



What is a Ball Bearing?

Part 2

Miniature Ball Bearing Manufacturing

While the basic structure of a ball bearing is very simple, the improvement of said ball bearing requires enhancing the manufacturing precision of the ball bearing components to their limit.

In order to maintain complete control of the manufacturing process, NMB manufactures all bearing components in-house. To assist and contain the precision required in a ball bearing, we have developed in-house grinding machines that can be controlled to sub micrometer precision (one ten thousandth of a millimeter). Polishing and automated assembly equipment is also developed and maintained in-house.

Ball Bearing Materials

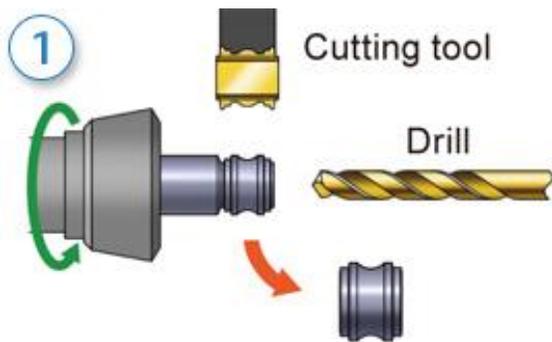
Chrome steel is used for standard ball bearing applications and environments where corrosion resistance is not a factor.

DDTM Material is a 400 series Martensitic stainless steel combined with a heat treating process exclusively developed by NMB's parent company, Minebea. Miniature and instrument bearings manufactured from DDTM Martensitic stainless steel meet the performance specifications of bearings that are manufactured with AISI 440C Martensitic stainless steel, and it is equal to or superior in hardness, superior in low noise characteristics, and is equivalent in corrosion resistance. These material characteristic advantages make for lower torque, smoother running, and longer life bearings.



Manufacturing Process

1- Cutting



Cutting is the first step of the manufacturing process. Drills and cutting tool machines are used to shape and cut the raw material into rings.

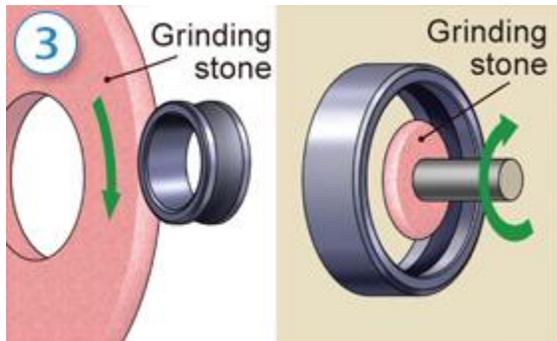
2 - Heat Treatment



A heat treatment process is used to enhance the durability and increase the life of the cut metal piece.

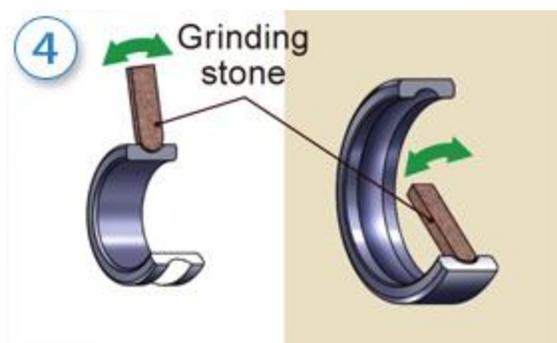


3 - Grinding



A grinding stone is used to grind the surfaces of parts to the required dimensional accuracy and precision. Dimensions such as the outer and inner diameters and the width are ground to micrometer (one-thousandth of a millimeter) precision, as is the groove, a key internal structure formed between the inner and outer rings in which balls run.

4 - Honing



The groove between the outer and inner rings in which the balls run is honed to nanometer (one-thousandth of a micrometer) precision.



5 - Assembly Process



The inner and outer rings, balls and cage; also known as a retainer, are assembled. Lubrication such as oil or grease is applied based on the application requirement of the bearing. After lubrication has been applied, and based on the customer's requirements, the bearing is assembled with either one or two shields. This is the process where exactly the right parts are assembled to meet the customer's specific requirements.

Uniform Manufacturing Processes around the World

The manufacturing process for miniature ball bearings requires extremely delicate and sophisticated precision, and simply using the same materials and manufacturing equipment does not guarantee that uniform products will be produced.

Minebea has introduced a proprietary "warp and weft" approach to ensure that all of its eight manufacturing plants worldwide produce a uniform quality of products.

Vertical examination of all the manufacturing processes is the "warp". Plant managers examine all the manufacturing processes and machines in every facility to ensure that the basis of Minebea's long-accumulated knowledge is integrated and verified.



The "weft" in this system is the dispatch of managers for each of the manufacturing processes from the Karuizawa Plant, the "mother plant," to the seven overseas plants to ensure with an objective eye that processes are horizontally deployed throughout the world.

One of the features of this system is the frequent visits by the Karuizawa Plant managers to the overseas plants, much as if they were visiting a plant next door, to oversee and train local employees. The combination of this warp and weft enables Minebea to achieve a manufacturing system which guarantees uniform products and high productivity, no matter where they were manufactured.

Dedication and commitment to the continuous improvement of manufacturing processes requires a significant investment of corporate resources in a wide range of technical disciplines. It also requires the implementation of these advanced technologies, and their application, to every phase of parts processing, bearing assembly and inspection.

Our ability to turn out millions of bearings of the highest quality at competitive costs every month has helped to make the company the world's leading manufacturer of miniature and instrument ball bearings.

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About NMB Technologies Corporation – NMB Technologies Corporation, a Minebea Group Company, is the world's largest manufacturer of [miniature precision ball bearings](#) and a volume leader in the design and manufacturing of precision electro-mechanical components, including [cooling fans and blowers](#), [precision small motors](#) and [mechanical bearing assemblies](#), as well as a total solutions supplier of backlight, and [LED programmable drivers](#). NMB products can be found in the personal computing, networking, telecommunications, home entertainment, home electronics, and automotive, medical and industrial markets. For more information on NMB Technologies Corporation visit: <http://www.nmbtc.com> or contact us directly.