

## 7. Bearing Fits

For rolling bearings, inner and outer rings are fixed on the shaft or in the housing so that relative movement does not occur between fitted surfaces during operation or under load. This relative movement (referred to as "creep") between the fitted surfaces of the bearing and the shaft or housing can occur in a radial direction, an axial direction, or in the direction of rotation. To help prevent this creeping movement, bearing rings and the shaft or housing are installed with one of three interference fits, a "tight fit" (also called shrink fit), "transition fit," or "loose fit" (also called clearance fit), and the degree of interference between their fitted surfaces varies.

### 7.1 Fit selection

Selection of the proper fit is generally based on the bearing rotation and load conditions. Generally-used, standard fits for most types of bearings and operating conditions can be obtained in bearing technical manuals. In combine with the following recommendations:

- (1) The interference should be tighter for heavy bearings load.
- (2) The interference should be tighter for vibration and shock load conditions.
- (3) In general, the larger of the bearing size the tighter of the interference.
- (4) A tighter than normal fit should be given when the bearing is installed in hollow shafts or in housings with thin walls.
- (5) The interference calculation needs to be considered the roughness of the mating surfaces.
- (6) A tighter than normal fit should be given when the bearing is installed in housings made of light alloys or plastics.
- (7) The interference calculation needs to be

considered the loosening of the inner ring on shaft due to temperature increases.

Table 7-1 lists the fits for electric motor bearings. The dimensional tolerance for both shaft and housing bore are shown in Appendix II and given as reference for bearing fits against shaft and housing bore.

**Table 7.1 Fits for electric motor bearings (deep groove ball bearings)**

Bearing fit	Shaft diameter mm		Tolerance class
	over	incl.	
Shafts fit		~ 18	j5
	18	~ 100	k5
	100	~ 160	m5
Housing fit	All sizes		H6 or J6