High - speed fatigue seal bearing

The seal of rolling bearings is one of the necessary conditions for simplification, miniaturization and lightening of mechanical equipment. High quality sealed bearings should have better grease retention, dust-proof and low temperature performance, and also have a longer service life.

1. bearing structure design. Taking the sealed bearing with two dimensions of the seal ring as the diameter of 25 * 52 and 15 x, for example, when the structure of the non-contact rubber sealing ring is used, because the space occupied by the sealing ring is larger than that of the dust proof cover, the width of the inner and outer rings of the bearing should be widened under the condition that the host space is allowed, which can increase the effective sealing space and facilitate the dispersion. At the same time, it can also fill more grease in order to improve the bearing life. The non assembly chamfering of the bearing is smaller than that of the conventional design, and r takes 0.3, which improves the dust-proof performance of the sealed bearing and reduces the leakage rate. The selection of bearing clearance is usually based on the third sets of clearances stipulated by GB, or even greater, which is beneficial to the high-speed performance of bearings.

2. design of the sealing structure. The design principle of the sealed bearing is to ensure that the sealing space is the largest after installing the sealing ring on the base bearing. This is restricted by many factors, for example, the minimum width of the outer ring seal groove is generally 0.5mm, and the minimum distance between the cage and the sealing ring is not less than 0.3mm. Under the premise of ensuring the machining accuracy, the inner ring grooved double lip sealing ring is selected, which is economical and can achieve better sealing performance.

3. design of cage. In order to adapt to the high speed performance, the solid riveting cage is provided with enough strength and light weight and good wear resistance. Taking into account the lubrication and heat dissipation of the sealing bearing, it is as thin as possible under the condition that the cage strength is allowed, so as to reduce the volume of the cage and increase the effective sealing space. At the same time, when the radial load is large, the speed of the high-speed bearing steel ball varies greatly, so that the pocket can be designed to be elliptical, so that the annular clearance between the pocket and the ball can be added, so that the grease can pass through the hole more easily, thereby enabling the cage to be effectively cooled, and the strength of the side wall of the pocket can be reduced and the cage can be avoided. Axial instability. The selection of guide clearance and pocket clearance of cage is larger than that of conventional bearing design, which is beneficial to lubrication and heat dissipation of bearings.

4. selection of seal clearance. The clearance between the dustproof cover and the inner ring is directly related to the sealing performance. Clearance is too large, sealing performance is not good, easy to grease, but the gap is too small, not only increases the difficulty of processing, and the external abrasive media easily cause wear to the inner ring flange; and for the use of sealed bearings, if the inner diameter of the seal is in interference fit with the outer diameter of the bearing inner ring, the grease leakage will not go out. The resistance moment of the moving

body and the cage is very large, which will cause the cavity to rise rapidly and bring more serious consequences. Through the test and analysis of the grease of the bearing, the suitable choice of bearing clearance is determined.

5. selection of grease and determination of filling amount. When the grease with high consistency is used, the grease and dustproof performance of the bearing are better, but the viscous resistance moment increases and the temperature rises. If the consistency of the grease is too low, the flow is large and easy to leak out. Based on the special requirements of high speed fatigue resistant sealed bearings, high temperature lithium or silicon based high temperature grease with high consistency should be adopted to meet the requirements of life reliability and sealing performance.