

Intelligent Drivesystems, Worldwide Services

# SEALING SOLUTIONS FOR YOUR DRIVES

EN

**SEALING SYSTEMS  
FOR NORD GEAR UNITS AND  
GEARED MOTORS**

  
**DRIVESYSTEMS**

# SEALING SYSTEMS FOR NORD GEAR UNITS AND GEARED MOTORS



NORD DRIVESYSTEM places a high priority on the topic of sealing gear units and geared motors. Reliable and durable sealing against the entry of foreign materials and the escape of lubricants is an essential factor for product life cycle costs, as leaks in gear units and geared motors are a significant cause of malfunctions.

With the launch of the UNICASE housing concept almost 40 years ago, NORD DRIVESYSTEMS introduced a housing design which does not involve any forces in the housing joints. This sustainably reduces the risk of leaks from housing joints, so that shaft seals are now the focus of attention. Although with geared motors the gear unit seal on the input side is optimally protected against environmental influences by the motor, the output shaft seal is highly exposed to such influences.

NORD DRIVESYSTEMS has developed various sealing systems for gear unit output shafts, which are recommended according to various environmental influences and applications. The sealing systems for gear unit output shafts are described below.

# OUTPUT SHAFT SEALS FOR GEAR UNITS

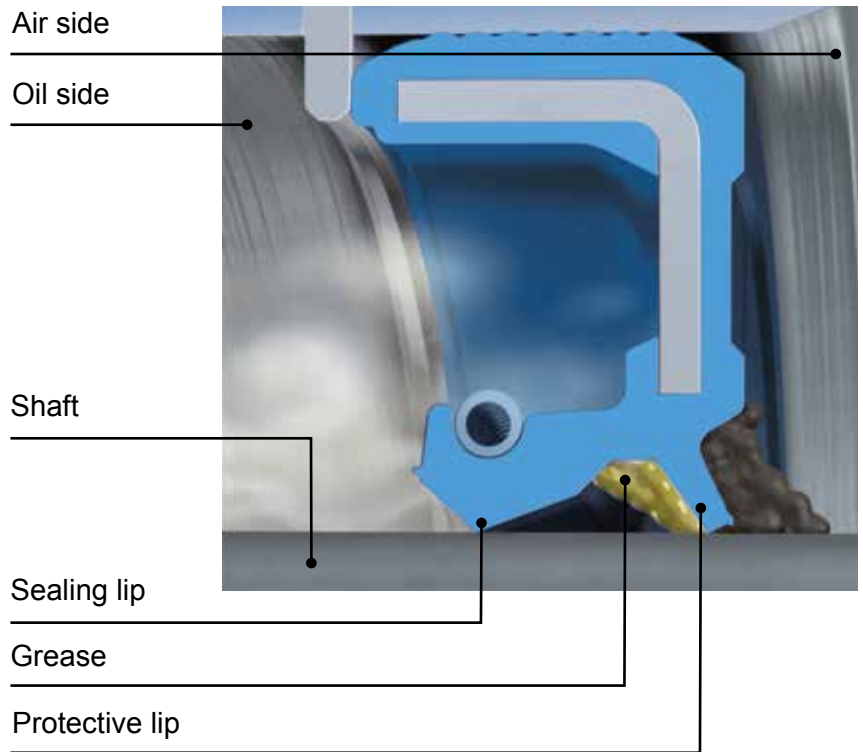
## 1. CATALOGUE VERSIONS

### 1.1 Standard versions for normal conditions

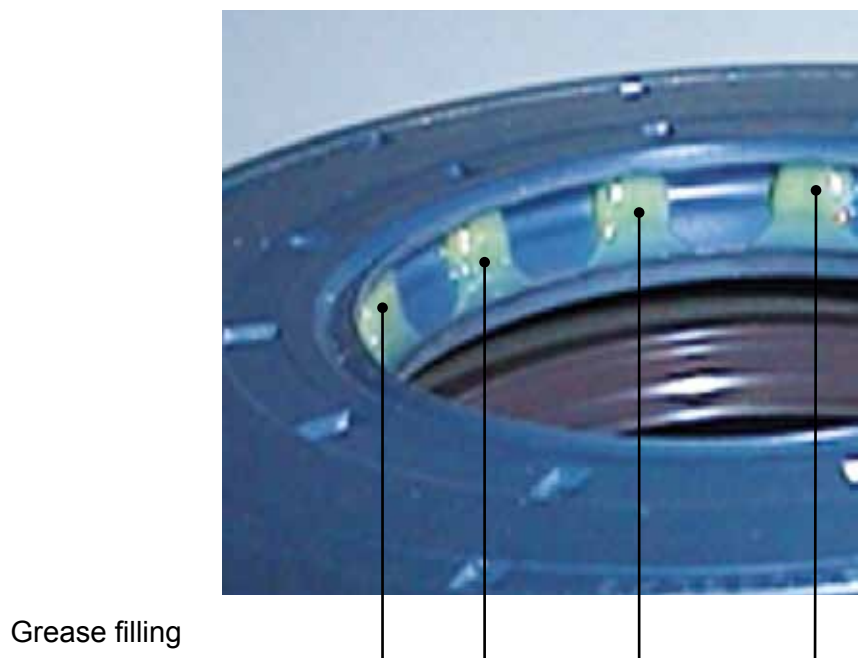
As standard, gear unit output shafts are sealed with radial shaft sealing rings made from nitrile-butadiene elastomer (NBR) and use radial spring-loaded sealing lips to seal in the lubricant, as well as an additional protective lip to provide extra protection against the entry of dirt. The space between the sealing lip and the protective lip is filled with a defined amount of special grease which reduces wear of the lips and provides an extra barrier, that further protects the sealing lip from dirt from the outside.

NORD DRIVESYSTEMS only uses branded shaft sealing rings from selected, well-known suppliers. The shafts are manufactured with precisely specified degrees of surfaces roughness in the contact area of the sealing rings.

### Radial shaft sealing ring with sealing lip and protective lip



### Defined grease filling between sealing lip and protective lip



# OUTPUT SHAFT SEALS FOR GEAR UNITS

## 1.2 Double shaft seal with two shaft sealing rings and grease lubricated roller bearings

Increased safety is provided by the double shaft seal on the output side. This consists of two shaft sealing rings. Substances which affect the seal from the outside must overcome additional barriers before they reach the inner sealing ring of the oil chamber and can cause leakage. In case of external damage, the second sealing ring provides additional protection against leaks.

The double shaft seal has an inner shaft sealing ring with (form A without protective lip) and an outer shaft sealing ring with (form AS with protective lip).

If the use of two shaft sealing rings is not possible due to the available space, a Type MSS1 shaft sealing ring with integrated double shaft sealing can be specified as an alternative.

As standard, double output shaft seals are used for the following NORD DRIVESYSTEMS gear units:

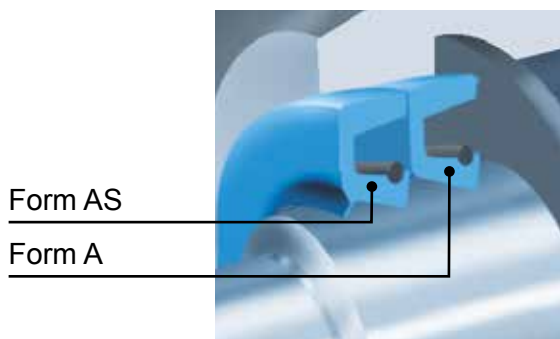
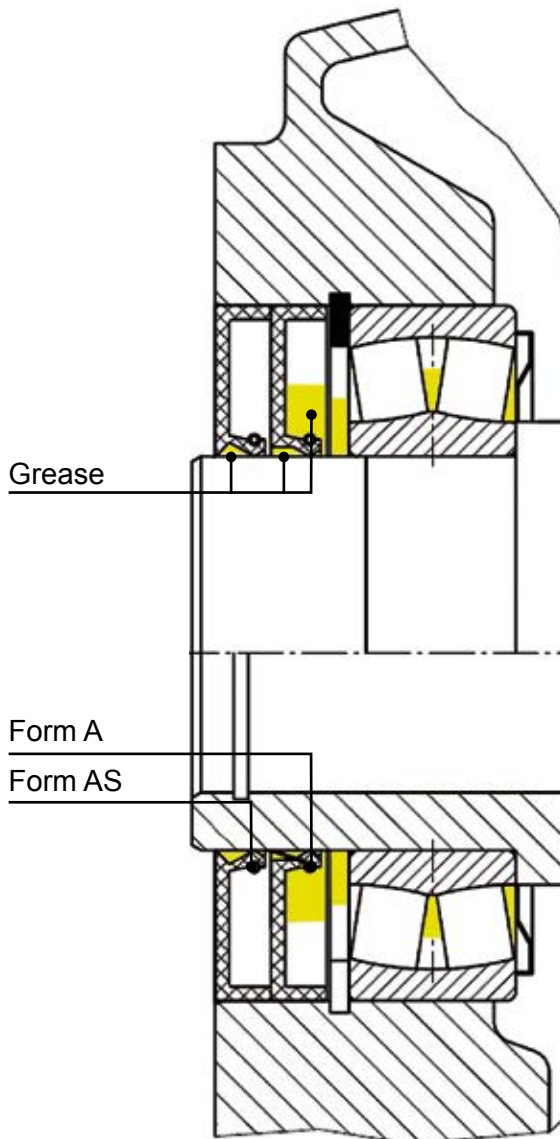
- Industrial gear units (SK 5207 up to 15507)
- 3 and 4-stage bevel gear units with hollow shafts (SK 9012.1 up to 9096.1) and with solid shafts for types SK 9072.1 and 9096.1
- Helical worm gear units with hollow shafts (SK 02040.1 up to 43125)
- Parallel shaft gear units with hollow shafts from SK 1282.1 up to 11382.1\*
- Parallel shaft gear units with solid shafts from SK 10282.1 up to 11382.1
- NORDBLOC helical gear units from SK 772.1 up to 973.1

In addition, double shaft sealing is available as an option for:

- 2-stage bevel gear units (SK 920072.1 up to 92772.1)
- Parallel shaft gear units SK 0182.1 and 0282.1)
- 3 and 4-stage bevel gear units with solid shafts (SK 9012.1 up to 9096.1)
- Parallel shaft gear units with solid shafts from SK 1282.1 up to 9382\*
- Helical gear units from SK 32 up to 103

(\*Note: For space reasons, parallel shaft gear units SK 2282, 4282 only have double shaft sealing on the A side)

For other types of gear unit, double output shaft sealing is possible by means of special measures. Please contact us.



### 1.3 Option: "FKM" for high temperatures and high resistance to chemicals

As an option, NORD can supply output shaft sealing rings made from fluor-rubber elastomer (FKM) for almost all types of gear units. FKM is also known under the trade name Viton.

FKM fulfils higher requirements for resistance to heat and chemicals. The operating temperature range of FKM is from -25 to 150 °C. For temperatures in the area of the seal in excess of 85 °C for mineral oil lubrication and 80 °C for synthetic lubricants, NORD DRIVESYSTEMS recommends the optional use of the usually brown FKM material in place of the standard NBR shaft sealing rings. For applications in which the shaft sealing ring comes into contact with chemicals from the outside, e.g. when cleaning the plant, the compatibility of the shaft sealing ring material must be checked, both for NBR and for FKM.

Please contact us (see Section 2).

## OUTPUT SHAFT SEALS FOR GEAR UNITS

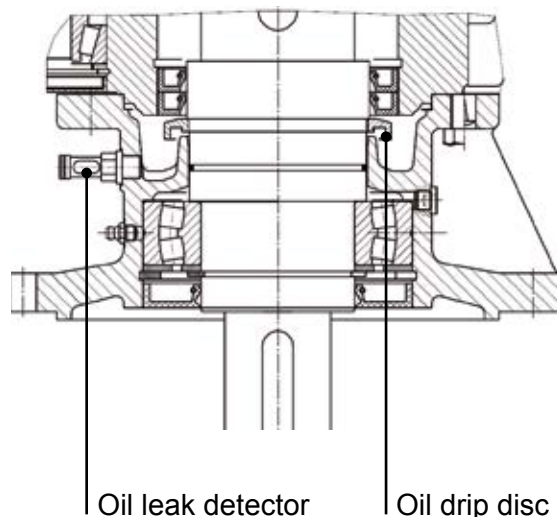
### 1.4 Option: VL3 "Drywell" bearings for vertical output shafts

Especially for agitators, NORD supplies reinforced output shaft bearings with larger bearing spacing and especially robust bearings, which are also suitable for handling large radial and axial forces. To greatly reduce the probability of lubricant leakage and possible contamination of the material being mixed, a VL3 Drywell version is available as an option for vertical output shafts.

The VL3 option offers the following safety function: In case of leakage at the double shaft sealing rings of the output shaft, the oil passes from the oil drip disc to a collecting space in the flange and is detected by an oil leak detector or an oil sensor. This prevents leakage into the agitator area.

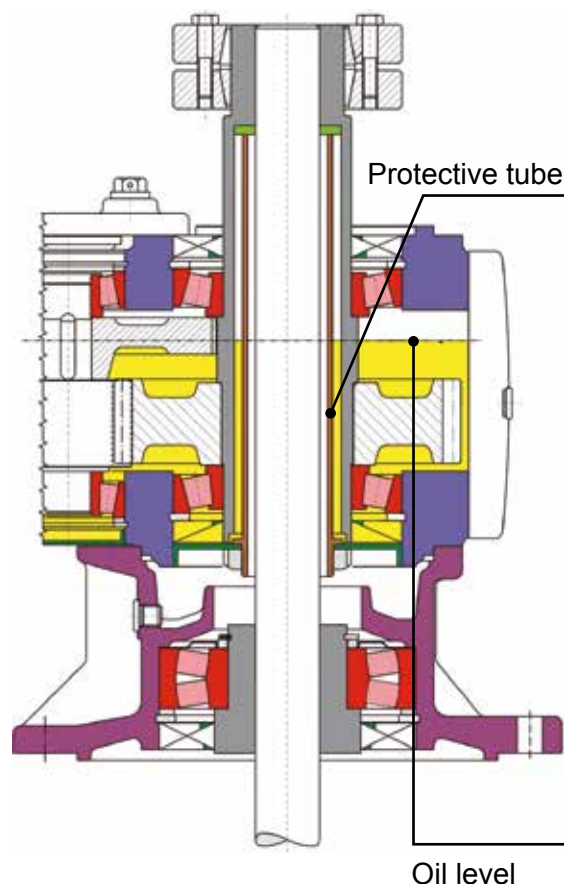
The VL3 option is available for:

- All industrial gear units with vertical output shafts (SK 5207 up to 15507)
- M4 version parallel shaft gear units with solid and hollow shafts from SK 1282.1 up to 11382.1
- M5 and M6 version 3 and 4-stage bevel gear units with solid and hollow shafts (SK 9012.1 up to 9096.1)



# OUTPUT SHAFT SEALS FOR GEAR UNITS

## "True Drywell" for geared motors



## 1.5 Option: "True Drywell" for vertical output shafts

Some applications have extremely stringent requirements for security against leaks, for which the contact seals on the vertical, downward output shaft of the gear unit are not considered to be adequately safe to prevent leaks in case of wear or contamination. For these applications, NORD DRIVESYSTEMS offers the option "True Drywell".

The NORD True Drywell version completely excludes the risk of leaks due to contact seals, as with True Drywell, there are no contact seals which are below the oil level and which could cause leaks during operation. A fixed protective tube protrudes far above the oil level. This provides an additional non-contact and wear-free seal based on the principle that, due to gravity, liquids cannot flow upwards.

This option is available for:

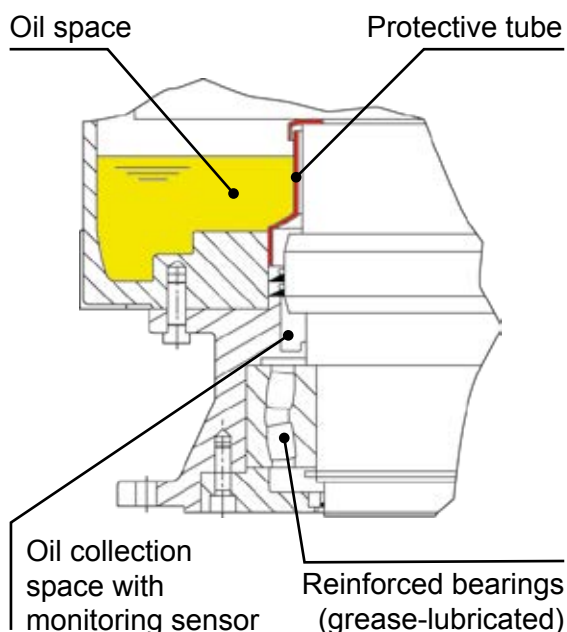
- All industrial gear units with vertical output shafts (SK 5207 up to 15507)

This option is available as a special version for parallel shaft and bevel gear units. Please contact us.

NORD True Drywell parallel shaft gear units feature a hollow shaft with shrink disc and reduced hollow shaft diameter, agitator version VLII, as well as standard gear unit venting (pressure venting is not permissible). The NORD range of modular gear units also enables the True Drywell version for M5 and M6 bevel gear units. Here however, the sealing of the output side is below the oil level.

For True Drywell versions of industrial gear units, a low-level protective tube is used in combination with a reduced oil level, which requires circulation lubrication. In this case, the True Drywell version is also combined with reinforced output bearings.

## "True Drywell" for industrial gear units



# OUTPUT SHAFT SEALS FOR GEAR UNITS

## 1.6 Taconite sealing system for aggressive rock and ore dust

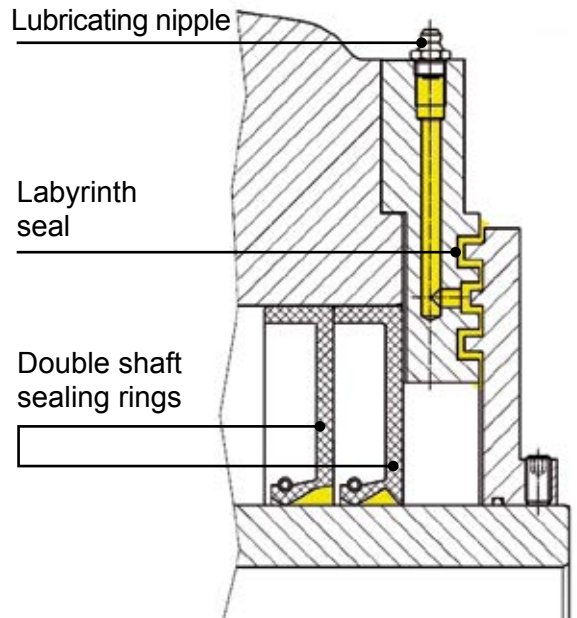
The Taconite\* sealing system was specially developed for operation with aggressive stone and ore dust. The Taconite sealing system consists of two shaft sealing rings and a radial labyrinth seal, which is filled with grease. This grease forms a barrier against the entry of stone dust. Due to regular re-lubrication via the grease nipple, the grease carries dust particles out of the labyrinth seal. Because of this, aggressive dust cannot penetrate as far as the shaft sealing rings. Contaminated grease which escapes from the sealing gap must be removed.

(\*Named after taconite, an iron ore which is mined in Minnesota/ USA.)

The Taconite option is available for:

- All industrial gear units (SK 5207 up to 15507)

The Taconite option is available as a special version for geared motors. Please contact us.



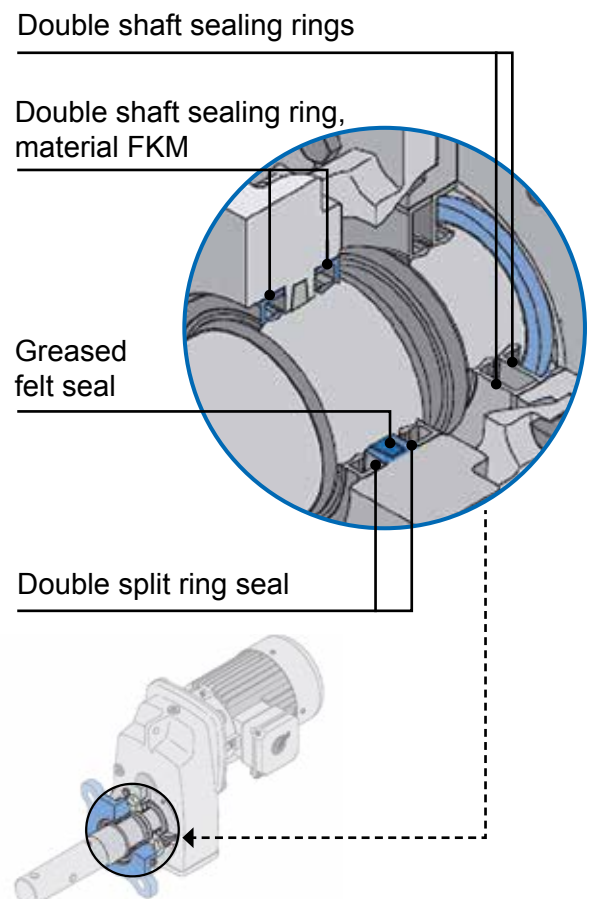
## 1.7 Option: SCP for Screw Conveyors

In screw conveyors, the output shaft of the gear unit often comes into contact with the materials which are being conveyed. Here, the conveyed material is literally forced against the seal of the output shaft. To cater for these special requirements, the option SCP "Screw Conveyor" was specially developed for the US American market.

The option SCP "Screw Conveyor" is available for:

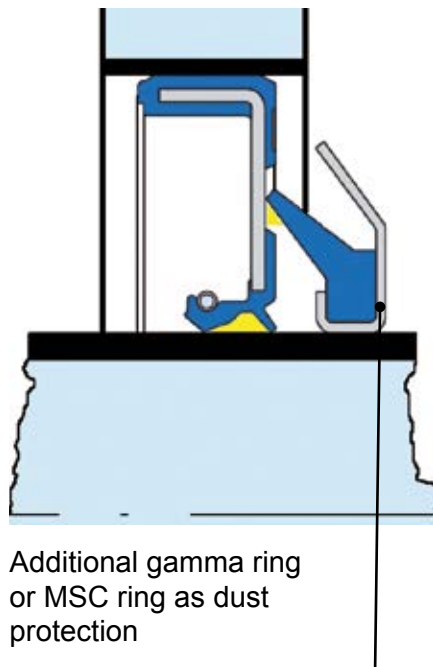
- Parallel shaft gear units in the sizes SK 1282.1 up to 6382
- Bevel gear units in the sizes SK 9012.1 up to 9053.1

The characteristic feature of the parallel shaft gear unit for screw conveyors is an output flange in which several different seals are integrated to protect the actual oil seal of the gear unit. If the conveyed material overcomes the two outer FKM shaft sealing rings, the felt ring and the two gap seals, it is still unlikely that it will reach the double oil sealing rings of the output shaft, as the material can fall downwards out of the flange. Result: The shaft seal is securely protected against the conveyed material.



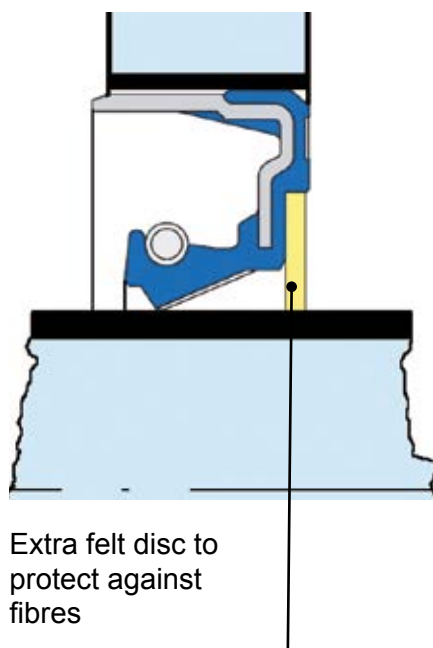
# OUTPUT SHAFT SEALS FOR GEAR UNITS

## 2. SPECIAL VERSIONS



### 2.1 Additional axial gamma ring for moderately dusty conditions

Additional protection against dust is provided by a gamma ring or MSC ring with an extra sealing lip that rubs axially against the outer face of the shaft sealing ring. The gamma ring or MSC ring does not rotate on the output shaft and is an addition to the sealing system. For this, the length of the output shaft is slightly increased. This special version is possible for many types of gear unit. Please contact us.



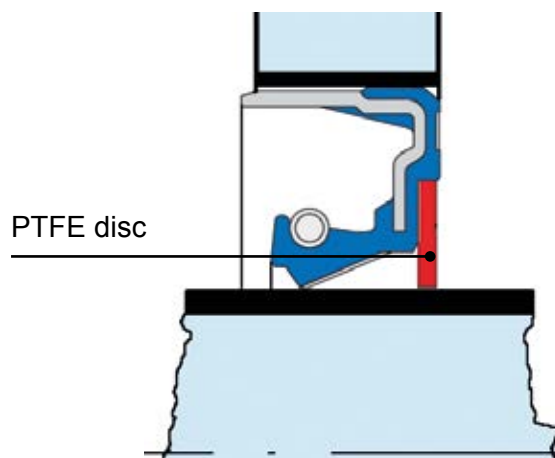
### 2.2 Extra felt disc for especial protection against textile fibres

Fibres, in particular textile fibres and fluff, can disturb a sealing system. If for example a fibre becomes trapped in the sealing ring, it may cause a temporary leak. A fixed felt disc which is glued to the outside of the shaft sealing ring has proved to be a particularly effective protection against fibres. This special version is possible for many types of gear unit. Please contact us.



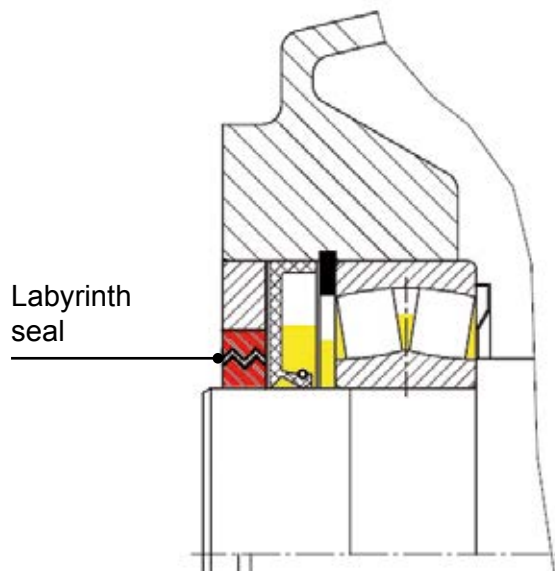
### 2.3 Additional PTFE- disc for chemicals

PTFE discs are used if the output shaft comes into temporary contact with aggressive chemicals (e.g. during cleaning). For output shafts on which 2 shaft sealing rings are possible, the outer shaft sealing ring can be replaced with a PTFE ring. This special version is possible for many types of gear unit. Please contact us.



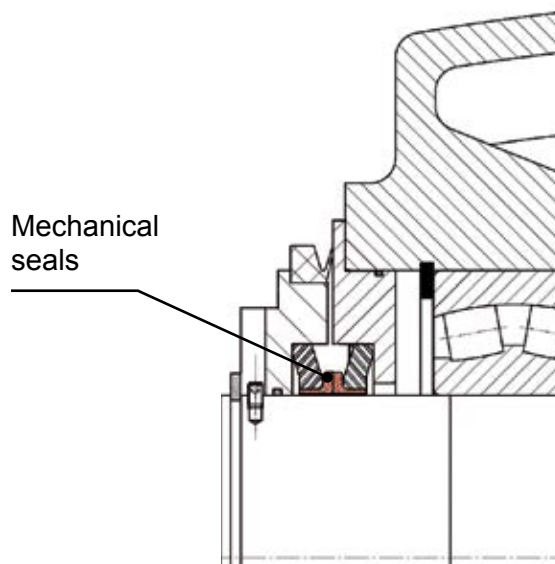
### 2.4 Labyrinth seals for moderate dust and splashed water

A non-lubricated labyrinth seal may be a good solution in cases where the amount of dust is not sufficient to justify the greater expense of a Taconite sealing system. These maintenance-free labyrinth seals can often be installed without dimension changes, in place of the outer shaft sealing ring for gear units which enable a double shaft sealing ring. Please contact us.



### 2.5 Mechanical seals for aggressive ambient media

Mechanical seals are used if the sealing area of the output shaft often comes into contact with aggressive and dirty liquids. Mechanical seals have proved to be very effective in the field of waste water. It should be noted that due to their function, mechanical seals have a slight leakage of oil in normal operation and are therefore not completely leak-proof. Mechanical seals can even be used below an outer liquid surface. In this case, care must be taken that the hydrostatic pressure in the gear unit is always greater than the outside pressure, so that no foreign materials can penetrate into the gear unit. This special version is possible for many types of gear unit. Please contact us.



# DER ANTRIEB

**Reliable. Versatile. Global.**



**NORD  
4.0  
READY!**



## **GEAR UNITS**

- Strong bearings
- High corrosion protection

## **MOTORS**

- High efficiency
- Global standards

## **INVERTERS**

- Compact design
- Easy commissioning



**Headquarters and technology centre near Hamburg**

Mechanical products	Electrical products	Electronic products
---------------------	---------------------	---------------------

**Gear units**



**Motors**



**Frequency inverters, motor starters and field distributors**



**Innovative drive solutions** for more than 100 branches of industry



**Gear unit production**



**Motor production**



**Inverter production**

**7 production locations with cutting edge technology** produce gear units, motors, frequency inverters etc., from a single source – even for complex drive systems



The map shown above is for information only and does not claim to be created or applicable to any legal purpose. For this reason, we do not assume any liability for legality, correctness and completeness.

**Subsidiaries and sales partners in 98 countries on 5 continents** provide local stocks, assembly centres, technical support and customer service.



**More than 3,900 employees throughout the world** create customised solutions

## **NORD DRIVESYSTEMS Group**

**Headquarters and technology centre**  
in Bargteheide near Hamburg

**Innovative drive solutions**  
for more than 100 branches of industry

**Mechanical products**  
parallel shaft, helical, bevel and worm gear units

**Electrical products**  
IE2/IE3/IE4 motors

**Electronic products**  
centralised and decentralised frequency inverters,  
motor starters, and field distributors

**7 production locations with cutting edge technology**  
for all drive components

**Subsidiaries and sales partners**  
**in 98 countries on 5 continents**  
provide local stocks, assembly centres,  
technical support and customer service.

**More than 3,900 employees throughout the world**  
create customised solutions

[www.nord.com/locator](http://www.nord.com/locator)

### **Headquarters:**

**Getriebebau NORD GmbH & Co. KG**  
Getriebebau-Nord-Str. 1, 22941 Bargteheide, Germany  
T +49 4532 2890, F +49 4532 289 2253  
[info@nord.com](mailto:info@nord.com)

**Member of the NORD DRIVESYSTEMS Group**

