NEW Non-Contact Seal Type CF
Target

- Machine tool industry
- Machining spindles
- ...
- Everywhere in combination with spindle bearings!!
Sealing of spindle bearings:

Self-made labyrinth – mostly with sealing air
→ complex and intensive

Sealed spindle bearings
→ Not „cheap“
→ Reduced load capacities
   (see GMN KH series)

There is no standard established!!!
Demands to spindle bearings

→ High speed applications
→ Lubrication: grease or oil
→ Specific assembly requirements: Pre-load
Standard Solution with GMN Labyrinth seals or self made labyrinth?

- Big
- Complex design
- Distance rings: hardened and ground
NEW
Non-contact-Seal Type CF
CF Profile

The CF Profile is an optimized sequence of radial and axial gaps.

Radial gaps:
Radial gaps create a back-transport effect by taking advantage of centrifugal forces when the shaft is rotating.

Narrow axial gaps:
Narrow axial gaps supported by capillary forces are difficult to pass.

Internal step:
An internal step at the end of the profile provides highest sealing efficiency even when the shaft is not rotating.
Designed for spindle bearings!

- Similar dimensions
- Minimum width: 6 mm
- Same tolerances
- Material: hardened steel
- Plane parallelism <= 5µm
NEW
Non-Contact Seal
Type CF

CF 6000 / CF 619
Technical Data:
Material: steel
Temperature: -40°C – 170°C
Hardness: HRC = 45-50

Design:
Main dimensions (shaft/housing) similar to ball bearing row 60 and row 619

Series 60: shaft dia: 20-100 mm
Series 619: shaft dia: 40-80 mm

Width: constantly 6 mm
Plane parallelism: 5 µm

Gap design: CF-Profile

Axial clearance $S_{ax} = 1$ mm = total axial movement

Radial clearance: $S_{rad} = 0.5$ mm
### NEW Non-Contact Seal Type CF

#### Type CF 60

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Advantages of non-contact seals

- High temperature
- Robust
- High speed
- No friction
- No wear
- No abrasion
- No increased temperature
- Power Saving
- Compact
- High efficiency
- Easy to assemble

NEW:

> Sealed – even at standstill
> Bearing dimensions
> CF 60/619 designed for spindle bearings
Sealing of deep groove ball bearings

- Material: aluminum
- Assembly beside ball bearing
- Sizes: 6200 to 6210
- Width: 6 mm
- Temperature range: -40°C to 200°C (-40°F to 392°F)
NEW
Non-Contact Seal
Type CF

Design:
Main dimensions (shaft/housing) similar to ball bearing row 62

- Shaft dia: 10-50 mm
- Width: constantly 6 mm
- Gap design: CF-Profile
- Axial clearance $S_{ax} = 1\,\text{mm} =$ total axial movement
- Radial clearance: $S_{rad} = 0.5\,\text{mm}$

Technische Daten
Werkstoff: Aluminum
Temperature range: -40 C – 200 C
## Type CF 62

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NEW

Non-Contact Seal Type CF

NEW

⇒ Packaging
NEW Non-Contact Seal Type CF

L/M Dichtung

S/Sa Dichtung

CF Dichtung

Focus Ball Bearing Series 618

For high speed applications in minimized space – the traditional GMN non-contact Seal type L or type M

The Clean Seal

For food-, paper and textile industry – The traditional GMN non-contact seal type S or type Sa

The NEW type CF

GMN’s new solution is especially designed for spindle bearings and provides highest efficiency in 6 mm width only.
IMPORTANT!

THE NEW CF SEAL IS

→ Replacement for self-made solutions
→ Replacement for sealing air

THE NEW CF SEAL IS NOT

→ Replacement for L/M or S/Sa!!
Background Information to the slides

Slide 1: The name CF stands for „Contact free“!

Slide 2: Non-contact seals are mainly used in high speed applications, i.e. machining spindles. Most of this applications are running with spindle bearings. For this reason it was necessary to design a new seal specifically in combination with spindle bearings.

Slide 3: Most common existing solutions are self-made labyrinths. Sealed spindle bearings are an option but in many cases load capacities are reduced because of smaller ball-dimensions. But: For maximum stiffness of the spindle highest load capacities with a maximum distance of the bearings are requested. There is no standard established!!

Slide 4: Spindle bearings must be pre-loaded. A standard design is a spindle bearing in combination with a hardened and ground distance ring and a shaft nut. With this specific design the sealing-problem is quite obvious.

Slide 5: There are also special solutions published – i.e. this picture from GMN non-contact seals catalog.

Slide 6: The new CF seal is designed specifically for spindle bearings. It is made from nitrogen steel, hardened and face-ground to max. 5μm plane parallelism. With this design the seal could replace the distance ring.

Slide 7: The CF seal is made from 3 different rings which create the so called CF-Profile. A thin ring is pressed on the inner ring. So the complete assembly could be delivered and mounted in one piece.

Slide 8: Important parameters to be used in combination with spindle bearings.
Slide 9: No need for any more self-made labyrinths and big designs. The picture shows the easiest way to seal a spindle bearing. The bearing is pre-loaded with the shaft nut through the seal’s inner ring. There is also no speed limit for the seal in this design. The seal is packed between shaft nut and bearing and could not move in axial direction. The radial clearance is big enough to allow unlimited speed in this design.

Slide 10: The CF seal for spindle bearings is produced exactly in ball-bearing dimension row 60 and row 619. Please note the big axial clearance of 1 mm – with the total width of 6mm only for all dimensions in mind.

Slide 11: Table of dimensions – see also catalog sheet. Please note that the CF-Profile is not shown in the catalog sheet because of patent reasons.

Slide 12: Important advantages of the CF-seal!

Slide 13: As an alternative we also offer the CF-design for deep-groove ball bearings. These bearings are not pre-loaded and so the seal must not be hardened and ground. We offer in main dimensions of ball bearing row 62 a CF-seal made from aluminum which must be placed with a little gap in front of the bearing.

Slide 14: Parameters for the CF 62-design.

Slide 15: Table of dimensions

Slide 16: All CF-seals are single-packed in a newly designed box – similar to GMN spindle bearings.

Slide 17: GMN Non-contact seals overview

Slide 18: Important to know and to consider!!