

NTN bearing internal clearance is how to choose.

Nominal Bore Diameter d mm		Measuring Load N (kgf)		Adjustment of internal clearance				
over	incl.			C2	CN	C3	C4	C5
10 ¹	18	24.5	(2.5)	3~4	4	4	4	4
18	50	49	(5)	4~5	5	6	6	6
50	300	147	(15)	6~8	8	8	9	9

When determining preload, the preload force required to provide an optimum combination of stiffness, bearing life span and operational reliability should be calculated first. Then calculate the preload force to be used when adjusting the bearings during mounting; the bearings should be at ambient temperature and should not be subjected to every other load.

The appropriate preload at normal operating temperature depends on the bearing load. A single row angular contact ball bearing or a tapered roller bearing can accommodate radial and axial loads simultaneously. Under radial load, these bearings produce an internal axial load which must be accommodated by a second bearing facing the opposite direction. Purely radial displacement of one bearing ring about the other means that half of the rolling elements are under load. The internal axial load produced in the bearing may be determined by:

Operating conditions	Applications	Selected clearance
With heavy or shock load, high fit.	Railway vehicle axles	C3
	Vibration screens	C3, C4
With indeterminate load, both inner and outer rings are tight fit.	Railway vehicle traction motors	C4
	Tractors and final reduction gear	C4
Shaft or inner ring is heated.	Paper making machines and driers	C3, C4
	Table rollers for rolling mill	C3
Required low noise and vibration when rotating.	Small electric motors	C2, CM
Adjustment of clearance to minimize shaft runout	Main spindles of lathes (Double-row cylindrical roller bearings)	C9NA, C0NA
Loose fit for both inner and outer rings.	Roll neck of steel mill	C2

When a single bearing a radial load F_r , an axial load F_a (external) of the same magnitude as the internal axial load must be concerned the bearing if the basic load rating is for being fully exploited. If the applied external load is lighter, fewer rolling elements will be supporting the load and the load carrying capacity of the bearing is correspondingly reduced. In an adjusted bearing arrangement comprising two single row angular contact ball bearings or more tapered roller bearings arranged back-to-back or face-to-face, each bearing must accommodate the axial load in one direction. When these bearing arrangements are gone by near-zero clearance, a radial load acting at a location centrally between the 2 bearings, is halved between them and half the amount of rolling elements in each bearing are loaded.

When determining preload, the preload force required to provide an optimum combination of stiffness, bearing life time and operational reliability should be calculated first. Then calculate the preload force to become used when adjusting the bearings during mounting; the bearings should be at ambient temperature and should not depend any other load.

The appropriate preload at normal operating temperature utilizes the bearing load. A single row angular contact ball bearing or a tapered roller bearing can accommodate radial and axial loads simultaneously. Under radial load, these bearings produce an internal axial load which must be accommodated by a second bearing facing the opposite direction. Purely radial displacement of one bearing ring about the other means that half of the rolling elements are under load. The internal axial load produced in the bearing may be determined by:

When a single bearing depends a radial load F_r , an axial load F_a (external) of the same magnitude as the internal axial load must be related to the bearing if the basic load rating is for being fully exploited. If the applied external load is lighter, fewer rolling elements will be supporting the load and the load carrying capacity of the bearing is correspondingly reduced. In an adjusted bearing arrangement comprising two single row angular contact ball bearings or more tapered roller bearings arranged back-to-back or face-to-face, each bearing must accommodate the axial load in one direction. When these bearing arrangements are adjusted to near-zero clearance, a radial load acting at a location centrally between the 2 bearings, is halved between them and half the amount of rolling elements in each bearing are loaded.