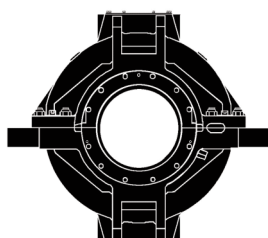


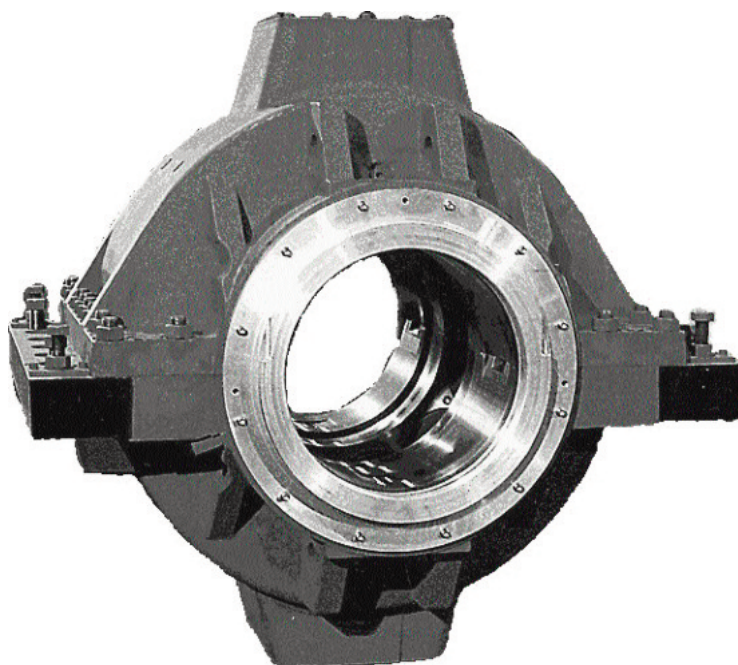
# Thrust Bearings Series D For Absorbtion Of High Axial And Radial Loads



## Thrust Bearings Type DG/DR



RENK thrust bearings type DG/DR will absorb high axial and radial loads, even shock loads, irrespective of the sense of rotation. The main feature of the bearings series D are the RS/RD thrust pads with circular working surfaces, as fully tested and proven in service in numerous applications for well over 25 years. The bearings type DR are available with natural cooling, water cooling or oil circulation lubrication, the bearings type DG are available with external oil supply only. Housings are normally of a saddle type (with support near the split line). A pedestal type of housing is also available on request (see also separate catalogue „Thrust Bearings Type DN“ - RH-1073).



# Technical Information

This publication contains all the relevant information that is needed when considering the use of thrust bearings (shaft range 180 to 600 mm diameter) for propeller shafts, turbines and pumps.

## Bearing Housing

The strong housing of the thrust bearing sizes 16 to 56 is made from a high quality cast iron (EN-GJL-300). Alternative materials, such as nodular cast iron (EN-GJS-400-18-LT), can be supplied in special cases.

## Radial Part

The radial part is normally designed as two bearing shells, in halves and has a plain cylindrical seating in the housing. The use of two shells offers the advantage of ease of assembly and alignment. Where specified, RENK thrust bearings can be supplied with only one or without shells. The shells are manufactured from steel (C 10) and have a spherical seating. They are lined with RENKmetal therm 89 or therm V6. The bearing shell bore tolerance is H7.

## Thrust Part

For application with propeller shafts, which necessitates ahead and astern movement, the bearings are supplied with 12 rigidly supported tilting RS thrust pads, mounted in a chain, divided in two halves for ease of removal. For stationary applications, such as hydrogenerators, the high thrust loads are taken by 12 elastically supported tilting RD thrust pads.

## Seals

For normal applications the thrust bearings sizes 16 to 56 are equipped with rigid seals (type 20). These seals are made of corrosion resistant aluminium alloys and correspond to protection grade IP 44. Special types of seals (e.g. air seals, or seals of

higher protection grades) are also available on request.

## Oil Supply

Bearings type DR can be operated with self-lubrication. The rotating thrust collar and the floating oil scraper combine to ensure a good supply of oil is always made available from the bearing oil sump to the working surfaces of the thrust and journal bearings. In the case of bearings type DR with external oil supply, the oil scraper provides a safe run-down should the external oil supply be interrupted.

Bearings type DG are only operated with an external oil supply and cooling system. In the DG arrangement, the oil outlet from the bearing, being positioned at the top, provides emergency lubrication for a short period of time during run-down.

## Heat Dissipation

At slow speeds or moderate loads frictional heat is dissipated by radiation and convection (natural cooling) only. Where natural cooling is insufficient, two water-cooled oil coolers can be fitted to the sump. The finned cooling tubes are made from a seawater-resistant material.

## Temperature Monitoring

For standard temperature monitoring, two commercially available thermosensors (working independently) can be used. We recommend the use of RENK resistance thermometers or RENK angle thermometers with direct reading.

## Oil Selection

Generally, any recognised brand of good quality plain mineral oil can be used as a lubricant. Please refer to our publication RH 2005, entitled „Lubricants for Slide Bearings – Recommendation“.

The necessary viscosity for each operating condition will be determined by the EDP calculations. These calculations are always carried out at the design stage. A printout of the results can be provided upon request.

## Flanged Thrust Shaft

The flanged thrust shaft which is made from forged steel and fully machined can be supplied on request. Customers who provide their own shafts should confer with RENK to agree interface dimensions,

surface finish and tolerances (size and geometrical).

## Certification

Acceptance of thrust shafts and (where applicable) the bearings can be carried out by any specified classification society.

### ① Type

- DG** centre line foot-mounted, without oil sump
- DR** centre line foot-mounted, with oil sump

### ② Heat dissipation

- N** natural cooling
- Z** lubrication by oil circulation from an external oil supply
- W** water cooling (finned tube cooler in oil sump)
- U** circulating pump and natural cooling
- T** circulating pump and water cooling (finned tube cooler in oil sump)

### ③ Radial part

- A** without radial bearing shell
- B** with radial bearing shell, in halves
- C** with two radial bearing shells, in halves

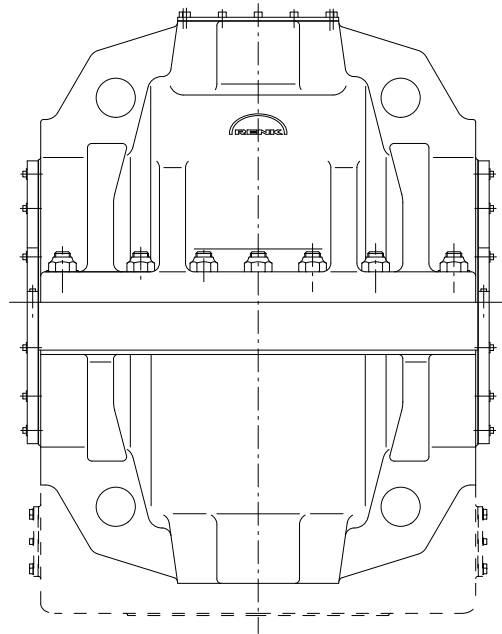
### Example

for quoting a centre line foot-mounted bearing, with oil sump, lubrication by oil circulation from an external oil supply, radial part with one radial bearing shell, size 56, shaft diameter 530 mm:

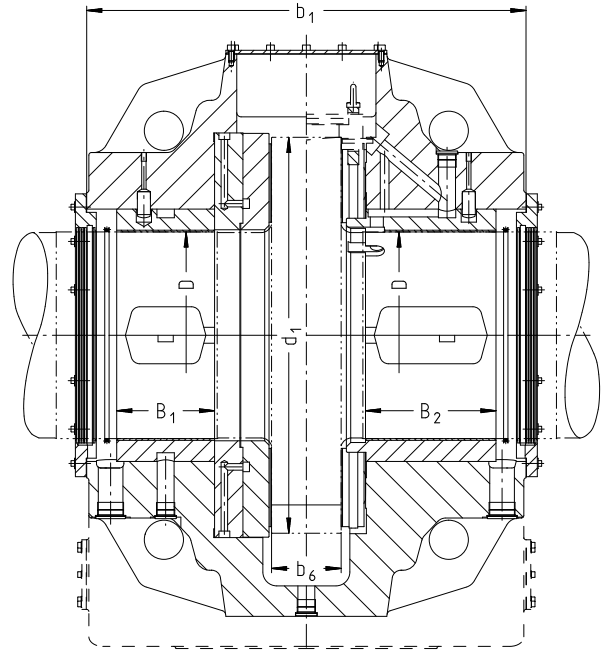
**Thrust Bearing**    ① **DR**    ② **Z**    ③ **B**    **56 - 530**

# Dimensions of Bearings

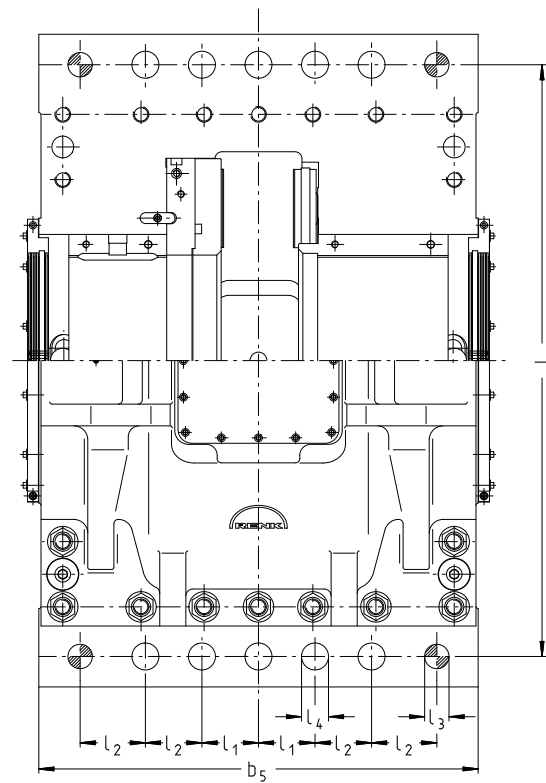
DG/R.

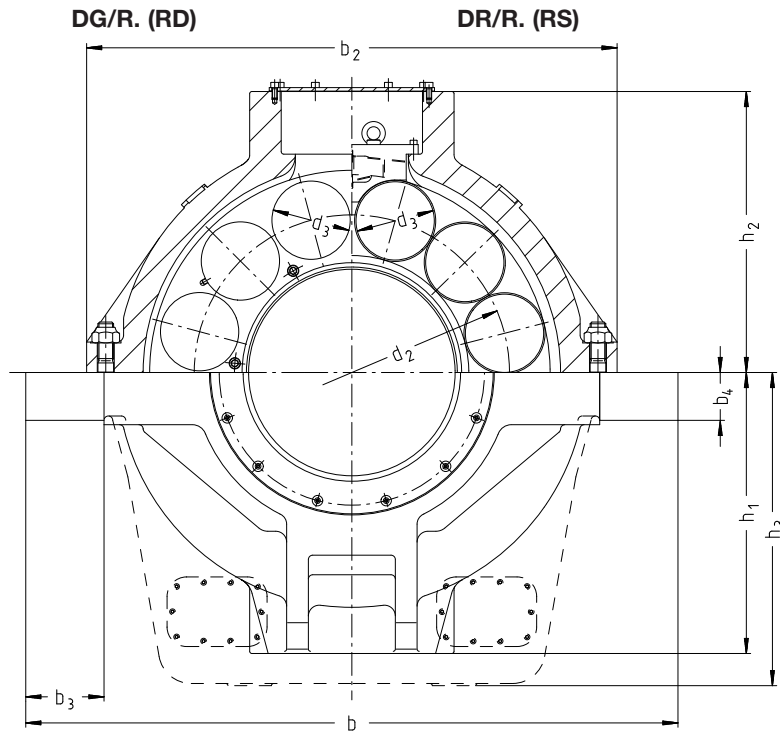


DG/R. (RD)



DG/R. (RS)





Dimensions in mm

Size <sup>1)</sup>	Shaft Ø max. D	B <sub>1</sub>	B <sub>2</sub>	b	b <sub>1</sub>	b <sub>2</sub>	b <sub>3</sub>	b <sub>4</sub>	b <sub>5</sub>	b <sub>6</sub> h <sub>8</sub>	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	h <sub>1</sub>	h <sub>2</sub>	h <sub>3</sub>	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>
16	180	80	90	595	435	480	85	45	445	56	335	267	63	220	220	335	540	52,5	50	20	23
20	225	100	120	705	540	585	85	50	540	71	425	337	80	350	350	380	650	36	68	20	23 <sup>2)</sup>
25	280	125	155	880	660	740	115	65	660	90	525	420	100	390	390	430	815	95	95	30	33
31	335	155	210	1120	790	900	170	80	790	110	645	510 515 <sup>3)</sup>	125	460	460	560	1010	115	115	42	45
35	375	175	205	1210	880	990	180	90	1110	125	720	571 575 <sup>3)</sup>	140	500	500	620	1100	145	145	42	45
40	425	200	240	1450	950	1170	210	100	1000	140	820	651 654 <sup>3)</sup>	160	550	550	670	1300	140	140	48	54
45	475	225	300	1500	1010	1220	180	110	1010	160	910 920 <sup>3)</sup>	725 735 <sup>3)</sup>	180	646	646	720	1360	130	150	56	62
50	530	250	290	1580	1080	1320	200	125	1080	180	1015	810	200	740	740	850	1450	150	150	56	62
56	600	280	300	1800	1220	1500	230	140	1220	200	1140	909	225	830	830	910	1660	170	180	64	70

<sup>1)</sup> Sizes 63, 71 and 80 upon request.

<sup>2)</sup> 6x

<sup>3)</sup> for thrust part RD

# Load Table

Load in kN

Size	D..B (RD)		D..C (RD)		D..B (RS)		D..C (RS)		F <sub>A</sub> (3)
	F <sub>R</sub> (1)	F <sub>R</sub> (2)	F <sub>R</sub> (1)	F <sub>R</sub> (2)	F <sub>R</sub> (1)	F <sub>R</sub> (2)	F <sub>R</sub> (1)	F <sub>R</sub> (2)	
16	36	57	72	114	40	65	80	130	94
20	56	90	112	180	67	108	134	216	151
25	87	140	174	280	108	174	216	348	236
31	130	208	260	416	176	281	352	562	368
35	164	262	328	524	192	307	384	614	462
40	212	340	424	680	255	408	510	816	603
45	267	427	534	854	356	570	712	1140	763
50	331	530	662	1060	384	615	768	1230	943
56	420	672	840	1344	450	720	900	1440	1193

The table serves only to select the size of DG/DR-Type bearing. Before booking an order, however, it will be necessary to carry out an EDP calculation, taking into account the reciprocal influence of operating parameters.

(1) Radial loads  $F_R$  in [kN] as permanent load (maximum value) for plain cylindrical bore without hydrostatic jacking.

(2) Radial loads  $F_R$  in [kN] as permanent load (maximum value) for plain cylindrical bore with hydrostatic jacking.

(3) Axial load  $F_A$  [kN] as maximum admissible load at start-up. During operation, this load can be increased by approx. 60%.

The values for axial load  $F_A$  [kN] are valid for all four variants of radial loads.

# Sales Organisation



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- |                |                  |                   |
|----------------|------------------|-------------------|
| Australia      | G.B. and Ireland | Norway            |
| Austria        | Hungary          | PR China          |
| Belgium        | India            | Slovak Republic   |
| Brazil         | Italy            | Slovenia Republic |
| Canada         | Japan            | South Africa      |
| Czech Republic | Liechtenstein    | South Korea       |
| Croatia        | Luxembourg       | Spain             |
| Finland        | Mexico           | Switzerland       |
| France         | Netherlands      | USA               |

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We reserve the right to changes made in the interests of technical improvement.