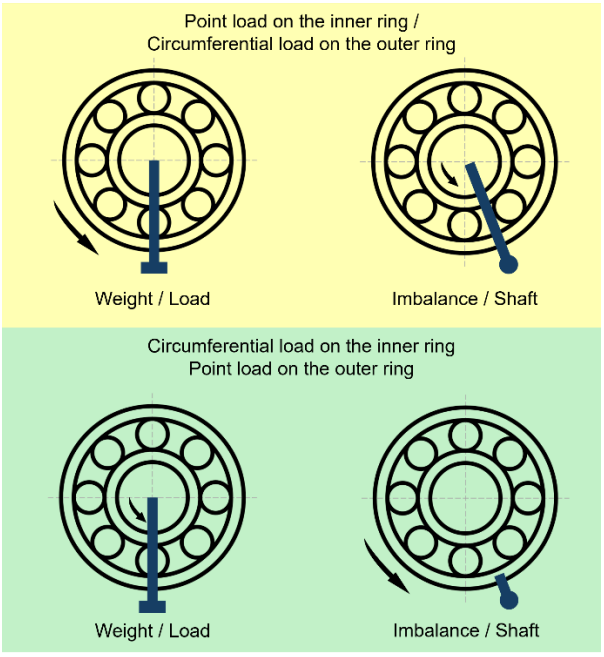
Mounting tolerances

For a bearing to achieve optimum performance, it must be correctly seated on the shaft and in the housing. The fit must always be selected according to the load condition and the running characteristics, as this is crucial for the operational safety and service life of the bearing.

Bearings subjected to dynamic loads that have a fit which is too loose may move on the shaft or in the housing. This can lead to fretting corrosion, increased running noise or damage to adjacent components. In particular, with miniature bearings or bearings with thin walled rings, an excessively tight fit can create unwanted preload. Such operating stress can adversely affect both the service life and the running behaviour of the bearing.



The following tables serve as a guide for selecting suitable fits between shaft and housing – depending on the load and direction of rotation in each case.

Shaft tolerances *[Applicable to solid steel shafts]*

Circulation ratio	Shaft diameter d [mm]	Assembly of the inner ring and loading	ISO tolerance field
Point load on the inner ring	All sizes	Inner ring can be moved easily	g5, g6
		Inner ring cannot be moved easily	h6,j6
Circumferential load on the inner ring and undefined load direction	≤ 50	normal load $P/C_r < 0,1$	j5, j6
	50 to 100	low load $P/C_r < 0,08$	j6
		normal and high load $P/C_r > 0,08$	k5, k6
	100 to 200	low load $P/C_r < 0,1$	k6, m6
		normal and high load $P/C_r > 0,1$	m6

Housing tolerances *[Applicable to steel or cast iron enclosures]*

For connecting structures made of materials other than steel, additional physical properties must be taken into account to ensure a secure fit. These properties influence the behaviour of the bearing point, particularly in the event of temperature changes and mechanical stress.

Of particular relevance here are:

- the elasticity modulus of the material
- the linear thermal expansion coefficient

These factors must be taken into account, particularly in the following designs::

- Aluminium housings or shafts
- Designs with thin-walled enclosures
- Applications with hollow shafts

Circulation ratio	Assembly of the outer ring	Design of the housing and load	ISO tolerance field
Point load on the outer ring	Outer ring can be easily moved	undivided housing	H6, H7
		split housing	H7, H8
		Heat supply via shaft	G7
	Outer ring not easily movable	undivided housing	J6
		split housing	J7
Circumferential load on the outer ring and undefined load direction	Outer ring cannot be moved	low and normal load	K7
		normal impact load and heavy load	M7
		high impact load $P/C_r > 0,15$	N7

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