

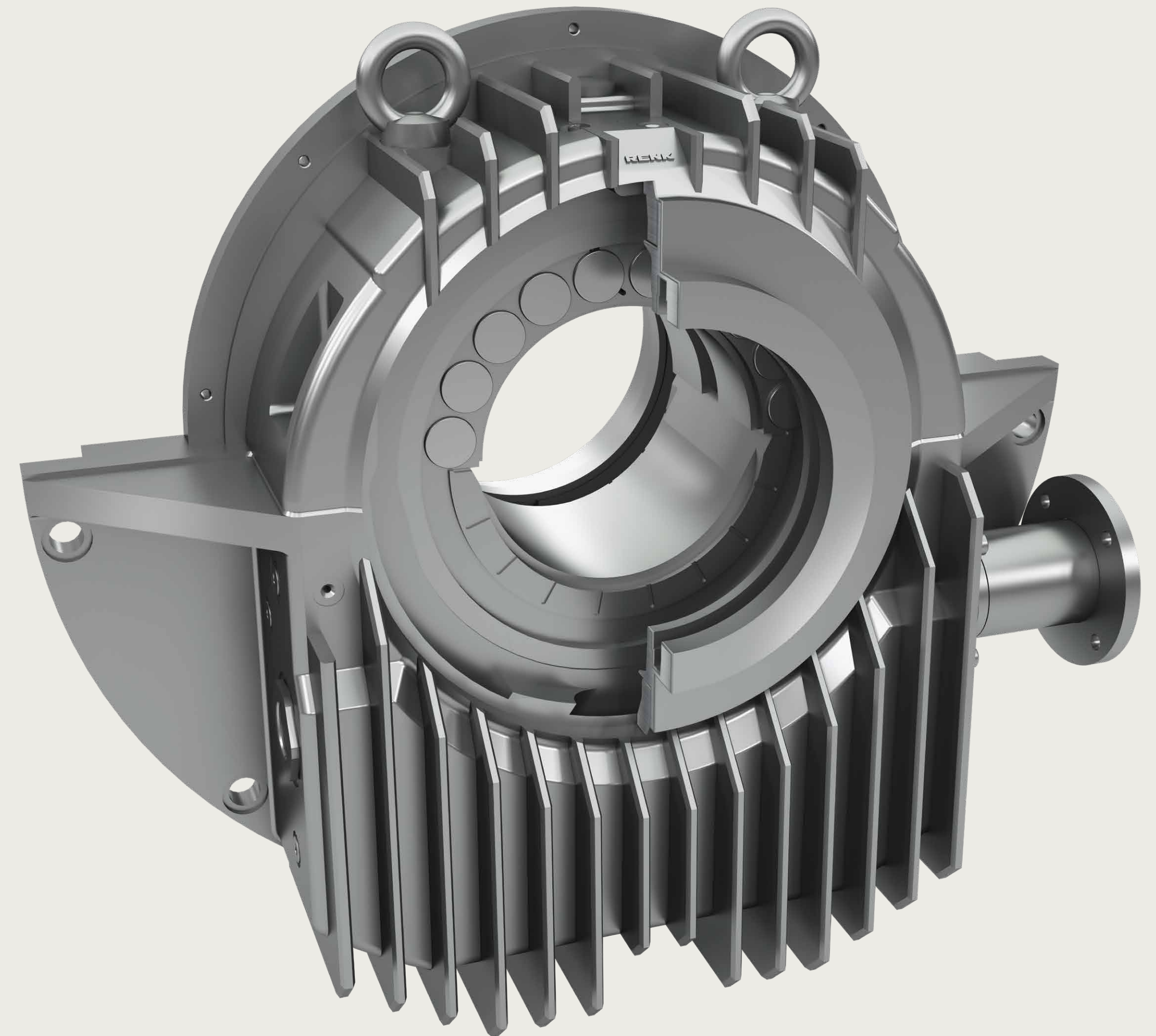
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RENK

SLIDE BEARING SOLUTIONS

Slide Bearings Type E – series EM journal range 80–355 mm

RH1046





Technical Information

This leaflet provides essential guidelines for most applications using EM-type bearings with electric machines. The full modular systems of the EM-type bearing is available, including options like two- or four-lobe bores, journal titling pads, and RD thrust pads (additional details available upon request). Many components for the list variants are stocked for quick availability.

Bearing Housing

The finned EM-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- 400-18-LT can be supplied by special arrangement. Tapped holes for thermometer, oil inlet and outlet, oil sight glass, thermometer in the oil sump or suction line of a circulating pump are available on either side. For special cases (e. g. fitting of oil coolers or vibration detectors) finish machined housings are taken from stock and provided with additional connection holes.

Bearing Shells

The shells are spherically seated in the housing. They consist of a supporting steel body lined with TIN based RENKmetal therm 89. 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. Depending on the operational parameters and performance, other white metals such as therm81ag are available. EM-type bearings are mostly equipped with shells with plain cylindrical bore and loose 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 non-continuous axial loads, as well as shells with built-in taper land faces (type...K) which will absorb medium axial loads.

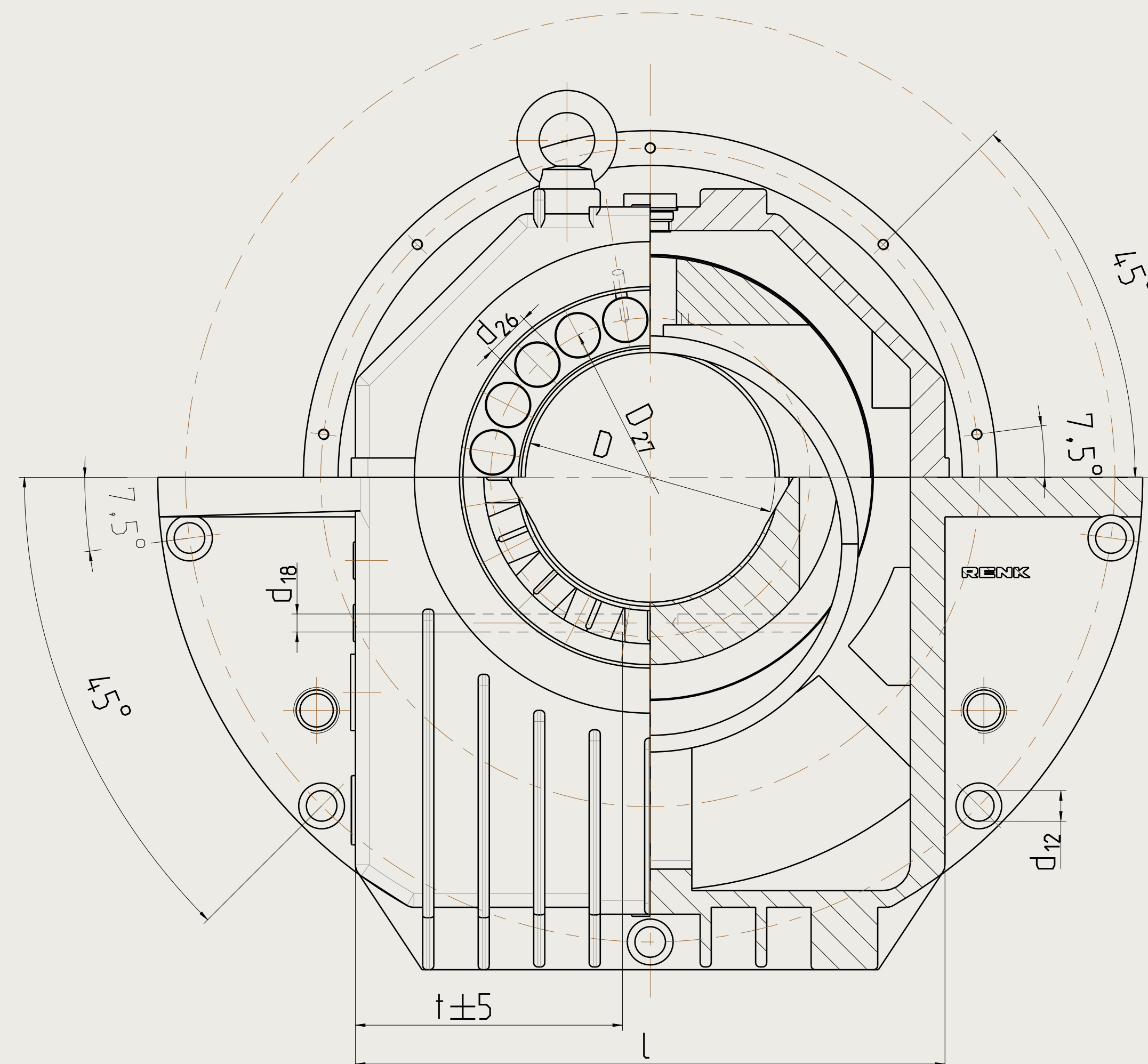
Thrust loads of a medium size are absorbed by taper land faces integral with the shoulders and suitable for one sense of rotation (type...E). High thrust loads can be taken by tilting RD thrust pads (type...A). In addition to the oil film, the cup springs supporting the RD thrust pads have damping properties and intercept shocks elastically. This design requires lubrication by circulating oil, e. g. the use of an oil pump.

Seals

EM-type bearings with floating labyrinth seals, known as type 10, are suitable for standard applications and meet the IP44 protection grade, which provides a level of resistance against dust and splashing water. However, if you need higher protection, you can select additional options with the EM modular system.

To ensure that these bearing are well-protected against any internal conditions that might affect performance, such as vacuum environment, or strong air moment, EM-type bearings also come with „machine seals“. Made from non-corrosive allow: these machine seals attached directly to the bearing housing and create a sealing gap with the shaft, adding an extra layer of protection.

To enhance functionality, the space between the bearing housing and the machine seal is vented to the atmosphere through two hoses. For sizes 22 and 28, casting balancing ports are included to maintain balance and compliant with API standards. If additional airtightness is needed, seal packing can be inserted into the standard circumferential groove (type HG), or two gap seals (type SG) can be used. All seals, aside from rigid options, are made from high performance, heat-resistant plastic to ensure durability and reliability in demanding conditions.





Technical Information

Oil Supply

Self-lubrication by means of a loose oil ring for peripheral shaft speeds up to 20 m/s is possible. 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. Loose oil rings can also be used for marine applications. In this case additional guide bushes are built into the shells (details on request).

Electrical Insulation

As a protection against stray currents conducted by the shaft, EM-type bearings can also be supplied in insulated versions. To do so, the spherical bearing shell seating within the housing is electrically insulated by using a plastic layer or an insulating foil. All EM-type bearing housings “with spherical insulation” are available from stock.

Heat dissipation

To enhance functionality, the space between the bearing housing and the machine seal is vented to the atmosphere through two hoses. For sizes 22 and 28, casting balancing ports are included to maintain balance and compliant with API standards. If additional airtightness is needed, seal packing can be inserted into the standard circumferential groove (type HG), or two gap seals (type SG) can be used. All seals, aside from rigid options, are made from high performance, heat-resistant plastic to ensure durability and reliability in demanding conditions.

Temperature Control

Two independent commercially available thermosensors can be used for temperature control. We recommend the use of RENK resistance thermometers.

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.

1 Type

E

2 Housing

M centrally flange -mounted

3 Heat dissipation

N natural cooling

Z lubrication by oil circulation from an external oil supply

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 guide bearing (locating bearing)

K taper land faces for both senses of rotation (locating bearing)

E taper land faces for one sense of rotation (locating bearing)

A elastically supported circular tilting pads (locating bearing)

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

Example

for quoting a slide bearing EM-type, 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:



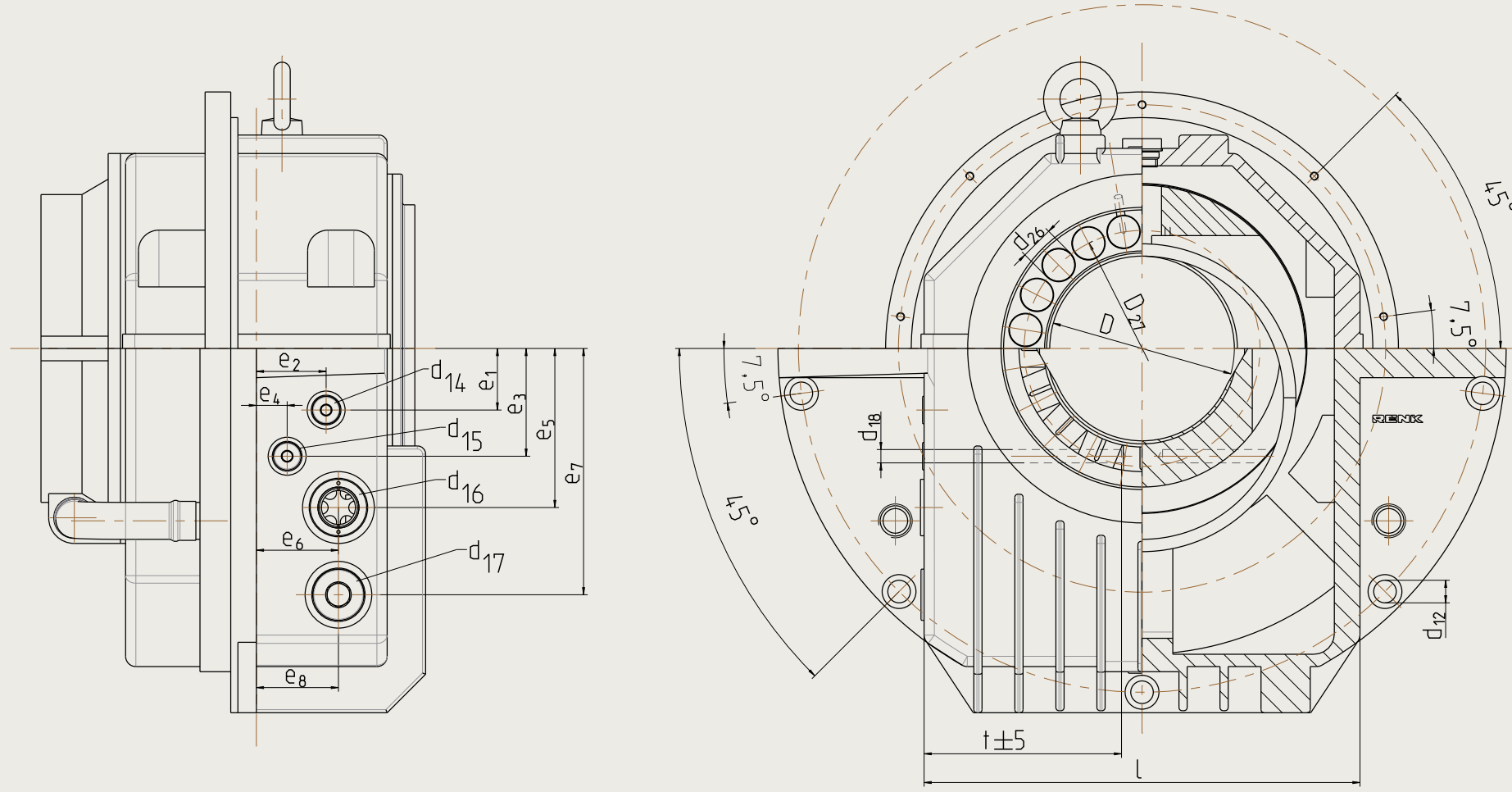
Slide Bearings Type E M Z L K 14-125

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

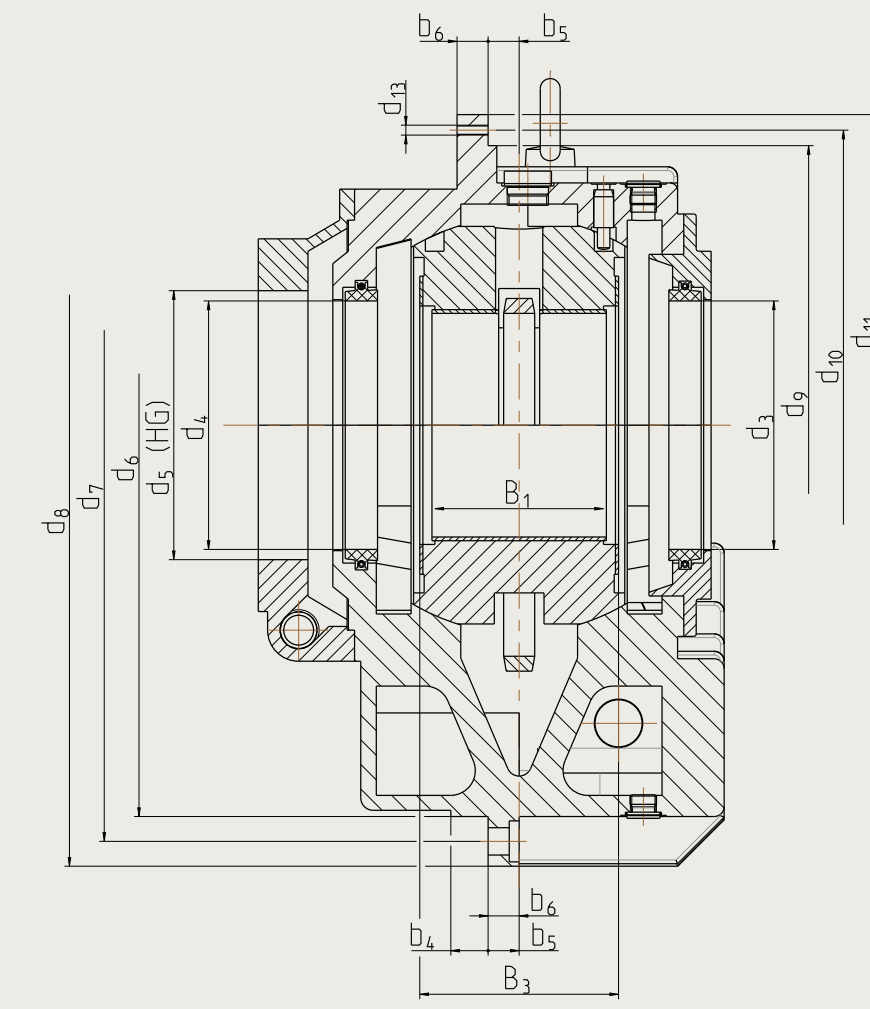
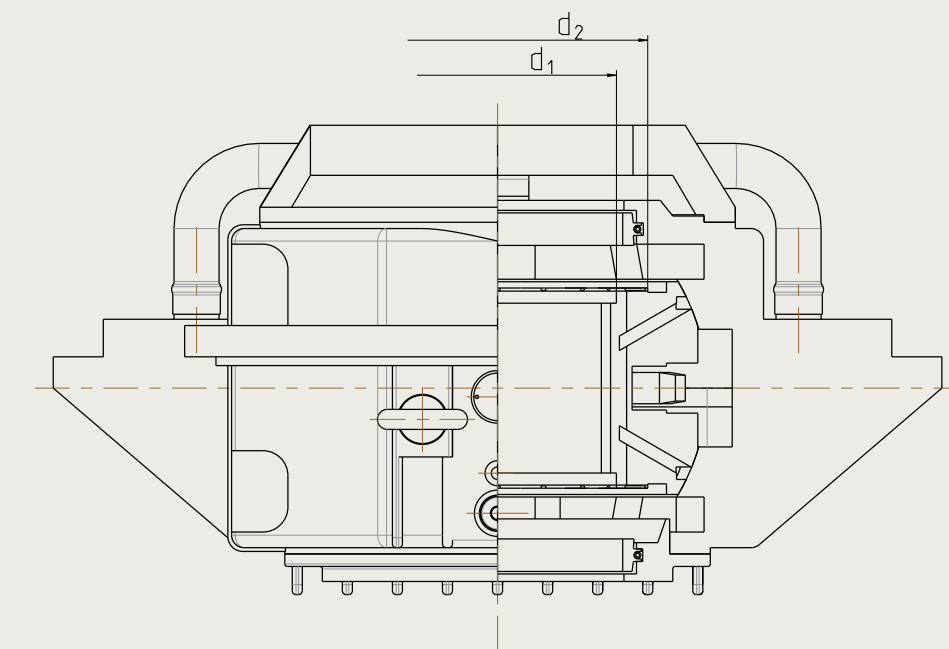


Dimensions of Bearings

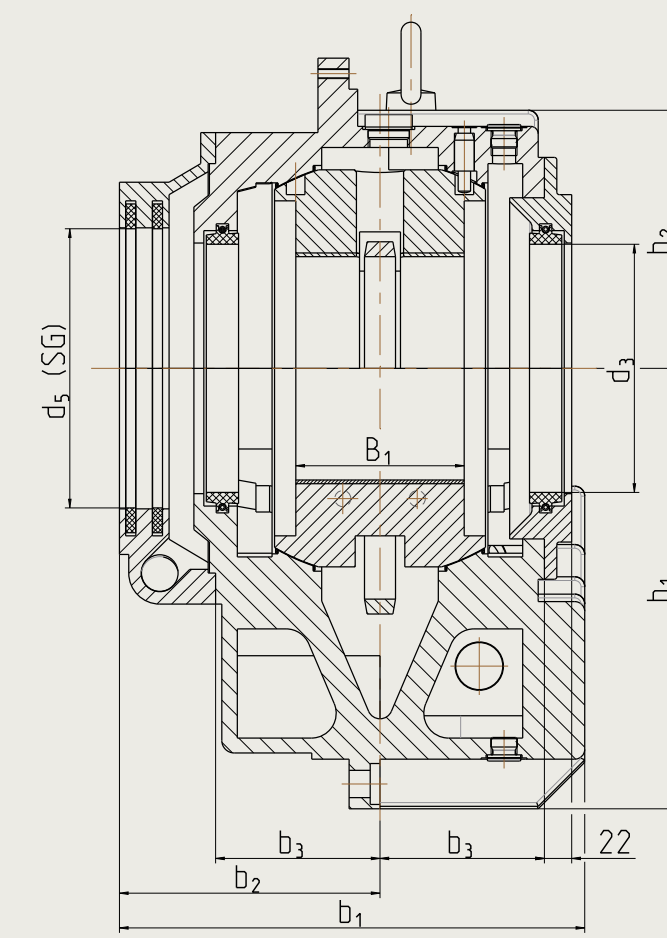
(DIN 31 694 / ISO 11687-3)
range 9-18



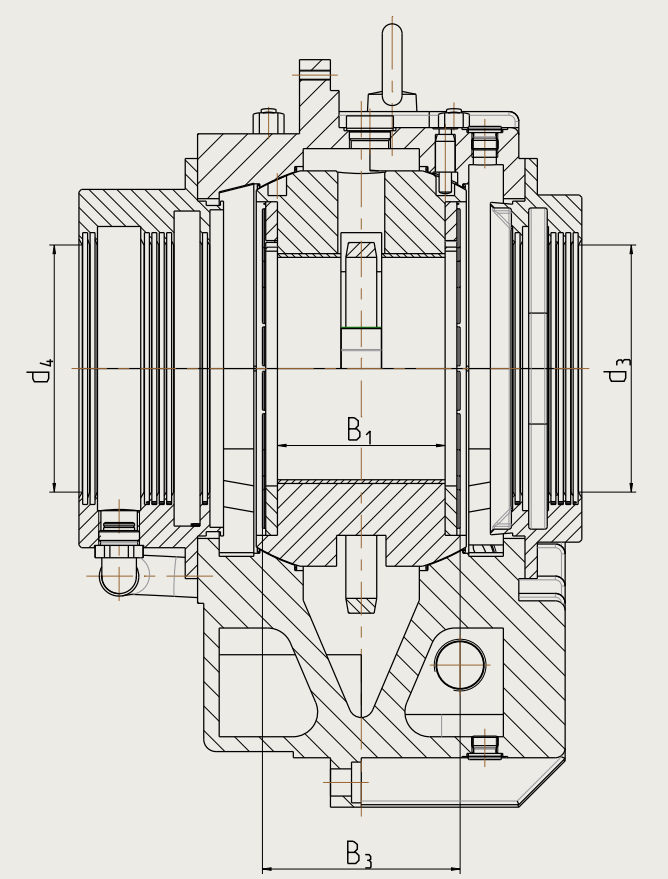
- d¹⁴ oil inlet if connected to oil circulating system or circulating pump
- d¹⁵ thermometer connection on both sides
- d¹⁶ oil level or oil outlet if connected to circulating system
oil level with self-contained lubrication middle of sight glass
oil level for circulating oil approx. 6 mm above lower edge of sight glass
- d¹⁷ screw plug
(connection for heater, oil pump thermometer, suction pipe of circulating pump, finned tube oil cooler) on both sides



EM.LB / EM.LK / EM.LE
Design of the seal carrier with the option seal packing (HG) shown.



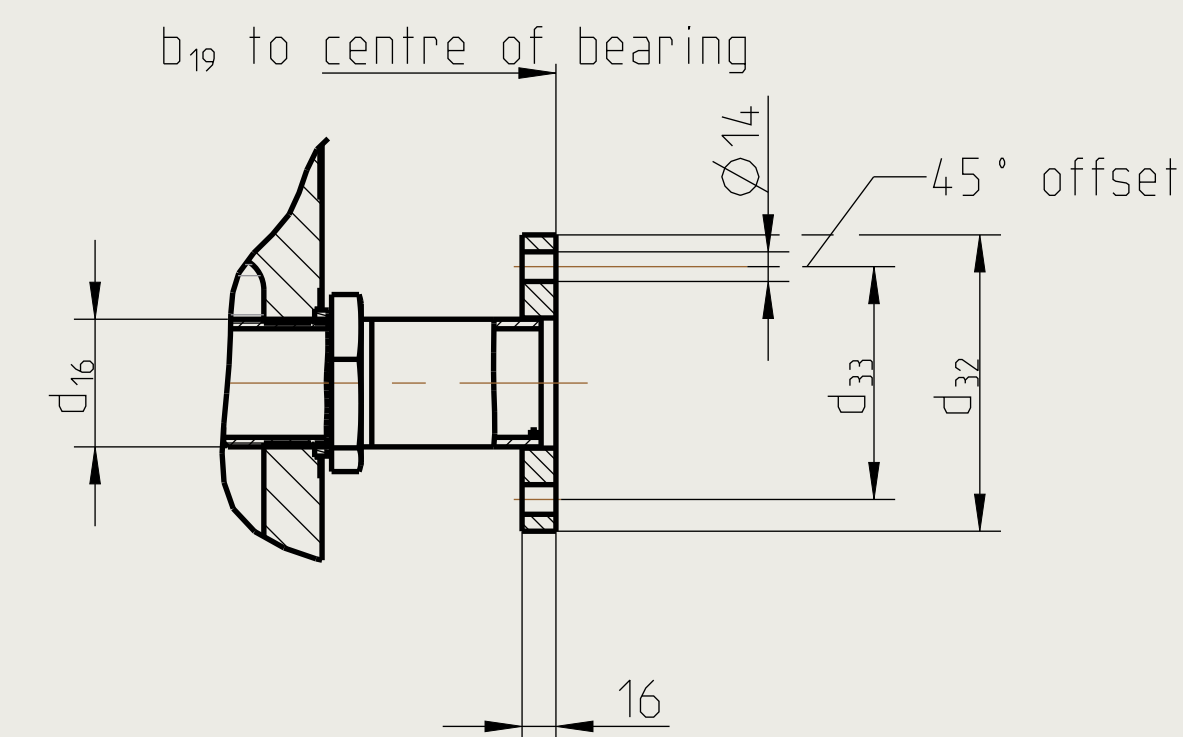
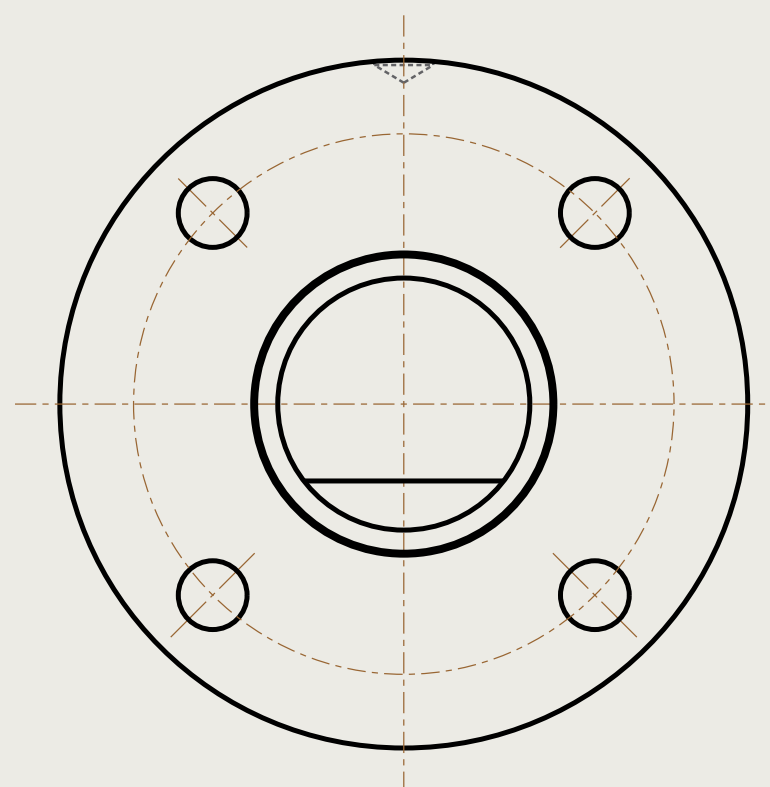
EM.LQ
Design of the seal carrier with the option gap seal (SG) shown.



EM.LA
Design of the seal carrier with rigid seal shown.



SLIDE BEARING SOLUTIONS



As for bearing types EMZL., 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.

flange DIN EN 1092-1, Typ 01, Form A, PN6
oil outlet

Dimensions in mm

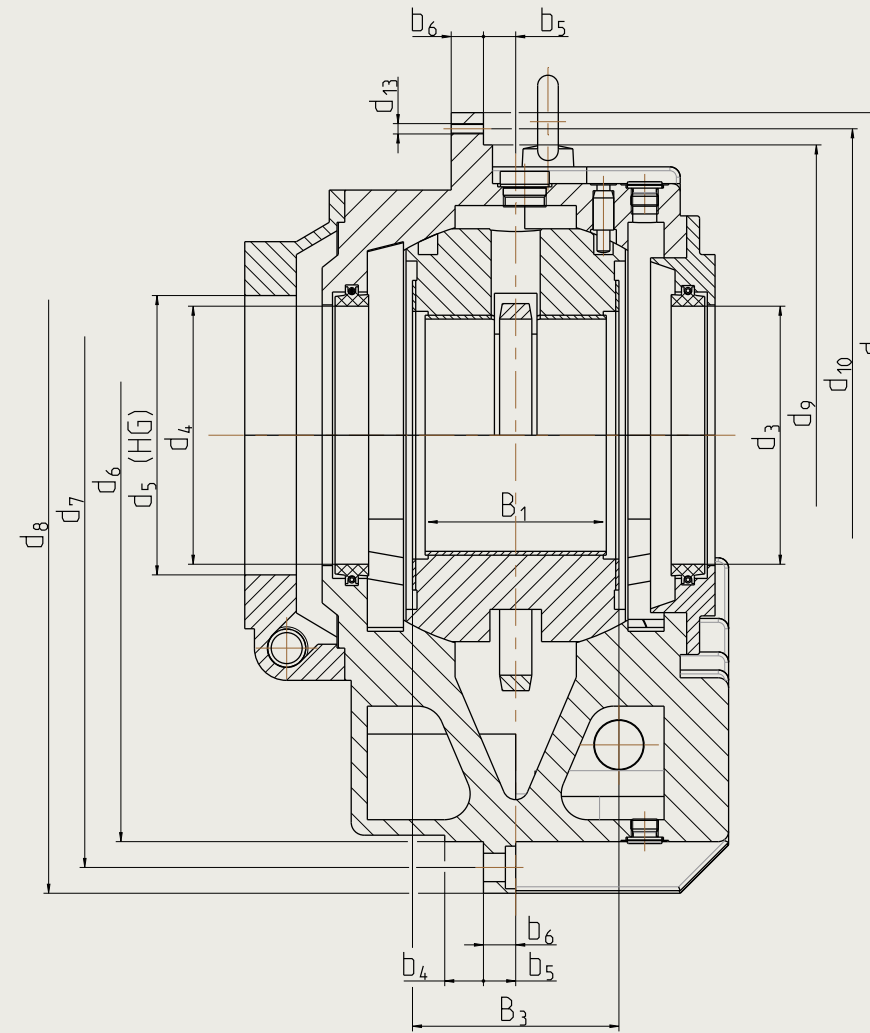
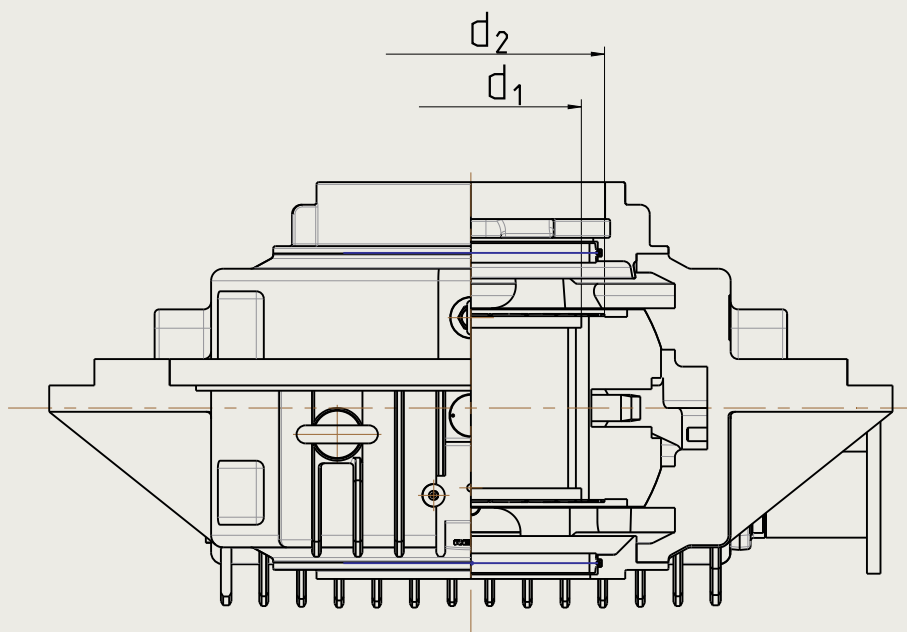
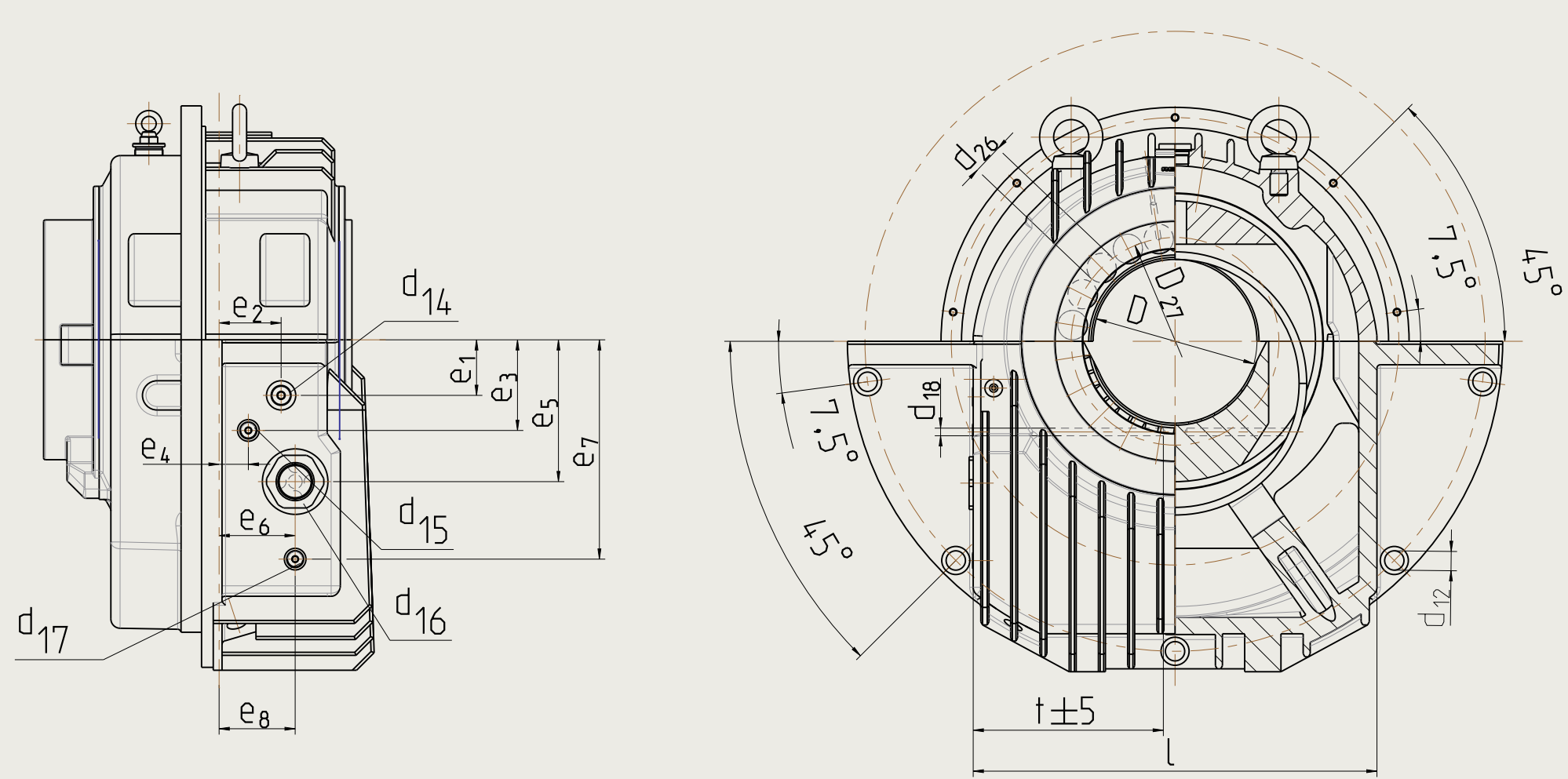
Size	D	B ₁	B ₃	b ₁	b ₂	b ₃	b ₄	b ₅	b ₆	b ₁₉	d ₁	d ₂	d ₃	d ₄	d ₅ HG	d ₅ SG	d ₆	d ₇	d ₈	d ₉	d ₁₀	d ₁₁	d ₁₂	d ₁₃	d ₁₄	d ₁₅	d ₁₆	d ₁₇	d ₁₈	d ₃₂	d ₃₃	e ₁	e ₂	e ₃	e ₄	e ₅	e ₆	e ₇	e ₈	h ₁	h ₂	l	t	weight [kg]	oil cap. [l]	d ₂₆	d ₂₇	RD-*) thrust pads [numb]
9	80	61,4	80 -0,22	250	145	80	30	20	16	205	86	110	80/ 90/ 100/ 110	100	111,5	110	375	400	425	270	285	300	11	M6	G 3/8	G 1/2	G 1 1/4	G 1 1/4	11	120	90	27,5	35,5	60	20	85	67,5	142	45	212	123	250	105	55	2,4	20	110	14
	90	61,4									96	120		100	121,5	110																											105			20	120	16
	100	65									106	130		100	131,5	110																											105			16	125	20
11	100	81,4	100 -0,22	280	160	95	30	20	18	230	108	135	100/ 110/ 125/ 140	125	136,5	140	450	475	500	320	340	355	14	M6	G 3/8	G 1/2	G 1 1/4	G 1 1/4	11	120	90	35	42	70	22,5	100	70	167	55	250	145	300	130	85	4,2	20	135	16
	110	81,4									118	150		125	151,5	140																											130			20	140	18
	125	85									133	160		125	161,5	140																											122			16	150	22
14	125	105,4	125 -0,22	325	185	112,5	30	25	20	280	135	170	125/ 140/ 160/ 180	160	171,5	180	530	560	600	380	400	425	18	M6	G 3/8	G 1/2	G 1 1/2	G 1 1/4	11	130	100	45	55	85	27,5	125	85	200	70	300	174	355	158	140	6,3	25	165	18
	140	105,4									150	190		160	191,5	180																											158			25	180	20
	160	106,4									170	200		160	201,5	200																											137			20	195	24
	180 ¹⁾	106,4									190	220		180	221,5	200																											117			-	-	-
18	160	135,7	160 -0,22	375	210	132,5	30	25	25	310	172	215	160/ 180/ 200/ 225	200	216,5	200	630	670	710	450	475	50	22	M8	G 1/2	G 1/2	G 1 1/2	G 1 1/4	13	130	100	60	68	105	30	155	80	240	80	355	208	425	190	230	10	31,5	210	18
	180	135,7									192	240		200	241,5	225																											190			31,5	230	20
	200	140,4									212	250		200	251,5	225																											170			25	245	24
	225 ¹⁾	140,4									237	275		225	276,5	225																											145			-	-	-

¹⁾ Available only with shells type B and Q. G = B.S.P.



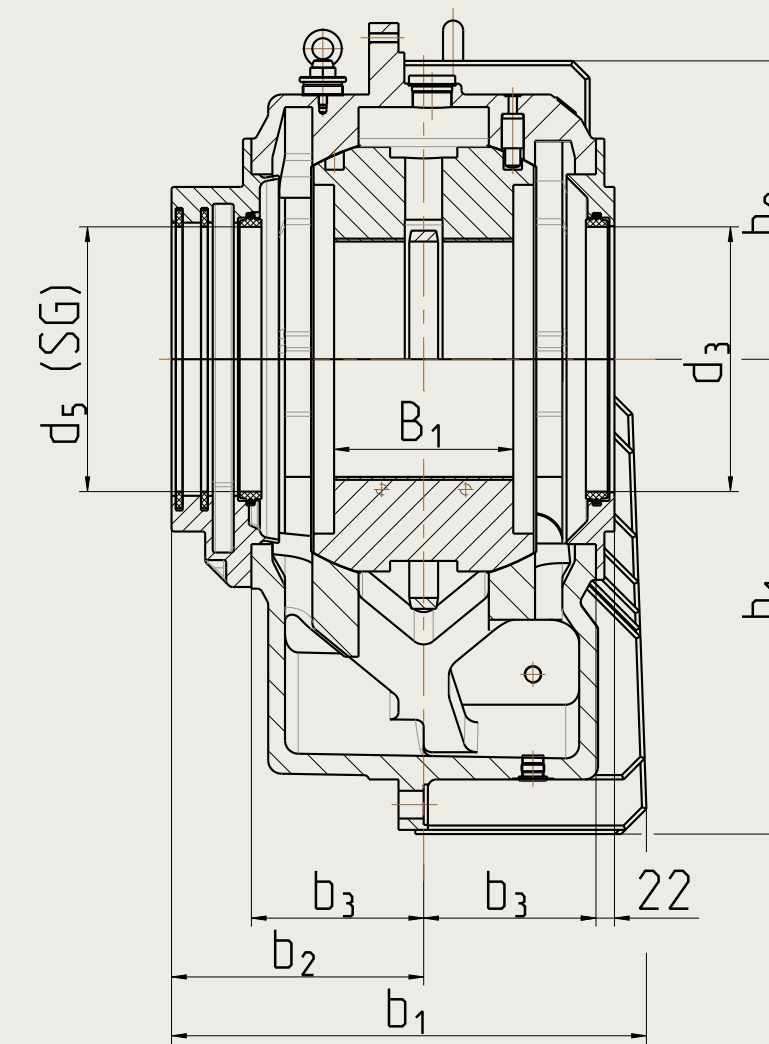
Dimensions of Bearings

(DIN 31 694 / ISO 11687-3)
range 22-28



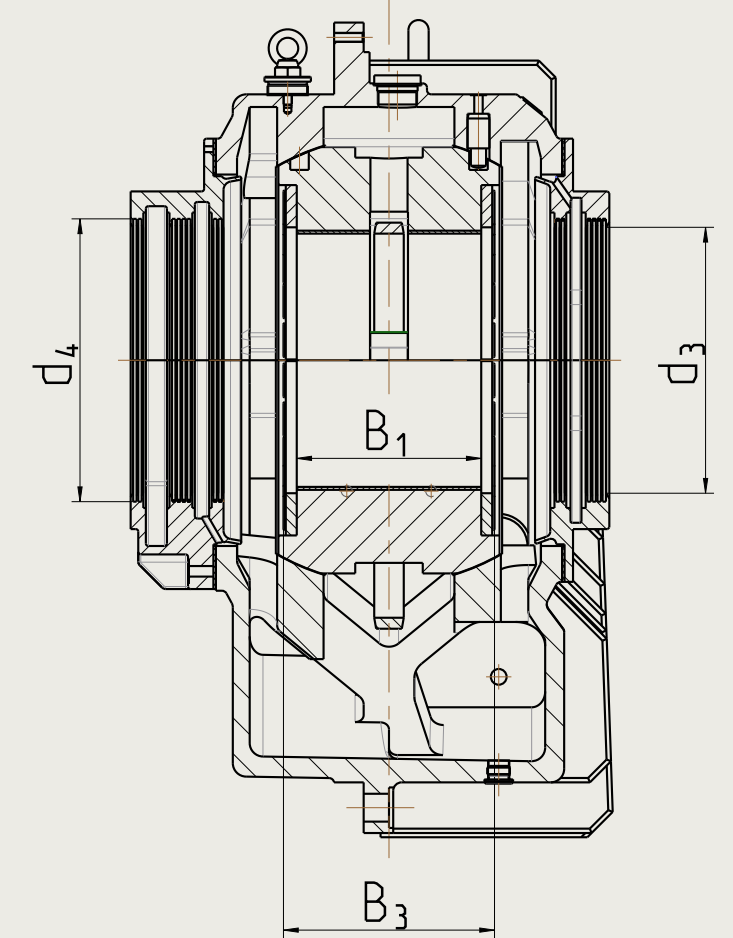
EM.LB / EM.LK / EM.LE

Design of the seal carrier with the option seal packing (HG) shown.



EM.LQ

Design of the seal carrier with the option gap seal (SG) shown.



EM.LA

Design of the seal carrier with rigid seal shown



SLIDE BEARING SOLUTIONS

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 HG	d ₅ SG	d ₆	d ₇	d ₈	d ₉	d ₁₀	d ₁₁	d ₁₂	d ₁₃	d ₁₄	d ₁₅	d ₁₆	d ₁₇	d ₁₈	d ₃₂	d ₃₃	e ₁	e ₂	e ₃	e ₄	e ₅	e ₆	e ₇	e ₈	h ₁	h ₂	l	t	d ₂₆	d ₂₇	RD-*) thrust pads [numb]	weight [kg]	oil cap. [l]
22	200	168,5	200 -0,22	457	245	165	30	30	30	395	214	265	200/ 225/ 250/ 280/ 300	250	266,5	250	800	850	900	570	600	630	26	M10	G 3/4	G 1/2	G 2	G 1/2	13	140	110	70	83	135	40	175	100	310	100	455	276	550	252	40	265	18	425	22,5
	225	168,5									239	290		250	291,5	250																											252	40	285	20		
	250	175,7									264	315		250	316,5	250																											238	31,5	305	24		
	280 ¹⁾	175,7									294	345		280	346,5	280																											192	-	-	-		
	300 ¹⁾	175,7									310	345		300	346,5	300																											177	-	-	-		
28	250	213,2	250 -0,24	565	300	205	35	30	35	465	266	325	250/ 280/ 300/ 315/ 335 ²⁾ / 355	315	326,5	315	1000	1060	1120	730	765	800	33	M12	G 3/4	G 1/2	G 2 1/2	G 1/2	13	160	130	95	106	155	50	220	130	375	130	565	355	690	322	50	325	18	860	39
	280	213,2									296	355		315	356,5	315																											322	50	355	20		
	300	218,5									316	375		315	376,5	315																											272	40	365	24		
	315	218,5									331	390		315	391,5	315																											267	40	380	24		
	335	218,5									351	410		355	411,5	355																											242	-	-	-		
	355	218,5									371	430		355	431,5	355																											229	-	-	-		

¹⁾ Available only with shells type B and Q. G = B.S.P.

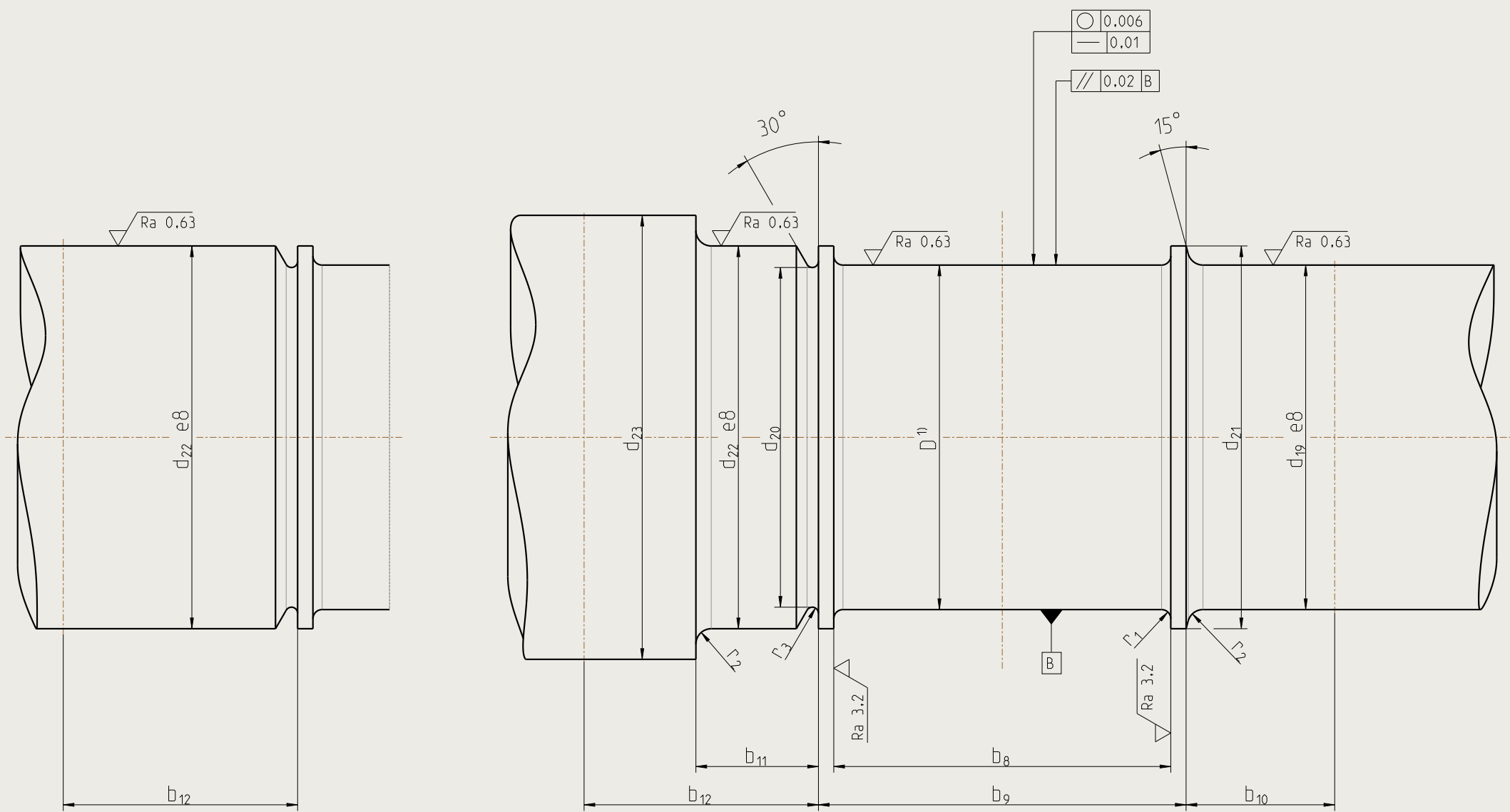
²⁾ rigid seal



Shaft dimensions

Non-locating bearing

Type of bearing shell E...Q

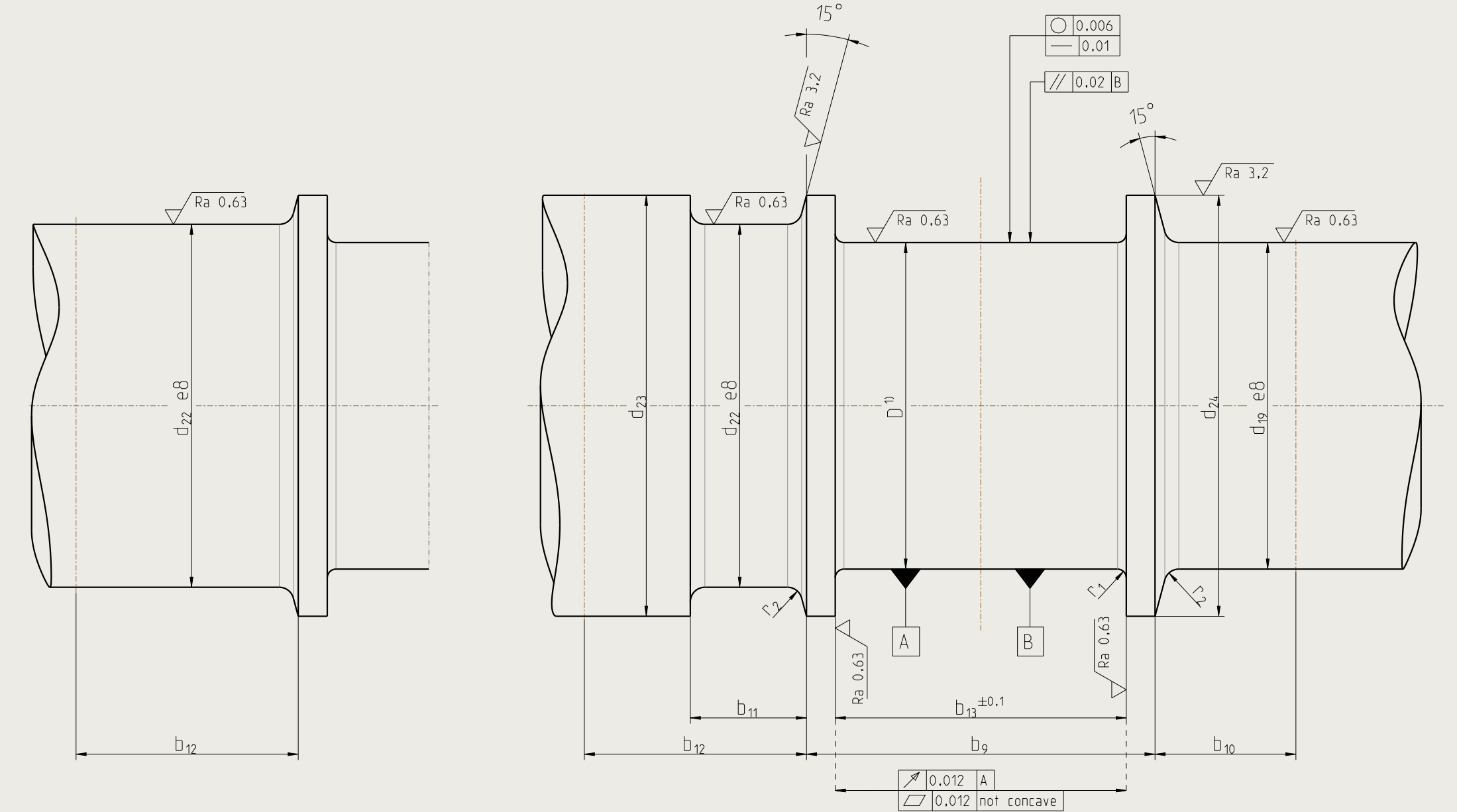


shaft design for machine seal with gap seal

shaft design for machine seal with seal packing

Locating bearing

Type of bearing shell E...B (d_{24}), E...K (d_{24}), E...E (d_{24})



shaft design for machine seal with gap seal

shaft design for machine seal with seal packing

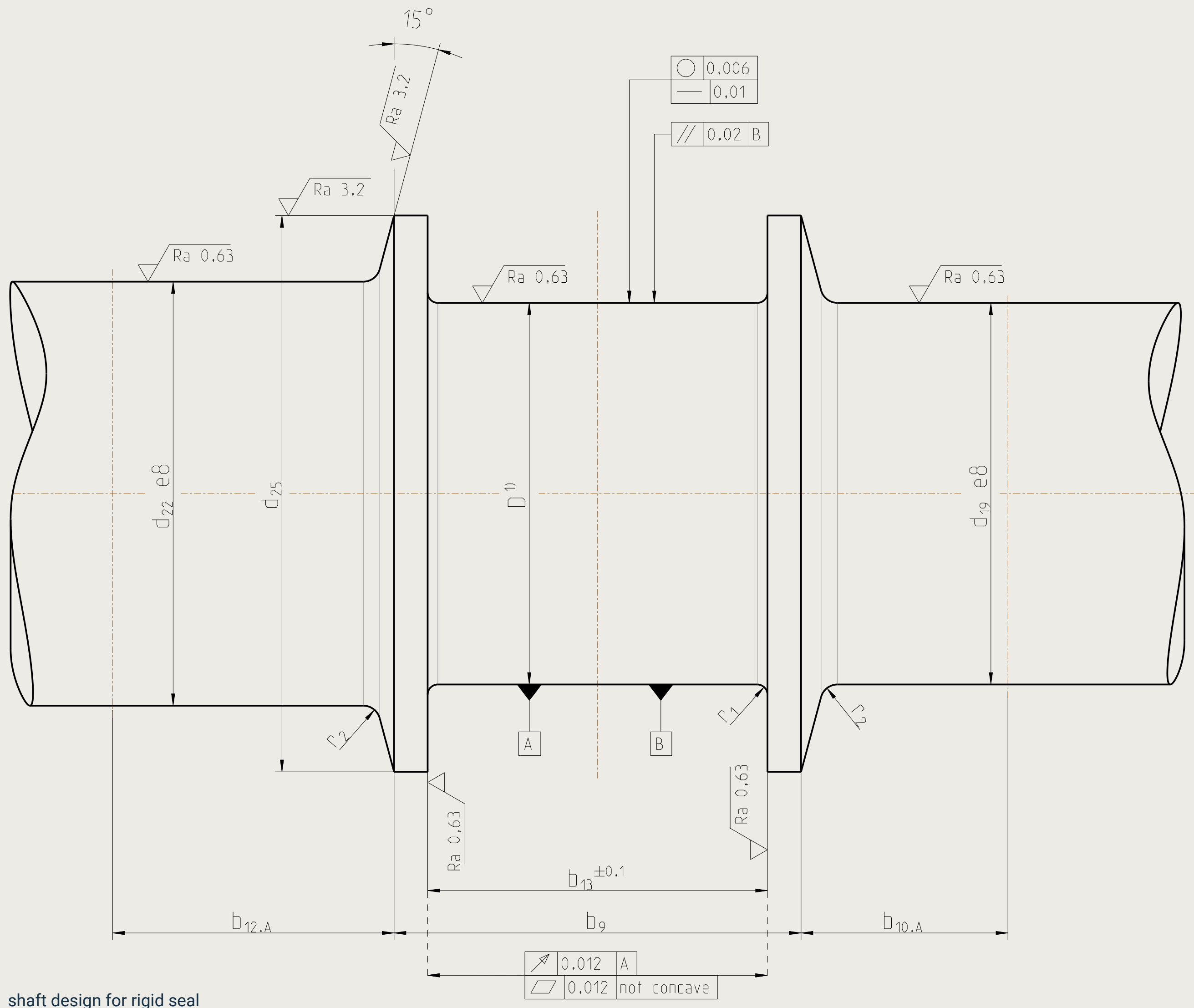
chamfered edges $0,5 \times 45^\circ$
surface condition DIN ISO 1302



Shaft dimensions

Locating bearing

Type of bearing shell E...A (d_{25})



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



SLIDE BEARING SOLUTIONS

Dimensions in mm

Size	D	b ₈ ¹⁾	b ₉	b ₁₀	b _{10.A}	b ₁₁	b ₁₂	b _{12.A}	b ₁₃ ²⁾	d ₁₉ (shaft diameter seal)					d ₂₁	d ₂₂	d ₂₃ ³⁾	d ₂₄	d ₂₅	r ₁	r ₂	r ₃	
										d ₂₀ (diameter recess) ⁶⁾													
9	80	90	100	55	93	60	95	134	80,4						90	100	110	110	132	2,5	4	1,6	
	90									80	90	100	110	120	120		142						
	100									-	(80)	(90)	(100)	130	130		143						
11	100	110	120	60	100	65	105	141	100,4						110	125	135	135	157	2,5	4	1,6	
	110									100	110	125	140	125	150		150	162					
	125									-	(100)	(110)	(125)	140	160		160	168					
14	125	140	150	65	110	75	115	149	125,4						140	160	170	170	192	4	6	2,5	
	140									125	140	160	180	160	160	190	190	207					
	160									-	(125)	(140)	(160)	180	160	200	200	217					
	180 ⁵⁾									200	180	220	220	-									
18	160	180	190	65	116	75	120	159	160,4						180	200	215	215	244	4	6	2,5	
	180									160	180	200	225	200	200	240	240	264					
	200									-	(160)	(180)	(200)	225	200	250	250	273					
	225 ⁵⁾									250	225	275	275	-									
22	200	220	240	98	126	80	154	170	200,4						225	250	265	265	308	6	10	4	
	225									200	225	250	280	300	250	250	290	290	328				
	250									-	(200)	(225)	(250)	(280)	280	250	315	315	339				
	280 ⁵⁾									315	280	345	345	-									
	300 ⁵⁾									330	300	345	345	-									
28	250	280	300	113	147	95	184	190	250,4						280	315	325	325	378	6	10	6	
	280									250	280	300	315	335 ⁴⁾	355	310	315	355	355				408
	300									-	(250)	(280)	(300)	(315)	(335)	330	315	375	375				408
	315									345	315	390	390	423									
	335									365	355	430	410	-									
	355									385	355	430	430	-									

¹⁾ Where a non-locating bearing is to permit greater axial movement (e.g. to allow for thermal expansion), the distance b₈ between the collars may be increased. Tolerances of form and position to DIN 31699. Degree of accuracy B₁₀ (radial). Degree of accuracy B₂₀ (axial); other upon request. General tolerance DIN 7168 mS.

²⁾ The normal axial clearance is 0,5 mm. When directional changes of thrust loads or axial shocks are to be anticipated, the dimensions b₁₃ may be reduced by a further 0,3 mm. Where a locating bearing is only required for a test run, the dimension b₁₃ can be increased by 3..6 mm. In this case dimensions b₁₃ have to be considered.

³⁾ All diameters d₂₃ are for standard machine seals and are valid for each shaft diameter D. In case of rigid seals dimensions on request.

⁴⁾ Rigid seal

⁵⁾ Available only with shells type B and Q.

⁶⁾ The choice of recess (d₂₀) is a suggestion for the design, which is determined by the seal diameter of the floating labyrinth seal (d₃).

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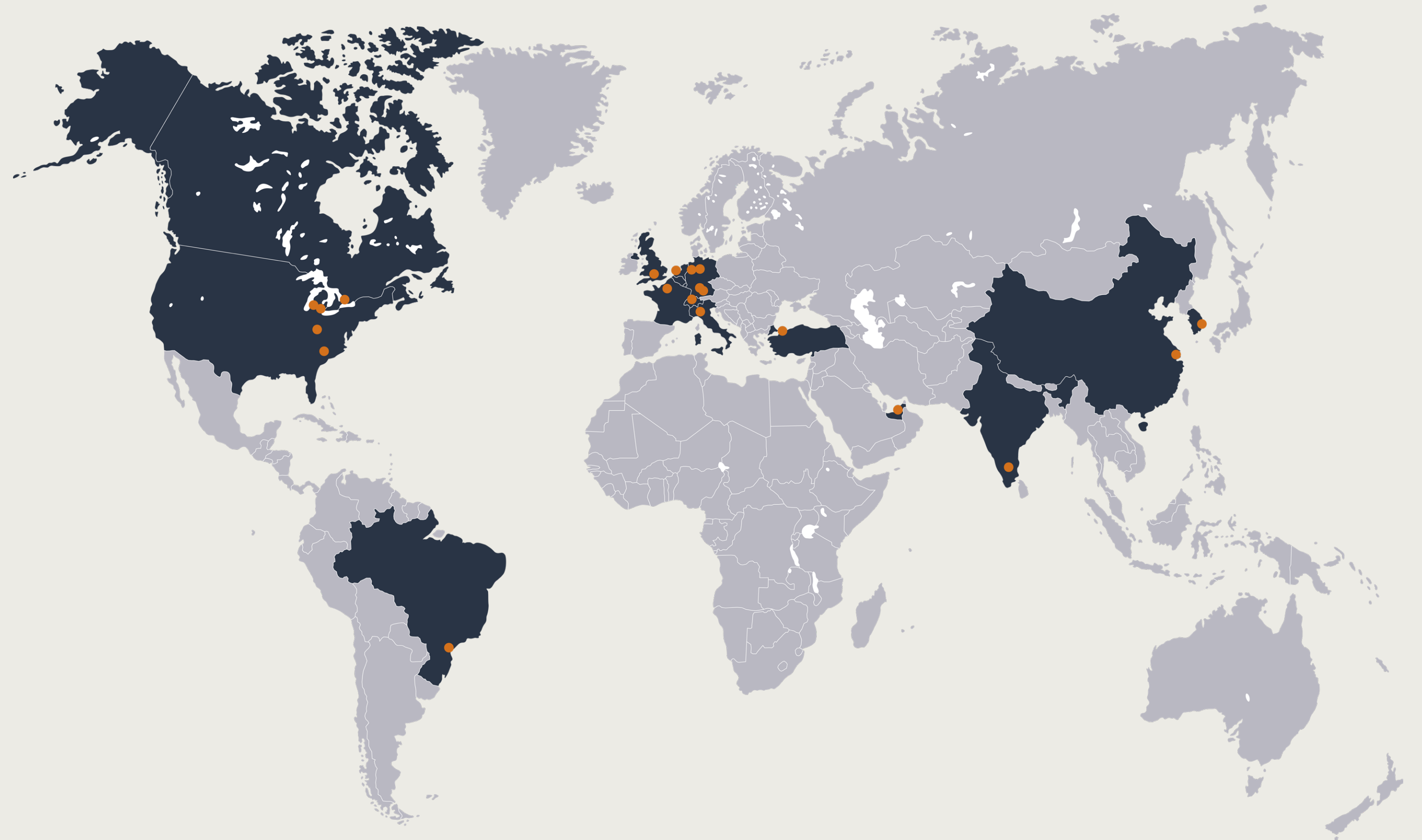
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* All other countries will be served from the german location.