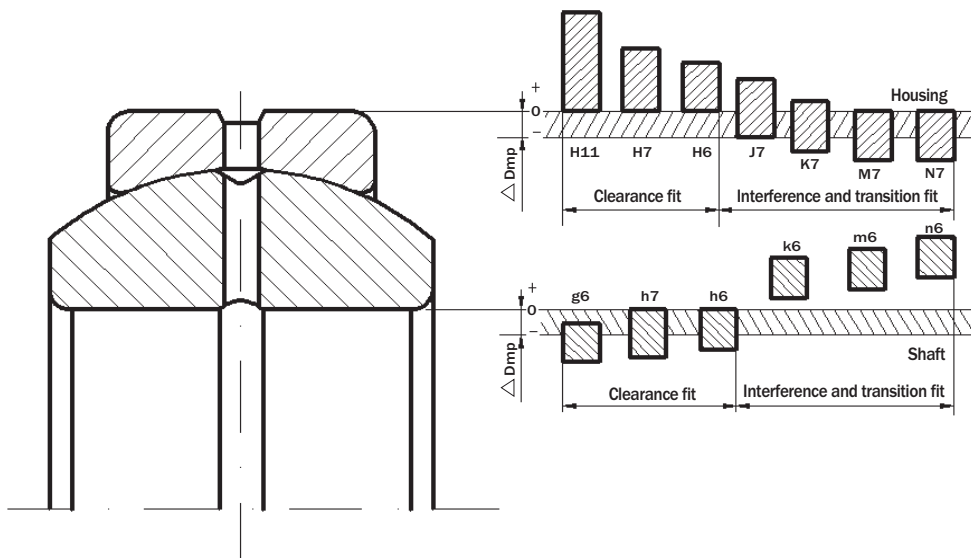


Generally speaking, satisfactory radial location and adequate support can only be obtained when the inner and outer rings are mounted with an appropriate degree of interference. Inadequately or incorrectly secured bearing rings may cause damage to the bearings and associated components. Therefore it is necessary to make careful investigation in selecting a proper fit. Some of the bearing failures caused by improper fit are listed below:

- Spherical surface cracking, early flaking and displacement of spherical surface
- Abrasion caused by creeping between bearing and shaft housing
- Seizing caused by negative internal clearances
- Increased noise and deteriorated rotational accuracy due to spherical surface deformation

The following table contains recommendations for suitable shaft and housing tolerances.



Shaft fits

Operating conditions	Relubricatable	Maintenance-free
Loads of all kinds, clearance or transition fit	h6 (shaft hardened)	h6, g6
Loads of all kinds, interference fit	m6	k6

Housing fits

Operating conditions	Relubricatable	Maintenance-free
Light loads-Axial displacement required	H7	H7
Heavy loads	M7	K7
Light alloy housings	N7	M7

SHAFT DIAMETER TOLERANCES

Shaft diameter /mm		Shaft diameter tolerances / μm							
		g6		h6		k6		m6	
over	incl.	High	Low	High	Low	High	Low	High	Low
3	6	-4	-12	0	-8	9	1	12	4
6	10	-5	-14	0	-9	10	1	15	6
10	18	-6	-17	0	-11	12	1	18	7
18	30	-7	-20	0	-13	15	2	21	8
30	50	-9	-25	0	-16	18	2	25	9
50	80	-10	-29	0	-19	21	2	30	11
80	120	-12	-34	0	-22	25	3	35	13
120	180	-14	-39	0	-25	28	3	40	15
180	250	-15	-44	0	-29	33	4	46	17
250	315	-17	-49	0	-32	36	4	52	20
315	400	-18	-54	0	-36	40	4	57	21
400	500	-20	-60	0	-40	45	5	63	23
500	630	-22	-66	0	-44	44	0	70	26

HOUSING BORE TOLERANCES

Housing bore diameter /mm		Housing bore tolerances / μm							
		H7		K7		M7		N7	
over	incl.	Low	High	Low	High	Low	High	Low	High
10	18	0	18	-12	6	-18	0	-23	-5
18	30	0	21	-15	6	-21	0	-28	-7
30	50	0	25	-18	7	-25	0	-33	-8
50	80	0	30	-21	9	-30	0	-39	-9
80	120	0	35	-25	10	-35	0	-45	-10
120	150	0	40	-28	12	-40	0	-52	-12
150	180	0	40	-28	12	-40	0	-52	-12
180	250	0	46	-33	13	-46	0	-60	-14
250	315	0	52	-36	16	-52	0	-66	-14
315	400	0	57	-40	17	-57	0	-73	-16
400	500	0	63	-45	18	-63	0	-80	-17
500	630	0	70	-70	0	—	—	—	—
630	800	0	80	-80	0	—	—	—	—
800	1000	0	90	-90	0	—	—	—	—

1. TOLERANCES OF RADIAL SPHERICAL PLAIN BEARINGS

1.1 BALL TOLERANCES OF SPHERICAL PLAIN BEARING

d(ID) (mm)	over incl	-	6	10	18	30	50	80	120	180	250
		6	10	18	30	50	80	120	180	250	315
GE..E		0 -0.008	0 -0.008	0 -0.008							
GE..ES				0 -0.008	0 -0.010	0 -0.012	0 -0.015	0 -0.020	0 -0.025	0 -0.030	0 -0.035
GE..ES 2RS				0 -0.008	0 -0.010	0 -0.012	0 -0.015	0 -0.020	0 -0.025	0 -0.030	0 -0.035
d(ID) (inch)	over incl	-	0.236	0.394	0.709	1.181	1.969	3.150	4.724	7.087	9.843
		0.236	0.394	0.709	1.181	1.969	3.150	4.724	7.087	9.843	12.403
GE..E		0 -0.00032	0 -0.00032	0 -0.00032							
GE..ES				0 -0.00032	0 -0.0004	0 -0.00047	0 -0.00059	0 -0.0008	0 -0.00099	0 -0.00118	0 -0.00137
GE..ES 2RS				0 -0.00032	0 -0.0004	0 -0.00047	0 -0.00059	0 -0.0008	0 -0.00099	0 -0.00118	0 -0.00137
GEZ..ES GEGZ..ES GEWZ..ES				0 -0.00032	0 -0.0004	0 -0.00047	0 -0.00059	0 -0.0008	0 -0.00099		
GEZ..ES 2RS GEGZ..ES 2RS GEWZ..ES 2RS				0 -0.00032	0 -0.0004	0 -0.00047	0 -0.00059	0 -0.0008	0 -0.00099		
GACZ...S					0 -0.00047	0 -0.00047	0 -0.00059	0 -0.0008	0 -0.00099	0 -0.00118	
GEZ...ET 2RS				0 -0.00032	0 -0.0004	0 -0.00047	0 -0.00059	0 -0.0008	0 -0.00099	0 -0.00118	
COM../HCOM..		+0.0015 -0.00051	+0.0015 -0.00051	+0.0015 -0.00051	+0.0015 -0.00051	+0.0015 -0.00051	+0.0015 -0.00051				
COM..T/HCOM..T		+0.0015 -0.00051	+0.0015 -0.00051	+0.0015 -0.00051	+0.0015 -0.00051	+0.0015 -0.00051	+0.0015 -0.00051				

1.2 BALL WIDTH TOLERANCES OF SPHERICAL PLAIN BEARING

d(ID) (inch)	over incl	-	1.969	3.150	4.724	7.087	9.843	12.402
		1.969	3.150	4.724	7.087	9.843	12.402	15.748
△Bs		0 -0.0047	0 -0.0059	0 -0.008	0 -0.01	0 -0.0118	0 -0.0137	0 -0.0157

1.3 RACE TOLERANCES OF SPHERICAL PLAIN BEARING

D(OD) (mm)	over incl	10	18	30	50	60	80	120	150	180	250	315
		18	30	50	60	80	120	150	180	250	315	400
GE..E		0 -0.008	0 -0.009									
GE..ES			0 -0.009	0 -0.011	0 -0.013	0 -0.013	0 -0.018	0 -0.025	0 -0.030	0 -0.030	0 -0.035	0 -0.040
GE..ES 2RS				0 -0.011	0 -0.013	0 -0.013	0 -0.015	0 -0.018	0 -0.025	0 -0.030	0 -0.035	0 -0.040

TOLERANCES



D(OD) (inch)	over incl	0.394 0.709	0.709 1.181	1.181 1.969	1.969 2.362	2.362 3.150	3.150 4.724	4.724 5.906	5.906 7.087	7.087 9.843	9.843 12.403	12.403 15.748
GE..E		0 -0.00032	0 -0.00035									
GE..ES			0 -0.00035	0 -0.00043	0 -0.00051	0 -0.00051	0 -0.00059	0 -0.00071	0 -0.00099	0 -0.00118	0 -0.00137	0 -0.00158
GE..ES 2RS				0 -0.00043	0 -0.00051	0 -0.00051	0 -0.00059	0 -0.00071	0 -0.00099	0 -0.00118	0 -0.00137	0 -0.00158
D(OD) (inch)	over incl	0.394 0.709	0.709 1.181	1.181 1.969	1.969 2.362	2.362 3.150	3.150 4.724	4.724 5.906	5.906 7.087	7.087 9.843	9.843 12.402	12.403 15.748
GEZ..ES GEWZ...ES	GEGZ..ES		0 -0.00035	0 -0.00043	0 -0.00051	0 -0.00051	0 -0.00059	0 -0.00071	0 -0.00099	0 -0.00118		
GEZ..ES 2RS GEGZ..ES 2RS GEWZ...ES 2RS				0 -0.00043	0 -0.00051	0 -0.00051	0 -0.00059	0 -0.00071				
GACZ...S				0 -0.00055	0 -0.00063	0 -0.00063	0 -0.00071	0 -0.00079	0 -0.00099	0 -0.00118	0 -0.00137	0 -0.00158
GEZ...ET 2RS			0 -0.00035	0 -0.00043	0 -0.00051	0 -0.00051	0 -0.00059	0 -0.00071	0 -0.00099	0 -0.00118	0 -0.00137	0 -0.00158
COM../HCOM..		0 -0.00071	0 -0.00071	0 -0.00071	0 -0.00071	0 -0.00071	0 -0.00071	0 -0.00071	0 -0.00071			
COM../HCOM..T		0 -0.00071	0 -0.00071	0 -0.00071	0 -0.00071	0 -0.00071	0 -0.00071	0 -0.00071	0 -0.00071			

1.4 RACE WIDTH TOLERANCES OF SPHERICAL PLAIN BEARING

D(OD) (inch)	over incl	- 1.969	1.969 3.150	3.150 4.724	4.724 7.087	7.087 9.843	9.843 12.402	12.402 15.748
ΔCs		0 -0.0094	0 -0.0118	0 -0.0157	0 -0.0197	0 -0.0236	0 -0.0276	0 -0.0315

2.TOLERANCES OF ROD ENDS

2.1 BALL TOLERANCES OF ROD ENDS

d(ID) (inch)	over incl	- 0.236	0.236 0.394	0.394 0.709	0.709 1.181	1.181 1.969	1.969 3.150	3.150 4.724
SIZP..S SAZP..S		+0.00047 0	+0.00059 0	+0.00071 0	+0.00083 0	+0.00099 0	+0.00118 0	
CF.. CM.. JF.. JF...F	CF..T CM..T JM..	CF..Y CM..Y JM...F	+0.0015 -0.00051	+0.0015 -0.00051	+0.0015 -0.00118	+0.0015 -0.00118	+0.0015 -0.00118	
KF..	KM..					0 -0.0005	0 -0.0005	
PF...G PM...G		+0.0025 -0.00051	+0.0025 -0.00051	+0.0025 -0.00118	+0.0025 -0.00118	+0.0025 -0.00118		

2.2 CENTER HEIGHT DEVIATION OF ROD ENDS.

d(ID) (inch)	over incl	- 0.236	0.236 0.787	0.787 1.181	1.181 1.772	1.772 2.362	2.362 3.15
Δhs		+0.0315 -0.0472	+0.0315 -0.0472	+0.0394 -0.067	+0.0551 -0.0827	+0.0709 -0.106	+0.0886 -0.134

RADIAL INTERNAL CLEARANCE OF SPHERICAL PLAIN BEARINGS **KGBAL**[®]

1.1 RADIAL SPHERICAL PLAIN BEARINGS-METRIC

BEARING NO.	d	Group C2	Group normal	Group C3
	Over~incl(mm)	min~max (μm)	min~max (μm)	min~max (μm)
	~12	8~32	32~68	68~104
	12~20	10~40	40~82	82~124
	20~35	12~50	50~100	100~150
GE..E	35~60	15~60	60~120	120~180
GE..ES	60~90	18~72	72~142	142~212
GE..ES 2RS	90~140	18~85	85~165	165~245
	140~240	18~100	100~192	192~284
	240~300	18~110	110~214	214~318
	300~320	18~135	135~261	261~387

1.2 RADIAL SPHERICAL PLAIN BEARINGS-INCH

BEARING NO.	d	Group C2	Group normal	Group C3
	Over~incl(inch)	min~max (inch)	min~max (inch)	min~max (inch)
GEGZ...ES	~0.625		0.002~0.0059	
GEZ...ES GEWZ...ES	0.625~2.0		0.0031~0.0071	
GEZ...ES 2RS				
GEGZ...ES 2RS	2.0~3.0		0.0039~0.0079	
GEWZ...ES 2RS	3.0~6.0		0.0051~0.0091	
	~0.315		0.0008~0.0024	
COM..	0.315~0.551		0.0016~0.0035	
HCOM..	0.551~0.787		0.0020~0.0043	
	0.787~2.362		0.0024~0.0047	
	~0.472		0.00016~0.0011	
COM..T	0.472~0.787		0.00020~0.0014	
HCOM..T	0.787~1.181		0.00024~0.0017	
	1.181~1.969		0.00024~0.0024	
	~0.787		0~0.0015	
	0.787~1.378		0~0.0020	
GEZ...ET 2RS	1.378~2.362		0~0.0024	
	2.362~3.543		0~0.0028	
	3.543~5.512		0~0.0033	
	5.512~9.449		0~0.0039	

RADIAL INTERNAL CLEARANCE OF SPHERICAL PLAIN BEARINGS **KGBAL**[®]

2. ROD END BEARINGS-INCH

BEARING NO.		d Over~incl(inch)	Group normal min~max (inch)
		~0.315	0.0004~0.0012
CF..	CM..	0.315~0.551	0.0006~0.0024
CF..Y	CM..Y	0.551~0.787	0.0016~0.0031
JF..	JM..	0.787~1.378	0.0020~0.0035
		1.378~1.969	0.0024~0.0043
SIZP..S	SAZP..S	~1.181	0.0003~0.0022
JF...F	JM...F		
PF..G	PM..G	~0.472	0~0.0013
CF..T	CM..T	0.472~0.787	0~0.0016
		0.787~1.181	0~0.0020
KF..		0.625~2.0	0.002~0.0071
KM..		2.0~3.0	0.002~0.0079