

Table 5-4 the maximal of fillet radius of shaft and shell bore

The minimum of bearing single direction fillet	r_{as}	The minimum of bearing single direction fillet	r_{as}
0.05	2.0	0.05	2.0
0.08	2.1	0.08	2.1
0.10	3.0	0.10	2.5
0.15	4.0	0.15	3.1
0.20	5.0	0.20	4.0
0.30	6.0	0.30	5.0
0.60	7.5	0.60	6.0
1.00	9.5	1.00	8.0
1.10	12.0	1.10	10.0
1.50	15.0	1.50	12.0

Table 5-5 the minimum of housing shoulder height

minimum of bearing single direction fillet	The minimum of h		minimum of bearing single direction fillet	The minimum of h	
	Normal condition	Special condition ^①		Normal condition	Special condition ^①
0.05	0.2	-	2.0	5	4.5
0.08	0.3	-	2.0	6	5.5
0.10	0.4	-	3.0	7	6.5
0.15	0.6	-	4.0	9	8.0
0.20	0.8	-	5.0	11	10.0
0.30	1.2	1.0	6.0	14	12.0
0.60	2.5	2.0	7.5	18	-
1.00	3.0	2.5	9.5	22	-
1.10	3.3	3.5	12.0	27	-
1.50	4.5	4.0	15.0	32	-

① Special condition means thrust load is very small, or small housing shoulder is required.

5.2.2 Axial retained

The axial retained of bearing includes retained inner ring at shaft and outer ring in shell bore. Although the axial retained are required to both inner and outer ring, but it needn't to fix simultaneous. To the structure of two locating supports, it only needs to be fixed in one direction because of every bearing enduring single direction axial load just. To the structure of one locating and one floating support, due to the bearing in locating support under the bidirectional axial load, so it needs to be fixed in dual directions, and the fix structures for floating depend on the type of bearing and the mode of floating.

There are many types of apparatuses for axial retained, the selection depends on the axial load, speed, the type of bearing, mounting position and dismounting environment. The higher the load and speed, the more reliability is required for axial retained. In this situation, lock nuts and snap collar are often used for inner ring, and end plates for outer ring. If the load is smaller and the speed is lower, spring collar and snap ring are often applied for inner and outer ring. The general methods for inner and outer ring listed in table5-6 and table 5-7.

Table 5-6 Normal fix type of bearing inner ring

Diagram	Fix type	Application and characteristic
	Fixed by Spring collar	Simple structure, convenient to mounting and dismounting, cover small space, often applied for fixing radial bearings.

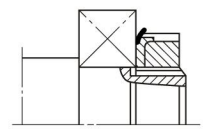
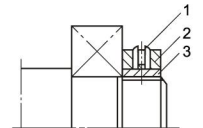
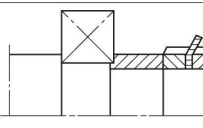
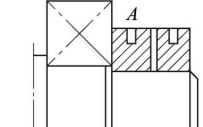
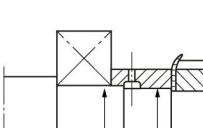
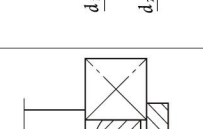
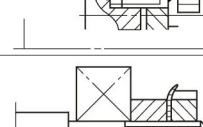
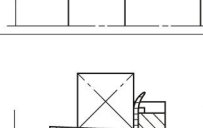
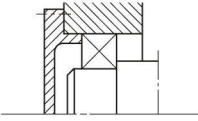
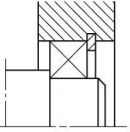
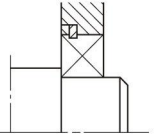
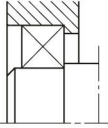
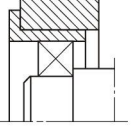
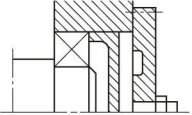
Diagram	Fix type	Application and characteristic
	Inner ring fixed by nut and snap ring	Simple structure, convenient to mounting and dismounting, and high fixed reliability.
	Inner ring fixed by nut-2, and prevention loosen by set screw-1, shim-3 is made of soft metal to enhance the effective of prevention loosen and thread damage.	Often applied in ends support or middle support of machine tool shaft.
	Inner ring fixed by two nuts and a sleeve.	Two nuts have a high prevention loosen reliability, and sleeve can prevent tilted by nuts.
	Inner ring fixed by nut with two grooves, bolt used to prevent loosen.	It can guarantee the nut cover vertical to the center line of shaft, and applied in vertical shaft of machine tool.
	Inner ring fixed by ladder sleeve, interference fit for sleeve and shaft diameter d_1 and d_2 .	This type fit to high speed shaft of high precision machine tool, it can overcome the changer induced by nut cover not plumping the center line. First mount the sleeve on shaft by heating, after cooled, expanding the sleeve by injecting pressure oil between sleeve and shaft, then adjust the position of sleeve by nuts.
	Bearing fixed by bolts and plate, and prevent loose by spring shim.	This type can't adjust the bearing clearance, often applied in the condition of shaft diameter > 70mm, high speed, and without turning thread on shaft.
	Inner bore with taper arrange to the taper bearing, and fixed by shim and nuts.	The bearing radial clearance can be adjusted, and suitable to bearing with tapered bore.
	Inner ring fixed by set sleeve, nuts, and snap ring.	Axial position and radial clearance of bearing can be adjusted. It's convenient to mounting and dismounting, often applied for fixing inner ring of self-aligning bearing. This type is applicable to supports with several pivot and difficult to process housing shoulder.

Table 5-7 Normal fix type of bearing outer ring

Diagram	Fix type	Characteristic
	Outer ring fixed by cover	Simple structure, high fix reliability, convenient to mounting and dismounting
	Outer ring fixed by Spring collar	Simple structure, convenient to mounting and dismounting, cover small space, often applied on radial bearings.
	Outer ring fixed by snap ring	Simple structure, applied in axial dimension limited.
	Outer located by housing shoulder, and the support fixed by bolt or plate.	Simple structure and high reliability.
	Outer located by shoulder on sleeve, and the support fixed by bolt or end plates.	Simple structure, shell bore can be a open bore, the axial position can be adjusted by shims, and has a good assembly procedure
	Outer ring fixed by bolt and top cover	Convenient to adjust clearance, and often applied of fixing angular contact ball bearing and taper roller bearing.