

Drill Chuck Bearing CASE STUDY



OVERVIEW

A leading tool manufacturer required a bearing that would allow one-way ratcheting, be compact in size, and make an audible “clicking” sound to signal the end user that the drill bit was tight in the chuck. In addition, the bearing had to be designed for precise and cost-effective manufacturing at high volumes. National Bearings was challenged with creating a bearing that included aesthetic features, while retaining high quality levels at a very reasonable price.

The Challenge

Meeting all the manufacturer’s requirements was a challenge in itself. But after an analysis of the original design, our engineers also realized that the standard angular contact bearing specified would not be able to incorporate the mounting components, deliver on the “click, click, click” or achieve one-way ratcheting.

In short, the standard solution would not allow them to manufacture the product as desired, especially for the low cost that was needed. To add to the challenge, the manufacturer wanted to reduce the number of components required in the design.

The Solution

Only a custom bearing could solve the issues the manufacturer faced. National Bearings went to work to design a bearing solution that included tight-tolerance metal stampings, which in the end provided a more cost-effective design than the standard machined and ground bearing.

The new bearing design reduced the number of components in the chuck; included the desired clicking sound; met the needed requirements for functionality and precision — all while ensuring low-cost manufacturing at high volumes.

The Result

Through close collaboration and numerous design iterations, National Bearings created a custom bearing that was vastly superior to the original standard version. Incorporating all of the important required and desired features, the custom bearing delivered enhanced performance and a simplified assembly — and still kept down costs for the client.

The original standard bearing and components cost the manufacturer about \$1.00 per chuck, plus a large amount of assembly time. The new custom bearing functioned as required with the correct level of precision, while reducing assembly time and cost less than 35¢ per piece!



The Unique National Bearings Approach

Complete, thorough application analysis allowed our engineering team to offer a subassembly solution that delivered on all counts. Not only did the solution meet all manufacturing requirements, it did so at a large cost savings to the client! We reduced the number of components needed, ensured precise design and manufacture of the product, and included both required and desired features — all without impacting functionality and manufacturability.