

Roller Crown Design For Taper Roller Bearings

[Tapered Roller Bearing](#) are widely used in heavy load metallurgy and mining equipment due to their large bearing capacity based on the characteristics of their own structure. The main parameters are: outer diameter D , inner diameter d , outer ring width C , inner ring width B , and assembly height T . In normal working of [tapered roller bearings](#), the main form of bearing failure is contact fatigue damage (pitting) on the rolling contact surface caused by variable stress of contact circulation. Therefore, the main problem of bearing design is to improve the distribution of contact stress between rolling contact pairs, improve the fatigue life of bearing rolling elements, and avoid bearing early fatigue failure. The design of convexity of taper roller has two aspects, that is, the design of convex profile of roller and the design of convex measurement, of which the design of convex profile is particularly important. Convex profile refers to the geometric shape of bearing roller bus, which determines the distribution characteristics of contact stress. Under the same load and contact conditions, the contact stress of tapered roller of different shapes is different along the length direction of the roller. The size of the convex measure refers to the maximum radial value between the surface point of the bearing roller and the specified reference point. At present, there are two kinds of convex generatrix of tapered roller.

Different convexity design of roller has significant influence on stress distribution and elastic deformation of roller and ring, which is directly related to bearing capacity and fatigue life of [rolling bearing](#). Stress concentration should be avoided in roller convex design, and the contact stress should be uniformly distributed in rolling contact pairs. The stress distribution in the contact area between the roller and the raceway is more uniform than that of the straight roller. The convexity measurement of roller not only directly affects the stress distribution of rolling contact pairs, but also greatly affects the stress value. The design of convex measurement should be determined according to the actual bearing load and working conditions. If the convex measurement design is not reasonable, the stress distribution in the contact area will be uneven and stress concentration will occur.