Selection of the bearing clearance

Bearing clearance has a great impact on bearing life,temperature rise, noise, etc.,so it is necessary to choose suitable clearance according to working conditions and performance requirements.The clearance of the bearings is divided into radial and axial clearance, respectively, they represent a set of fixed, another set along the radial and axial displacement from one limit position to another limit position. The radial clearance of the bearing, including the original clearance in the Free State before the bearing is installed,the assembly clearance after loading the spindle and the housing,and the working clearance formed under the action of the load. For ball bearings, the most suitable operating clearance is close to 0, and for roller bearings, a small operating clearance is maintained.In parts that require a strong support rigidity, the bearing should have a certain number of preload.This is the principle of determining the radial clearance of a bearing.In GB gb4604-93, the radial clearance of rolling bearings is divided into 5 groups, and the clearance values are from small to large, of which 0 groups are standard clearance.In high-temperature, high-speed, low noise, low friction and other special conditions to operate the bearing should choose a larger radial clearance, for precision spindle bearings should choose a smaller radial clearance.It is important to note that the operating clearance after the bearing installed is smaller than the original clearance before installation, as the bearing is subjected to a certain load rotation, as well as the elastic deformation produced by the bearing and the load.

For radial thrust ball bearings and tapered roller bearings, they are usually mounted face-to-back or on-back, with the axial position of a particular bearing ring determining the internal clearance or pre-pressure.Starting from the zero-gap condition, the specified clearance can be obtained by adjusting the thickness of the gasket on the outer ring of the bearing or by loosening or screwing the back of the shaft. There is a fixed relationship between the axial clearance and radial clearance of such bearings, which is sufficient to satisfy one of these values.
When selecting bearing clearance, the following aspects should also be considered:

1. Operating conditions of the bearing, such as load, temperature, speed, etc.
2. Requirements for bearing performance, such as rotational accuracy, frictional torque, vibration and noise;
3. When the bearing and the shaft and the housing bore are interference fit, the bearing clearance is reduced;
4. When the bearing is working, the temperature difference between the inner and outer rings causes the bearing clearance to decrease;
5. The bearing clearance decreases or increases due to the different expansion coefficients of the shaft and the housing material;
6. Due to the large temperature difference between the inner and outer rings, deep groove ball bearings need to withstand a larger axial load or need to improve the tuning performance, the requirement to increase the limit speed and reduce the bearing friction torque and other occasions;
7. When the basic group does not meet the usage requirements, the Auxiliary group clearance should be selected. The large clearance auxiliary group is suitable for bearing and shaft and

housing hole with interference fit, small clearance Auxiliary group is suitable for high rotational accuracy, strict control of the axial displacement of the housing hole, and the need to reduce vibration and noise.