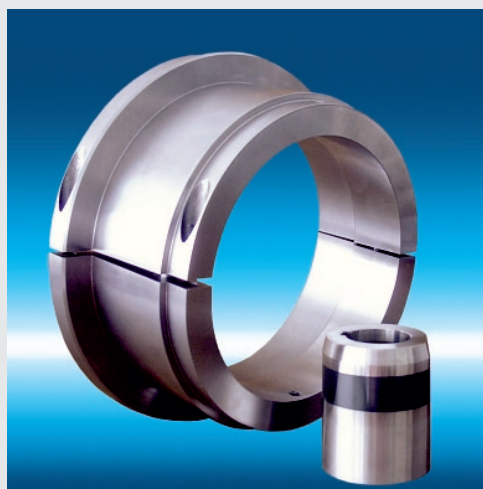


RotaSeal

Seal Systems



**High-Performance
Shaft Seals**

Chamber Shaft Seal TEDIMA RotaSeal GD-2

The shaft seal of our production range GD-2 is a shaft seal in a split case. The applied seal rings are three-piece, radially cut and are radially movable within the housing. Because of the split housing, the installation respectively dismounting is considerably simplified. Special assembly handholds make the handling of big seals much easier. Corresponding mounting threads are foreseen in the housings of bigger dimensions. The layout of the seal, the materials of both housing and seal ring can be adapted to the various operating conditions. The seal rings can be supplied in several PTFE compounds (PTFE with filler materials) as well as in various qualities of artificial carbon.

The shaft seal TEDIMA RotaSeal GD-2 is recommended for applications in fans, blowers, compressors, mixing units, centrifuges, gears, steam turbines etc. **The application field ranges from high vacuum up to pressures of 30 bar, from slowly rotating shafts up to 150 m/s sliding speed, from operating temperatures of -190°C up to 600°C, from media like pure air up to high-toxic and/or abrasive gases.**

The available materials for the seal rings are especially designed for dry running and hence do not need any additional lubrication. So to increase the leak tightness the grease barriers of various seals in the low-pressure version can be activated. Suitable grease types are listed under 'useful accessories'. In addition, synthetic PTFE grease is available, which is applicable for high chemical requirements. Activating the grease barriers, however, is merely recommendable with low pressures (up to approx. 1.5 bar and with temperatures of max. 300°C).



Shaft seals TEDIMA RotaSeal of the production line GD-2 are available in two versions as follows:

Low-Pressure Version 'ND'

Allowed pressure difference per each active seal ring from 0.6 up to 1.0 bar depending on the shaft diameter. Radial tolerance 'S' between shaft and chamber bore-hole from 2.5 up to 5.0 mm.

High-Pressure Version 'HD'

Allowed pressure difference per each efficient seal ring from 3.0 up to 5.0 bar depending on the shaft diameter. Radial tolerance 'S' between shaft and chamber bore-hole from 1.0 up to 2.0 mm.

As there is a choice of special housing materials, the shaft seal can also be supplied for EX protection category 1. For designing the seal, especially with high pressures and/or high temperatures, it is recommended to attach the completed questionnaire to the inquiry.

The production line GD-2 consists of the following types:

GDS-2	Shaft seal with barrier gas and grease barrier connection
GDA-2	Shaft seal with suction and grease barrier connection
GDK-2	Shaft seal, short design with G $\frac{1}{4}$ " connection for grease barrier
GDKS-2	Shaft seal, short design with smaller outer diameter and G $\frac{1}{2}$ " connection for barrier gas
GDKF-2	Shaft seal, short design with smaller outer diameter and G $\frac{1}{4}$ " connection for grease barrier
GDSA-2	Shaft seal with gas barrier with suction and G $\frac{1}{4}$ " connection for grease barrier

Chamber Shaft Seal

TEDIMA RotaSeal GD-5

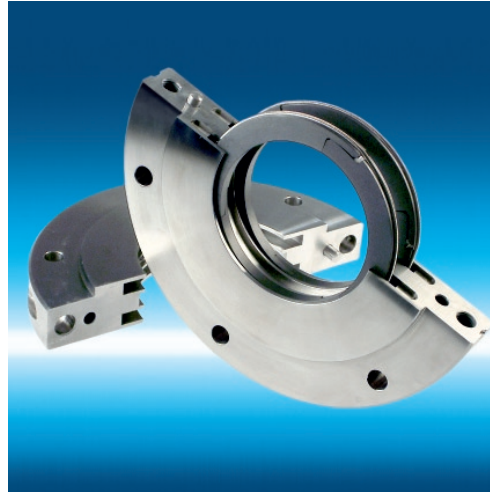
The shaft seal of our production range GD-5 is a sliding three-piece carbon seal ring for the application in blowers, agitators, dryers, stirring units, fermenters etc.

The three-piece seal elements are made from PTFE-compound or special carbon and are produced in an adjustable version, i.e. with overlapping mortised, gastight joints. By the garter spring and the existing medium/barrier gas pressure, the seal ring elements are permanently pressed to the shaft respectively the shaft sleeve. Because of the continuous sliding contact between seal ring and shaft respectively shaft sleeve, latter ones should be furnished with a wear protection. Further details are given in our brochure: Shaft Sleeves Type TWB 2.

Special characteristics:

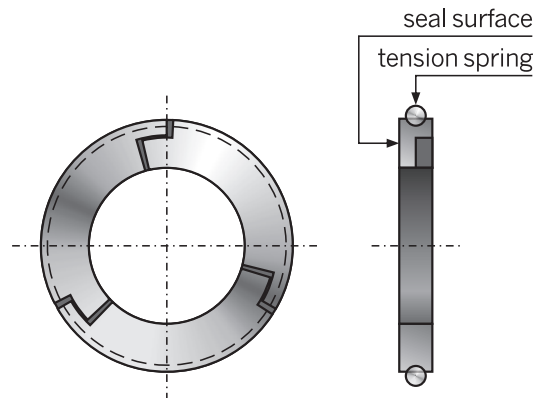
- Easy mounting and dismounting because of split housing
- Low leakage even with different operating temperatures because of adjustable seal rings

The adjustable seal rings have to be installed depending on the rotation and pressure direction. On this, please follow our installation instruction.



Technical data

Shaft diameter	45-3,500 mm
Speed	max. 40 m/s
Temperature	max. 500°C
Pressure	max. 5 bara



The production line GD-5 consists of the following types:

GDS-5	Split housing with barrier gas connection G $\frac{1}{2}$ "
GDA-5	Split housing with connection for suction G $\frac{1}{2}$ " - G1"
GDK-5	Split housing, short design, without connections for barrier gas or suction

Chamber Shaft Seal, solid version TEDIMA RotaSeal KD-3

The high-performance shaft seal RotaSeal KD-3 is an economic shaft seal. Because of its modular system, the single parts can be assembled according to the various operating conditions. Chamber, barrier gas and/or grease barrier as well as intermediate chamber are designed depending on the special operating conditions.

The respective chamber elements are solid. The shaft seal is formed by the axial screw connection of each chamber element. The chamber elements are delivered including drillings for the holder screws.

The seal elements are multi-part radially cut and are held onto the shaft by the garter spring.

The material of chamber and seal ring is chosen according to the specific operating conditions. The chamber materials are stainless steel, e.g. 1.4571, 1.4021, 1.4539 as well as special materials such as Titan, Hastelloy etc.

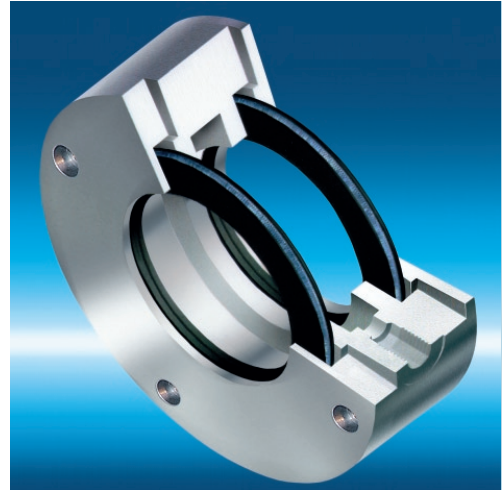
The materials for the seal elements can be a variety of PTFE compounds or several artificial carbon qualities.

The RotaSeal KD-3 series is mainly used for the seal of small or middle-sized ventilators, fans, compressors and bearing seals.

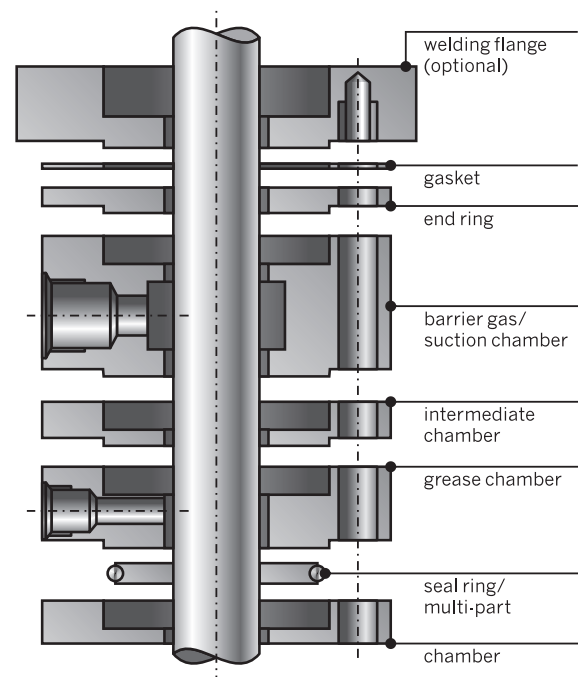
Grease chambers do increase the tightness: the grease barriers may reduce the barrier gas volume respectively the leakage by up to 90 %. Barrier gas is indispensable when solid containing media or even toxic media are to be sealed.

As in a modular system, the high-performance shaft seal RotaSeal Type KD-3 can be flexibly assembled from the above mentioned elements for several operating conditions.

The chambers are produced with drillings for the appropriate holder screws. In case of narrow installation spaces, long slots should be preferred.



The modular system: a survey of the single elements



When assembling the seal rings only those single segments with the same numbering may be assembled!

Technical data

Shaft diameter	20-250 mm
Speed	max. 120 m/s
Temperature	max. 500°C
Pressure	max. 10 bara

Chamber Shaft Seal, solid version

TEDIMA RotaSeal KD-4 HD

The shaft seal type KD-4 HD is a labyrinth seal with solid chambers and seal rings which are radially flexibly mounted.

The seal rings consist of several segments and are kept together by the garter spring. The seal rings are suitable for dry running and do not need any lubrication whatsoever.

The material of the seal ring is chosen according to the operating conditions. Standard material is T10K.

The shaft seal KD-4 HD is suitable for sealing the shaft glands of turbines, compressors etc. with subcritical and supercritical rotors.

As a wear protection for the shaft, a surface hardness of minimum 60 HRC has to be considered. If the shaft does not have the necessary surface hardness, we recommend a shaft sleeve according to our norm file TWB 2 along with wear protection of quality FMP 65/75. Special shaft sleeves according to customers' specification may as well be delivered.

When in operating condition, the multi-part seal rings made from special carbon do swim on the high turbulent and high-energy gap stream without any direct contact to the shaft. Only with increased radial movements of the shaft, e.g. when passing the critical rotary speed, a short contact between seal ring and shaft may happen. With the help of special constructive measures it was achieved that the radial movement of the seal rings stay in full function even with a differential pressure Δp of 10 bar per seal ring. Consequently, the surface pressure between ring and shaft is minimized. For these reasons, the seal gap between seal ring and shaft can be dimensioned extremely small, always depending on the different thermal expansion coefficient of the seal rings and shaft materials as well as the centrifugal force of shaft sleeves.

Compared to the rigid and contact-free labyrinth seals, the shaft seal TEDIMA KD-4 HD offers a considerably



better efficiency especially with supercritical rotors. The leakage values are reduced by up to 90 %.

The layout of a seal system of the 'HD' series is based on precise as possible details regarding maximum operating conditions and material characteristics. Hence it is necessary to have the completed design data sheet at hand with all necessary details when planning the shaft seal according to customers' inquiries and orders.

Technical data

Shaft diameter	20-300 mm
Speed	max. 150 m/s
Temperature	max. 500°C
Pressure	max. 80 bara

Chamber Shaft Seal, solid version TEDIMA RotaSeal KD-8 HD

The shaft seal type KD-8 HD is a labyrinth seal with solid chambers and seal rings which are radially flexibly mounted. It is especially adequate for the application with extremely high medium-pressure.

The one-piece seal rings consist of a temperature and pressure resistant titan enclosure with seal carbon insert. The seal rings are suitable for dry running and do not need any lubrication whatsoever. The material of the seal ring is chosen according to the operating conditions. Standard material is T10K.



The shaft seal KD-8 HD is suitable for seal the shaft glands of turbines, compressors and other high-pressure equipments with subcritical and supercritical rotors.

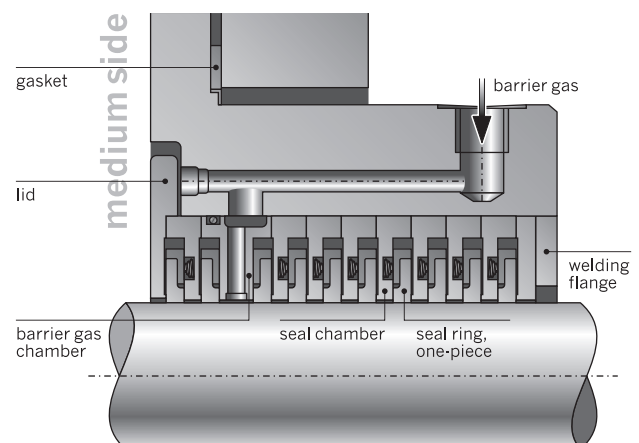
When in operating condition, the multi-part seal rings made from special carbon do swim on the high turbulent and high-energy gap stream without any direct contact to the shaft. Only with increased radial movements of the shaft, e.g. when passing the critical rotary speed, a short contact between seal ring and shaft may happen. With the help of special constructive measures it was achieved that the radial movement of the seal rings stay in full function even with a differential pressure Δp of 10 bar per seal ring. Consequently, the surface pressure between ring and shaft is minimized. For these reasons, the seal gap between seal ring and shaft can be dimensioned extremely small, always depending on the different thermal expansion coefficient of the seal rings and shaft materials as well as the centrifugal force of shaft sleeves.

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better efficiency especially with supercritical rotors. The leakage values are reduced by up to 90 %.

The layout of a seal system of the 'HD' series is based on precise as possible details regarding maximum operating conditions and material characteristics. Hence it is necessary to have the completed design data sheet at hand with all necessary details when planning the shaft seal according to customers' inquiries and orders.



Technical Data

Shaft diameter	20-300 mm
Speed	max. 150 m/s
Temperature	max. 500°C
Pressure	max. 160 bara

Shaft Sleeves

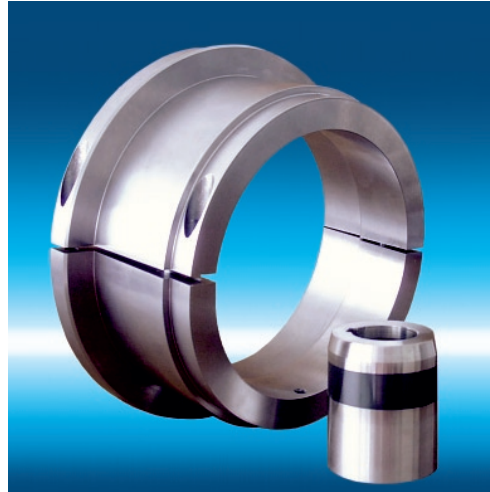
TEDIMA TWB-2

Shaft sleeves are applied in order to protect the shaft respectively the running surface of the shaft seal from damage or abrasive wear.

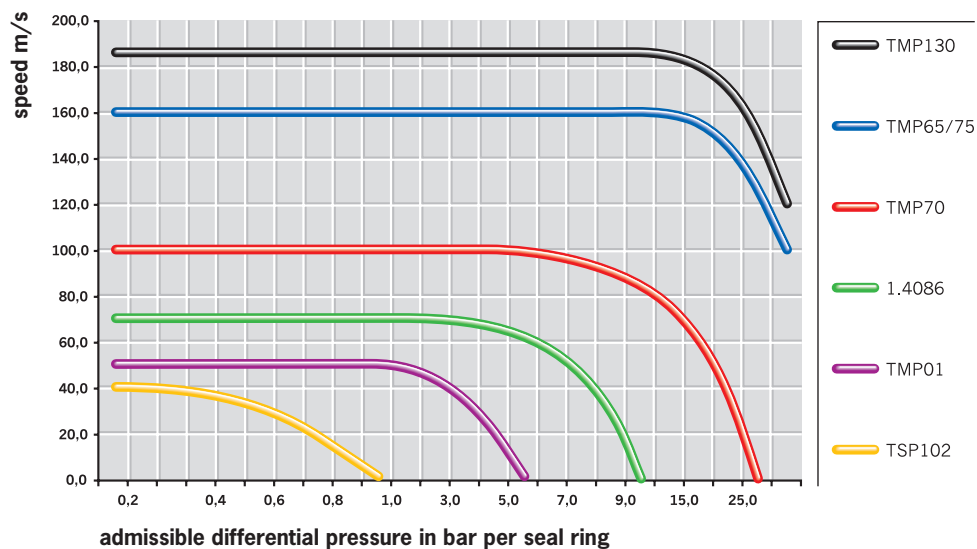
An insufficient hardness of the shaft may make the application of a shaft sleeve indispensable because for present operating conditions the appropriate surface hardness must be considered.

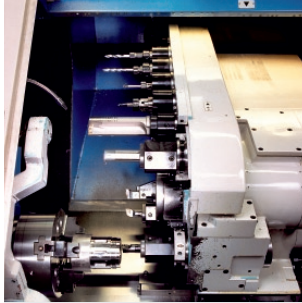
When choosing the shaft sleeve it should be noticed that the thermal expansion coefficient α of shaft and shaft sleeve are almost equal.

With the adequate choice of the shaft sleeve, the chemical resistance of a steel shaft can be improved to the level of stainless steel.



Rating chart for Shaft Sleeves TWB-2 with different surface coatings





TEDIMA

Technische Dichtungen,
Maschinen und Anlagen GmbH
P.O. Box 111365 • D-47814 Krefeld



Address: Carl-Sonnenschein-Straße 70
D-47809 Krefeld

Phone: +49 (0) 21 51 / 1 56 08 -0

Fax: +49 (0) 21 51 / 1 56 08 -25

eMail: info@tedima.de

Website: www.tedima.de