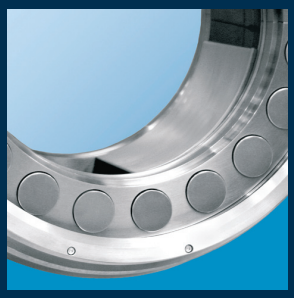
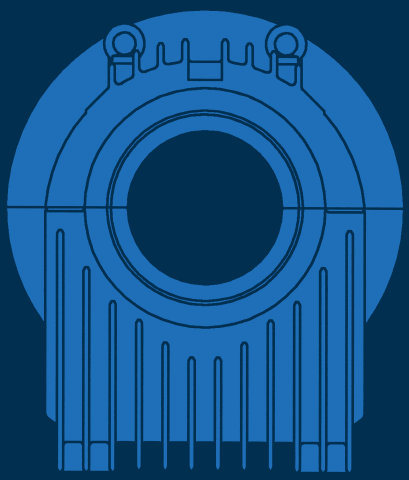




Innovative Power Transmission

Slide Bearings Type E

Series EF Journal Range 80 - 355 mm



This leaflet contains information which should be considered for the majority of applications where EF-type bearings are used with electric machines.
All the other facilities of the E-type bearing modular system will, of course, also apply to EF-type bearings:
e.g. bearing shells with two- or four-lobe bore, with journal tilting pads or RD thrust pads. Relevant details will be found in the main catalogue on "RENK Slide Bearings Type E".

All parts of the variants mentioned in this leaflet are available from stock.

Bearing Housing

The finned EF-type housings are made from a high-quality cast iron (EN-GJL-300) and are designed for heavy duty performance. Other materials such as, for instance, nodular cast iron EN-GJS-400-15 or cast steel GS 45 can be supplied by special arrangement.

Bearing Shell

The shells are spherically seated in the housing. They consist of a supporting steel body lined with lead based RENKmetal therm 89/V6. Both design and manufacture are in accordance with the highest standards required in heavy engineering: trouble-free assembly and long life even under severe operating conditions.

EF-type bearings are mostly equipped with shells with plain cylindrical bore and lubricating oil ring. Shells are available either for self-contained operation (E.NL.) or prepared for external oil circulation (E.ZL.).

Apart from bearings without thrust parts (type...Q) there are shells with plain white-metal lined shoulders (type...B) to absorb limited noncontinuous axial loads, as well as shells with built-in taper land faces (type...K) which will absorb medium axial loads. Alternatively the taper land faces can be supplied suitable for only one sense of rotation (type…E) to absorb high axial loads.

Seals

EF-type bearings with floating labyrinth seals (type 10) are used for standard applications. They consist of a fibre-reinforced, highly heat resistant material RENKplastic therm P 50, and are not subject to wear. This seal conforms to protection grade IP 44. Higher protection grades (up to IP 56) can be fitted under the modular system.

To protect machines fitted with EF-type bearings against any interference from inside (e.g. vacuum or strong air circulation), EF-type bearings should be used generally only with additional "machine seals". Such seals are fitted to the inside of the machine end shield forming a sealing gap with the shaft.

RENK Hannover can supply a machine seal (made of a non-corrosive alloy). Optionally the air-tightness of this machine seal can be improved by inserting a hemp tallow packing in the standard circumferential groove of the seal.

The space between housing and machine seal is connected to atmosphere so that no vacuum or strong air turbulence can occur at the internal bearing seal.

Oil Supply

Self-lubrication by means of a loose oil ring for peripheral shaft speeds up to 20 m/s. The lubricating oil delivered to the internal perimeter is transferred by the loose oil ring directly to the shaft. Where bearings are lubricated by oil circulation systems, loose oil rings can be used with peripheral shaft speeds of up to 26 m/s to permit emergency shut-down without damage. Loose oil rings can also be used for marine applications. In this case additional guide bushes are built into the shells.

Electrical Insulation

As protection against stray currents conducted by the shaft, EF-type bearings can also be supplied in insulated version. To do so, the spherical bearing shell seating within the housing is electrically insulated by using a plastic shell firmly stuck to the housing or an insulating foil. All EF-type bearing housings "with spherical insulation" are availble from stock.

Heat dissipation

Frictional heat is often dissipated merely by radiation and convection only: "natural cooling". Depending on the shaft diameter, speeds of up to 3600 min^{-1} are admissible.

Because of their advanced design, EF-type bearings with natural cooling can now be used for a wide range of applications.

Oil coolers (with seawater-resistant finned cooler tubes) incorporated in the oil sump can be used in addition. Dimensions on request. EF-type bearing housings are generally suitable for connection to an oil circulating system.

In such case the oil level in the housing is defined by the weir in the oil outlet pipe of our supply.

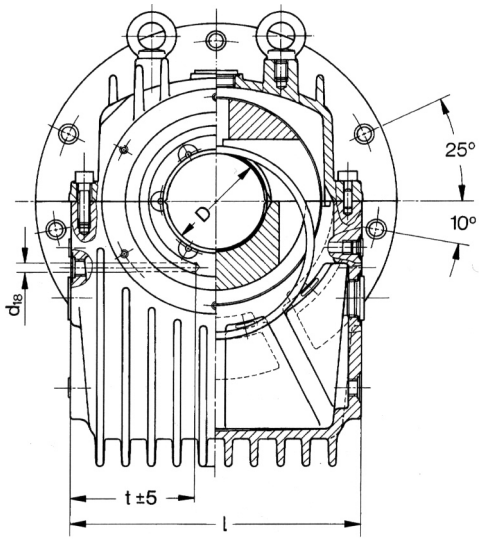
Temperature Control

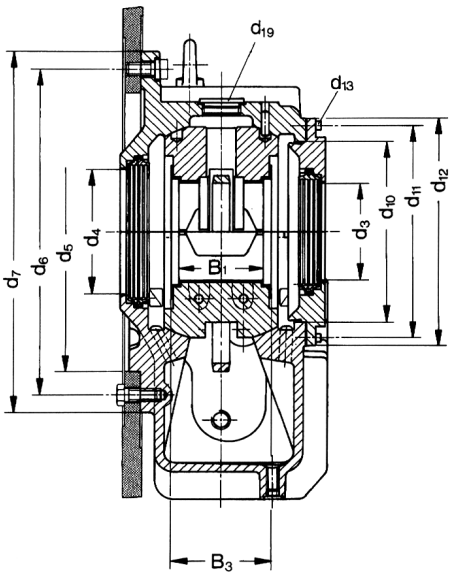
Two independent thermosensors which are commercially available can be used for temperature control. We recommend the use of RENK resistance thermo-meters or RENK angle thermometers for direct visual control.

Oil Selection

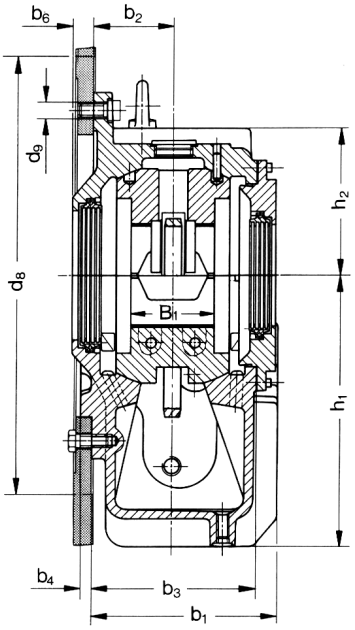
Generally any branded mineral oil of low foaming tendency and good resistance to ageing can be used as a lubricant. The correct viscosity for each operating condition should be checked by EDP calculation. Such calculations are carried out at the design stage. A printout of the results computed can be provided on request.

Dimensions of Bearings (DIN 31 694)

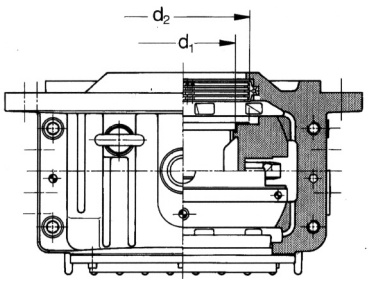




EF. LB
EF. LK
EF. LE



EF. LQ



d_{14} = oil inlet if connected to oil circulating system or circulating pump
d_{15} = thermometer connection
d_{16} = oil level or oil outlet if connected to oil circulating system
d_{17} = screw plug for oil sump thermometer, suction line of circulating pump connection of heater (or modified for finned tube oil cooler optionally)

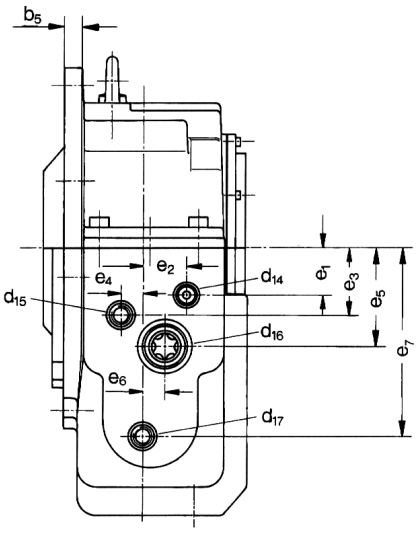
From bearing size 14 larger bore diameters are possible (information upon request).

Dimensions in mm

Size	D	B_1	B_3	b_1	b_2	b_3	b_4	b_5	b_6	b_{19}	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8[2]	d_9	d_{10}	d_{11}
	80	61,4									86	110									
9	90	61,4	80	162	70	140	14	12	23	215	96	120	80/90/100/110	100	280	310	340	420	14	150	170
	100	65	-0,22								106	130									
	100	81,4									108	135									
11	110	81,4	100	192	80	165	15	17	29	235	118	150	100/110/125/140	125	315	350	380	460	14	180	195
	125	85	-0,22								133	160									
	125	105,4									135	170		160							
	140	105,4									150	190		160							
14	160	106,4	125	232	100	205	16	23	26	285	170	200	125/140/160/180	160	355	415	460	550	18	230	270
	180[1]	106,4	-0,22								190	220		180							
	160	135,7									172	215		200							
	180	135,7									192	240		200							
18	200	140,4	160	273	116	241	18	25	31	315	212	250	160/180/200/225	200	400	490	540	640	22	275	320
	225[1]	140,4	-0,22								237	275		225							
	200	168,5									214	265		250							
	225	168,5									239	290		250							
22	250	175,7	200	354	150	314	20	37	32	395	264	315	200/225/250/280/300	250	500	620	680	785	26	340	380
	280[1]	175,7	-0,22								294	345		280							
	300[1]	175,7									310	345		300							
	250	213,2									266	325		315							
	280	213,2									296	355		315							
28	300	218,5	250	414	170	365	30	42	43	475	316	375	250/280/300/315/355	315	600	770	850	970	33	440	500
	315	218,5	-0,24								331	390		315							
	335	218,5									351	410		355							
	355	218,5									371	430		355							

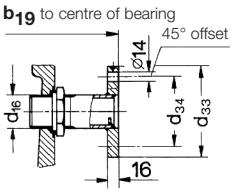
[1] Available only with shells B and Q.

[2] Diameter of finished surface of machine end shield.



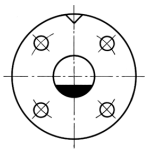
① Type	E	
② Housing	M =	centrally flange-mounted
③ Heat dissipation	N =	natural cooling
	Z =	lubrication by oil circulation with external oil cooling
	X =	lubrication by oil circulation with external oil cooling for high oil throughput
	W =	water cooling (finned tube cooler in oil sump)
	U =	circulating pump and natural cooling
	T =	circulating pump and water cooling
④ Shape of bore and type of lubrication*)	L =	plain cylindrical bore, with loose oil ring lubrication
⑤ Thrust surface*)	Q =	without thrust parts (non-locating bearing)
	B =	plain sliding surfaces (locating bearing)
	K =	taper land faces for both senses of rotation (locating bearing)
	E =	taper land faces for one sense of rotation (locating bearing)

*) = if not mentioned see main catalogue, details on request



flange DIN 2573 oil outlet

As for bearing types E.ZL., the oil outlet with weir is to be mounted horizontally at the bottom. The mark at the flange will then be visible centrally at the top.



Example

for quoting a slide bearing type EF, lubrication by oil circulation with external oil cooling, cylindrical bore with loose oil ring lubrication (for emergency operation), thrust part with taper land faces, size 14, shaft diameter 125 mm:

① ② ③ ④ ⑤

Slide bearing E F Z L K 14-125

The indicated weights are average values (not binding).
The drawings are not strictly binding.

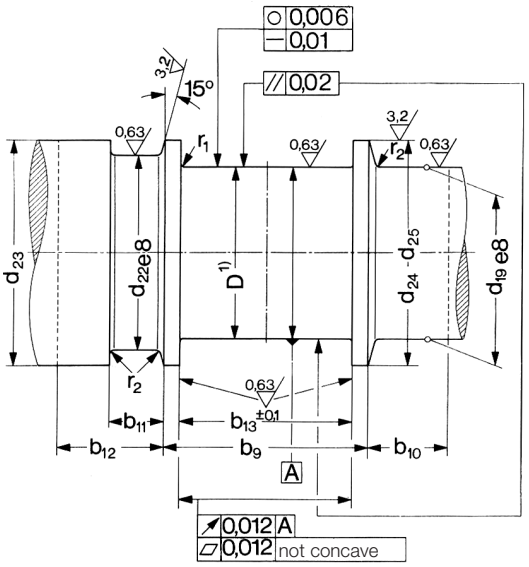
d_{12}	d_{13}	d_{14}	d_{16}	d_{18}	d_{19}	d_{33}	d_{34}	e_1	e_2	e_3	e_4	e_5	e_6	e_7	h_1	h_2	l	$t^{1)}$	weight [kg]	oil quantity [litres]
190	6 x M6	G 3/8	G 1 1/4	11	G1	120	90	35	35,5	60	20	85	22,5	175	250	130	270	115 115 115	46	2,8
215	6 x M6	G 3/8	G 1 1/4	11	G1	120	90	40	42	70	22,5	100	22,5	195	280	145	310	135 135 127	74	4,7
290	6 x M6	G 3/8	G 1 1/2	11	G1 1/2	130	100	60	55	85	27,5	125	27,5	240	340	185	370	165 165 145 125	125	8
340	8 x M8	G 1/2	G 1 1/2	13	G2	130	100	70	68	105	30	155	30	270	400	225	440	197 197 175 150	200	13
400	8 x M8	G 3/4	G 2	13	G2	140	110	80	83	135	40	175	40	350	450	275	550	252 252 238 192 177	430	21
525	8 x M8	G 3/4	G 2 1/2	13	G2	160	130	95	106	155	50	220	50	400	500	325	690	322 322 272 267 242 229	770	34

All connection tap-holes in housing are no longer mirror inverted but in-line on both sides.

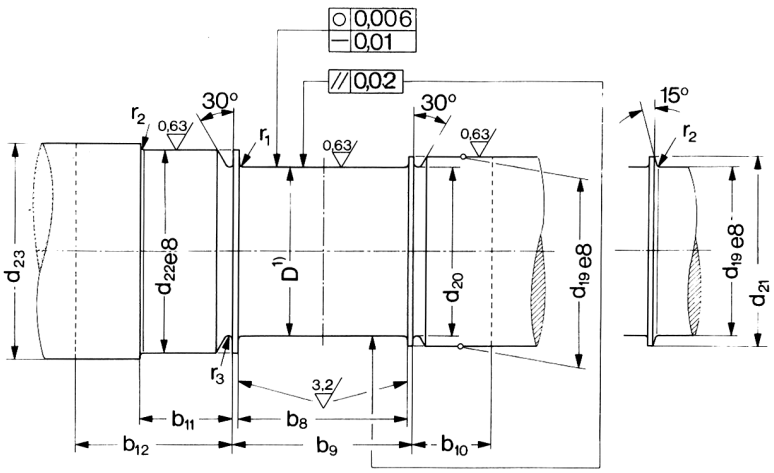
G = B.S.P.

Shaft Dimensions

Locating bearing
Type of bearing shell E...B
E...K
E...E



Non-locating bearing
Type of bearing shell E...Q



chamfered edges 0,5 x 45°
surface condition DIN ISO 1302

Dimensions in mm

Size	D[1]	b_8[2]	b_9	b_{10}	b_{11}	b_{12}	b_{13}[3]	$\frac{d_{19}}{d_{20}}$					d_{21}	d_{22}	d_{23}[4]	d_{24}	d_{25}	r_1	r_2	r_3
9	80 90 100	90	100	55	60	95	80,4	$\frac{80}{-}$	$\frac{90}{80}$	$\frac{100}{90}$	$\frac{110}{100}$		90 100 110	100	110 120 130	110 120 130	132 142 143	2,5	4	1,6
11	100 110 125	110	120	50	55	105	100,4	$\frac{100}{-}$	$\frac{110}{100}$	$\frac{125}{110}$	$\frac{140}{125}$		110 125 140	125	135 150 160	135 150 160	157 162 168	2,5	4	1,6
14	125 140 160 180	140	150	60	60	115	125,4	$\frac{125}{-}$	$\frac{140}{125}$	$\frac{160}{140}$	$\frac{180}{160}$		140 160 180 200	160 160 160 180	170 190 200 220	170 190 200 220	192 207 217 –	4	6	2,5
18	160 180 200 225	180	188	60	65	120	160,4	$\frac{160}{-}$	$\frac{180}{160}$	$\frac{200}{180}$	$\frac{225}{200}$		180 200 225 250	200 200 200 225	215 240 250 275	215 240 250 275	244 264 273 –	4	6	2,5
22	200 225 250 280 300	220	240	70	70	135	200,4	$\frac{200}{-}$	$\frac{225}{200}$	$\frac{250}{225}$	$\frac{280}{250}$		225 250 280 315 330	250 250 250 280 300	265 290 315 345 345	265 290 315 345 345	308 328 339 – –	6	10	4
28	250 280 300 315 335 355	280	296	70	75	140	250,4	$\frac{250}{-}$	$\frac{280}{250}$	$\frac{300}{280}$	$\frac{315}{280}$	$\frac{(335)}{315}$[5]	$\frac{355}{335}$	280 310 330 345 365 385	315 315 315 315 355 355	325 355 375 390 430 430	325 355 375 390 410 430	378 408 408 423 – –	6	10	6

1) For shaft tolerances see “Manual for the application of RENK slide bearings“.

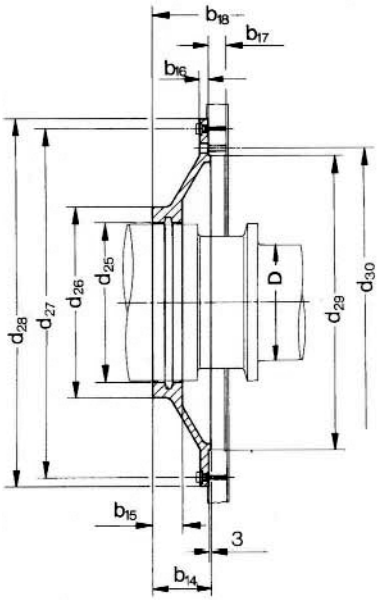
2) Where a non-locating bearing is to permit greater axial movement (e. g. to allow for thermal expansion), the distance b_8 between the collars may be increased.

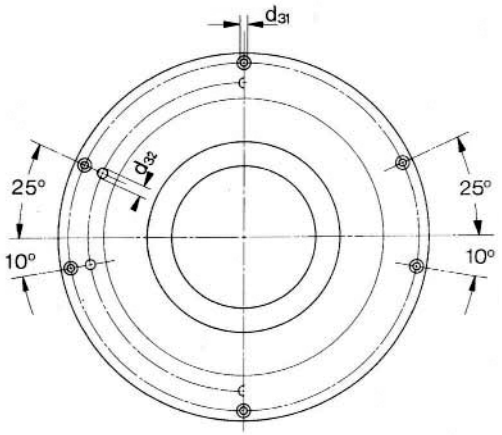
3) The normal axial clearance is 0,5 mm. When directional changes of thrust loads or where axial shocks are to be anticipated, the dimensions b_{13} may be reduced by a further 0.3 mm.
Where a locating bearing is only required for a test run, the dimension b_{13} can be increased by 3...6 mm.

4) All diameters d_{23} are for standard machine seals and are valid for each shaft diameter D. In case of rigid seals dimensions on request.

Tolerances of form and position to DIN 31 699.
Degree of accuracy B 10 (radial). Degree of accuracy B 20 (axial); others upon request.
General tolerance DIN 7168 mS.

5) Rigid seal





Also available in split design.

Dimensions in mm

Size	D	b_{14}	b_{15}	b_{16}	b_{17} [1]	d_{25} [2]	d_{26}	d_{27}	d_{28}	d_{29}	d_{30}	d_{31}	d_{32}	weight [kg]
	80					111,5								
9	90	60	35	10	21	121,5	160	360	380	280	310	7	14	4,5
	100					131,5								
	100					136,5								
11	110	65	35	10	21	151,5	180	400	420	315	350	7	14	5
	125					161,5								
	125					171,5								
14	140	70	35	10	21	191,5	230	375	395	355	–	7	–	4,8
	160					201,5								
	160					216,5								
18	180	75	40	10	26	241,5	290	430	460	400	–	10	–	6,5
	200					251,5								
	200					266,5								
22	225	80	45	10	28	291,5	390	535	570	500	–	10	–	10
	250					316,5								
	250					326,5								
28	280	85	50	10	36	356,5	450	640	680	600	–	10	–	15
	300					376,5								

1) Min. recommend value
2) Min. inner diameter of the machine seal depends on the diameter of collars for locating bearings due to non split design.

RENK AKTIENGESELLSCHAFT

Werk Hannover
Weltausstellungsallee 21
30539 Hannover
Germany
Phone: + 49 (5 11) 86 01-0
Fax: + 49 (5 11) 86 01-182
Email: info.hannover@renk.biz
www.renk.eu

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