Precision of associated components

Installation preparation

The processing quality of bearing seats and the precision of the selected fits decisively influence the performance of the installed bearing. Operational availability of maximum ball bearing performance increases with the precision of the relevant machine environment.

Careful installation preparations on decisive machine components ensure necessary surface quality and guarantee compliance with the tolerances for shape and position of bearing seats.

Long-term and extensive practical experience has revealed specific guidelines with respect to necessary precision tolerances for associated components that will permit optimal bearing utilization.

Guidelines for shaft and housing fits / shape and position tolerances (DIN EN ISO 1101)

Shaft

Nominal diameter d			[mm] over / including	3 / 6	6 / 10	10 / 18	18 / 30	30 / 50	50 / 80	80 / 120
Dimensions			[µm]	+2 / -2	+2 / -2	+3 / -3	+3 / -3	+4 / -4	+4 / -4	+5 / -5
Cylindricity	⌭	t_1		1	1	1.2	1.5	1.7	2	2.5
Axial runout	↗	t_2		1	1	1.2	1.5	1.7	2	2.5
Concentricity	◎	t_3		1	1	1.2	1.5	1.7	2	2.5
Mean surface roughness	R_a	R_a		0.2	0.2	0.2	0.2	0.2	0.2	0.2

Housing

Nominal diameter D			[mm] over / including	10 / 18	18 / 30	30 / 50	50 / 80	80 / 120	120 / 180
Dimensions Fixed bearings			[µm]	+5 / +0	+6 / +0	+7 / +0	+8 / +0	+9 / +0	+9 / +0
Dimensions Floating bearing				+7 / +2	+8 / +2	+9 / +3	+10 / +3	+11 / +4	+12 / +4
Cylindricity	⌭	t_1		1.2	1.5	1.5	2	2.5	3.5
Axial runout	↗	t_2		1.2	1.5	1.5	2	2.5	3.5
Concentricity	◎	t_3		1.2	1.5	1.5	2	2.5	3.5
Mean surface roughness	R_a	R_a		0.4	0.4	0.4	0.4	0.4	0.4

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Precision of associated components

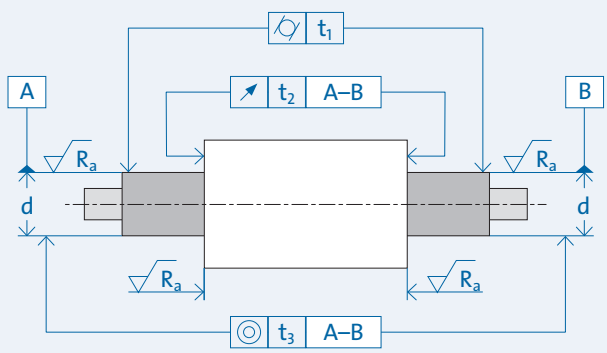
Optimization of the fit
at high speeds

With increasing speeds (from about n · dm = 1.5 · 10^6 mm/min) progressively rising centrifugal force can cause widening of the inner ring and lead to the following functional impairments.

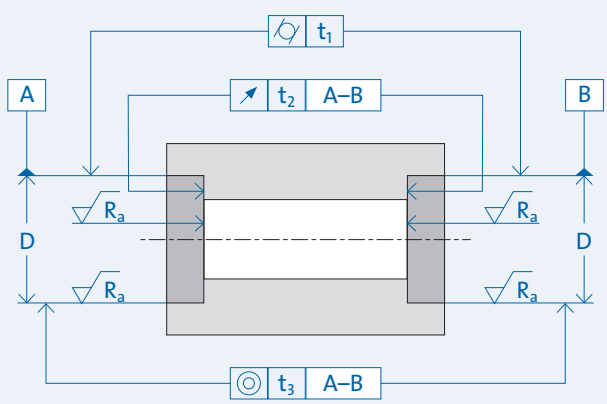
- Inner ring slippage on the shaft and contact surfaces
- Fretting corrosion
- Vibrations

A tighter fit is recommended to prevent the inner ring from lifting off.

Shaft



Housing



Bore code	Bore diameter	Recommended interference [µm] at n · dm factor [· 10^6 mm/min]				
	d [mm]	1.5	1.75	2.0	2.25	2.5
00	10	1	1	2	2	3
01	12	1	2	2	3	4
02	15	2	2	3	4	5
03	17	2	3	4	5	6
04	20	2	3	4	5	6
05	25	3	4	5	7	9
06	30	4	5	7	8	10
07	35	4	6	8	10	12
08	40	5	7	9	12	15
09	45	6	8	11	13	17
10	50	7	9	12	15	19
11	55	8	10	13	17	21
12	60	8	11	15	19	23
13	65	9	13	16	21	26
14	70	10	13	17	21	26
15	75	10	14	18	23	29
16	80	11	15	19	25	30
17	85	12	16	21	26	33
18	90	12	17	22	28	34
19	95	13	18	23	30	37
20	100	14	19	25	31	39
21	105	15	20	26	33	41
22	110	15	21	27	34	42
24	120	17	23	30	38	47

Valid for solid shaft

For hollow shaft (50 %): Correction factor = 0.8

Correction factors for interference of bearing types and bearing series	
SM 60..	1
SM 619..	1,10
KH 60..	1,05
KH 619..	1,15

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