

Ball Bearing Solution for 3D Printing Galvanometer

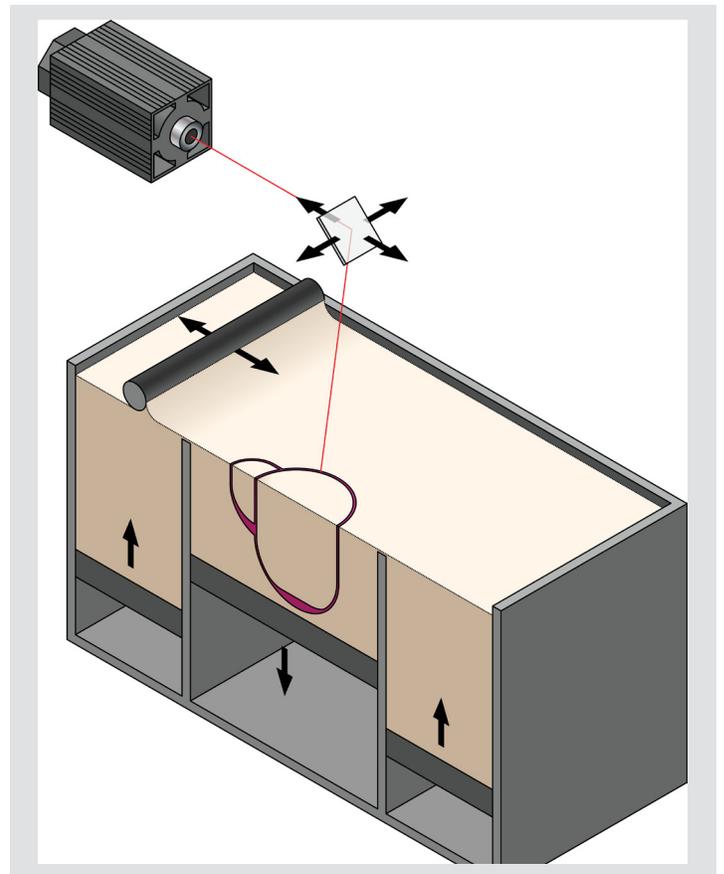


NMB Miniature Ball Bearings enable ultra-precise rotational movements for galvanometers within 3D printing applications which eliminates dimensional errors in the final 3D print.

3D printing facilitates rapid prototyping, accelerates product development and it has become an important tool for engineers and designers. This technology has been especially helpful during the recent Coronavirus pandemic allowing manufacturers to quickly adapt to meet urgent needs for ventilators, PPE and other medical equipment.

In order to create accurate prototypes that engineers can utilize in the design process, 3D printers employ galvanometers which produce precise oscillatory movements. A galvanometer uses two motorized scanning mirrors – one for each axis – to direct a laser beam towards the print surface. This laser beam reacts with the UV-sensitive resin to harden – or cure – each layer.

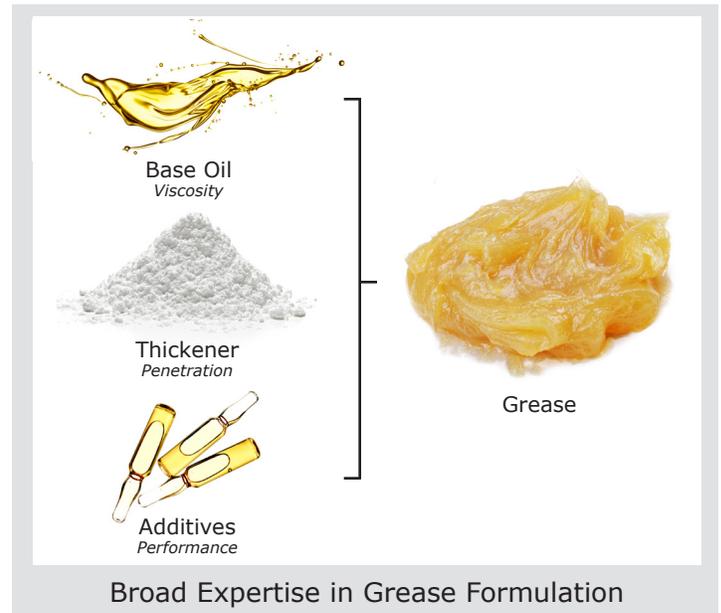
Because the galvanometer is essential to the printing process, components used within this mechanism need to be highly reliable.



Ball Bearing Material & Lubricant Expertise for Optimized Solutions

There are two ball bearings used in each galvanometer for 3D printers. Because this environment can be sensitive to magnetism and all martensitic steel holds magnetic properties, any magnetic effect can cause inaccuracies in the final product. As a result of this, NMB proposed a hybrid solution with ceramic balls reducing any imprecise movement due to magnetic "spring back". NMB miniature ball bearings are typically manufactured using chrome or stainless steel for both the inner/outer rings and balls, however ceramic material can be used on the ball components to improve the end product design, as well as when extreme speed is required.

This lubrication eliminated the oscillation marks on the raceway surfaces allowing for precise rotational movements of the galvanometer.



Broad Expertise in Grease Formulation

MinebeaMitsumi has over 60 years of experience developing and manufacturing miniature ball bearings. Our vertically integrated approach demonstrates our core technology capabilities in material selection, lubrication solutions and installation support.

3D printers enable makers to create fast, accurate prototypes and adapt rapidly when changing needs arise. For ultra-precise applications such as 3D printing, NMB miniature bearings are a reliable, cutting-edge solution. Local engineering support ensures each solution is optimized to meet our customer's specific performance requirements.



NMB Hybrid Ball Bearing with Ceramic Balls

In order to reduce any potential damage to the raceway, it is important to select an optimal lubricant. Our experience developing similar oscillatory solutions for hard disk drives helped during the selection process – by working with our engineers, we were able to recommend a Perfluoropolyether (fluorinated synthetic) base oil.