C} \dots +170 \text{ °C (-4 °F} \dots +338 \text{ °F)}$   
 Sliding velocity:  $v_g = 4 \dots 15 \text{ m/s (13} \dots 49 \text{ ft/s)}$   
 Axial movement:  $\pm 1.0 \text{ mm}$

# Integrated and effective: The Cartex-DN circulating device.



QFT1000 Quench fluid system



TS2000 Thermosiphon system

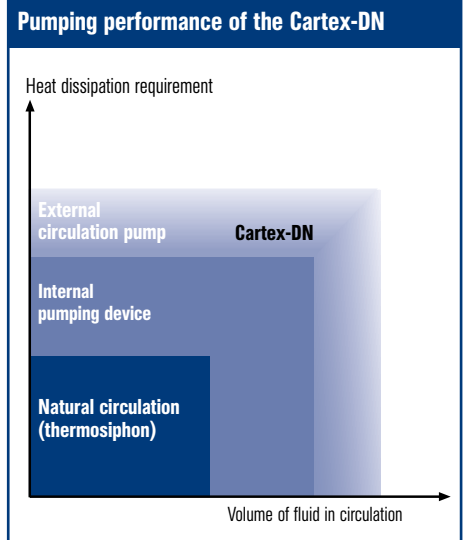
## Seal supply systems

The EagleBurgmann QFT1000 and QFT2000 buffer fluid tanks are suitable for the Cartex-DN in tandem operation. Thermosiphon systems of the EagleBurgmann TS1016 and TS2000 range support double and tandem seal configurations.

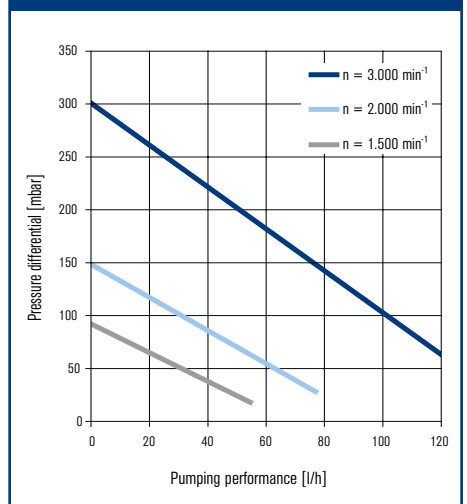
A supply system is required for the operation of a double seal. Besides providing pressurization, the supply system also ensures controlled heat dissipation from the seal chamber. This is necessary because the life of a mechanical seal is heavily dependent on the temperature at the sliding faces.

The EagleBurgmann Cartex-DN has an internal pumping device. Continuous design improvements and in-house testing have led to the conclusion that there is often no need for an external circulation pump. Therefore end users get the benefits of lower operating and investment costs as well as increased operational reliability at the same time. The pumping performance of the Cartex-DN covers a wide range of applications even without an external pump.

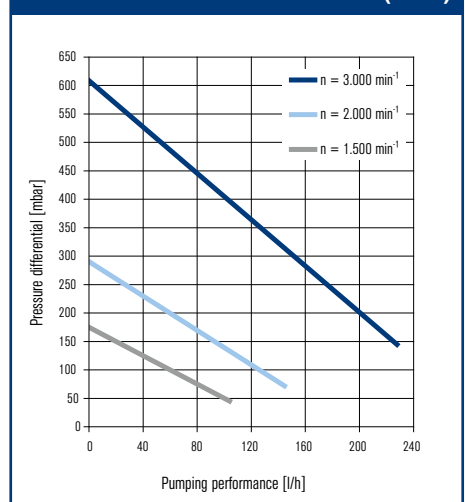
The test results confirm the outstanding performance of the pumping device on the Cartex-DN, which is twice as good as comparable devices supplied by other manufacturers.



## Cartex-DN/50-00: Mineral oil ISO VG 5 (40 °C)



## Cartex-DN/85-00: Mineral oil ISO VG 5 (40 °C)



### Important note

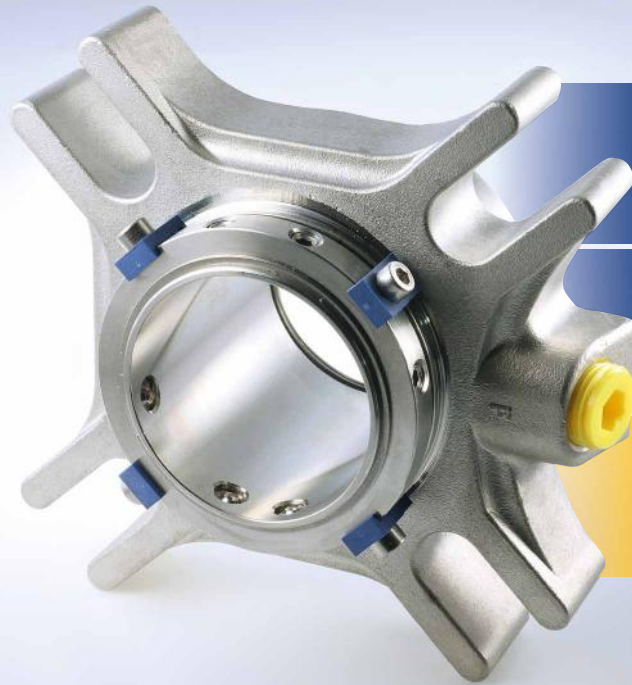
All the technical specifications are based on extensive tests and our many years of experience. However, the diversity of possible applications means that they can serve as guide values only.

It should be noted that the extremal values of each operating parameter cannot be applied at the same time because of their interaction. Furthermore, the operating range of each specific product depends on the respective shaft diameter, materials used, mode of operation and on the medium to be sealed.

A guarantee can only be given in the individual case if the exact conditions of application are known and these are confirmed in a special agreement. When critical conditions of operation are involved, we recommend consulting with our specialist engineers.

Subject to change.

# Efficient as standard: eCartex - the new generation.

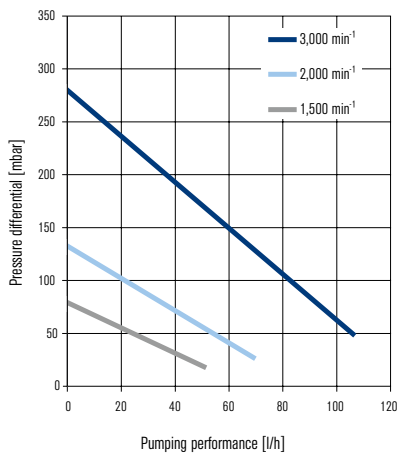


**-80 %**  
reduced  
power consumption.

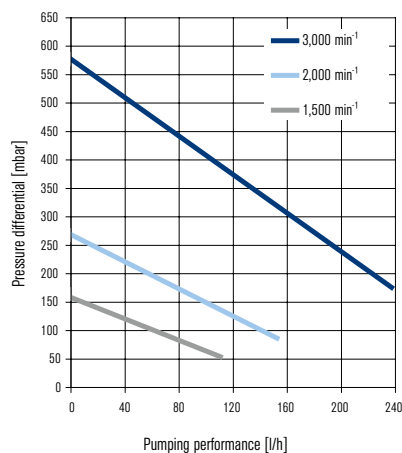
**+100 %**  
increased  
service life.

**Install  
now.  
Benefit  
immediately.**

**Cartex-DN/50-00: Desalinated water (30 °C)**



**Cartex-DN/85-00: Desalinated water (30 °C)**



Outstanding feature of the innovative eCartex equipment are DiamondFace coated seal faces. They are extremely hard and wear-resistant and exhibit low friction, excellent heat conductivity and extremely high chemical resistance. Above that they have better dry running properties in case of poor lubrication of the seal faces.

In practice, this means that lifetime of seals significantly increase, maintenance intervals extend accordingly and life cycle costs can be reduced. The eCartex equipment is available as standard for all Cartex single and dual seals.



## DiamondFace

The introduction of DiamondFace by EagleBurgmann in 2007 was a milestone in the history of mechanical seal technology. A micro-crystalline layer, which has all the attributes of natural diamond, is applied to the seal faces by means of a chemical vapor deposition (CVD) process in a vacuum reactor at a temperature of 2,000 °C (3,632 °F). Developed in cooperation with the Fraunhofer Institute for Surface Engineering and Thin Films in Braunschweig/Germany, the process produces high coating thicknesses and an extremely even seal face. Coating adhesion exceeds all known requirements in practical application.

Video: DiamondFace



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EagleBurgmann, a joint venture of the German Freudenberg Group and the Japanese Eagle Industry Group, is one of the internationally leading companies for industrial sealing technology. Our products are used everywhere where safety and reliability are important: in the oil and gas industry, refining technology, the petrochemical, chemical and pharmaceutical industries, food processing, power, water, mining, pulp & paper, aerospace and many other spheres. Every day, more than 6,000 employees in more than 60 subsidiaries contribute their ideas, solutions and commitment towards ensuring that customers all over the world can rely on our seals. Our modular TotalSealCare service underlines our strong customer orientation and offers tailor-made services for every application.

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