



New Hampshire Ball Bearings, Inc.
— A Minebea Company —

inside track

A High Tech Heat Treat

Over the previous two years, NHBB has diligently produced a ground breaking addition to its HiTech manufacturing plant in Peterborough, NH.

The new sophisticated heat treatment plant, all 11,000 square feet of it, was completed in the fall of 2005. Significant efforts were made throughout the project to coordinate relocation of all heat treat equipment, so as to minimize the impact on production. The capabilities that this new heat treatment plant brings to NHBB will undoubtedly provide predictable high performance and increased production capacity as NHBB progresses into the 21st century.

The calculated relocation process was the final stage in a two year, four part operation. New building construction began in June, 2004 including the fitting of all new

underground utilities, sprinklers, flooring and roofing, as well as a masonry firewall designed to separate the heat treat facility from the main manufacturing plant in an emergency situation. As fall and winter arrived, the project moved on to interior renovations, including all mechanical and electrical upgrades. Each piece of new and updated equipment was in place and fully operational by the fall of 2005.

In coordination with this project, NHBB added a highly developed vacuum carburizing furnace to its fleet, complementing the already established presence of several other hardening and tempering furnaces. According to Steve Carey, HiTech's Manager of Materials Engineering, "This new furnace will allow NHBB



Heat treatment plant completed in the fall of 2005.

to enter areas of the bearing markets in which we had previously not participated."

Carey continued, "The innovative vacuum carburizing furnace provides improved capacity for standard vacuum heat treating in addition to allowing NHBB to

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Integrated Business Management

NHBB's HiTech Division is pleased to announce confirmation of an Integrated Business Management System from its registrar, BSI, the world's leading international standards, testing, registration and certification organization.

The Integrated Business Management System combines the already registered Quality Management System per AS9100 Rev. B and Environmental Management System per ISO 14001:2004. NHBB HiTech has been implicitly working to these combined standards for several years.

Bert Broderick, HiTech Quality Manager explains, "Rather than being mutually exclusive, as these standards were when they were first written, the most recent updates actually have a lot of overlap. Impacts to the environment were always considered as part of any continuous

improvement activities and product integrity was always considered as part of any environmental regulatory review, so in the end, it made sense to integrate them." As a result of the integration, HiTech realizes 20% less audit days per year.

The representatives of BSI made extremely favorable comments regarding the cleanliness and organization of the HiTech facility, praising the workforce for being actively engaged in both the Quality and Environmental systems, and pronouncing as "world class" the training materials developed for this internal audit system.

NHBB is the first bearing company to have one of its divisions attain this elite management system status from BSI and HiTech is one of the first manufacturing facilities in New Hampshire to accomplish the feat.

EPA Performance Track Three-Peat for NHBB

Further advancing as a global leader in the production of world class bearing products, NHBB's Precision Division has been named a member of the U.S. Environmental Protection Agency's (EPA) National Environmental Performance Track program. Precision joins NHBB's two other manufacturing divisions, HiTech and Astro, and more than 300 other U.S. manufacturing facilities in their commitment to consistently exceed environmental regulation requirements.

Since 1971, the Precision Division has focused on producing sophisticated, non-standard, ultra-precision miniature and instrument bearing designs. These specialty bearings are essential to and used significantly in commercial and military aerospace applications, as well as in dental, medical and other advanced industrial fields.

Precision bearing manufacturing is a machine intensive process. Each assembly produced is machined to tolerances measured, in some cases, to within millionths of an inch. This precision is achieved through the use of machine tools and heat treating equipment, all of which use an abundance of power and raw materials.

Launched in June, 2000, the EPA's National Environmental Performance Track program and its members are taking extra steps to minimize their manufacturing impact on the environment while maintaining improved productivity.

Objectives include the reduction of waste and significant adverse impacts caused by new products or processes; the reduction and elimination of pollutants into the environment; and the promotion of environmental awareness among employees and the community.



“Through our continual environmental projects and advancements, NHBB, as an organization, has pledged to exceed all federal and community regulatory requirements.”

Dave Bustillos, Precision Division Facility Manager, offered details of several projects that have lent themselves to this philosophy. “Since 2000, we have reduced air emissions, specifically Volatile Organic

Compounds (VOCs), from 11 tons to approximately 1 ton as of July 2005.” In addition, “One particular open top cleanser and degreaser of manufacturing utensils, containing the Ozone Depletion Potential (ODP) chemical AK-225, has been readily substituted with an aqueous degreaser.” Bustillos added that, “Oil is one

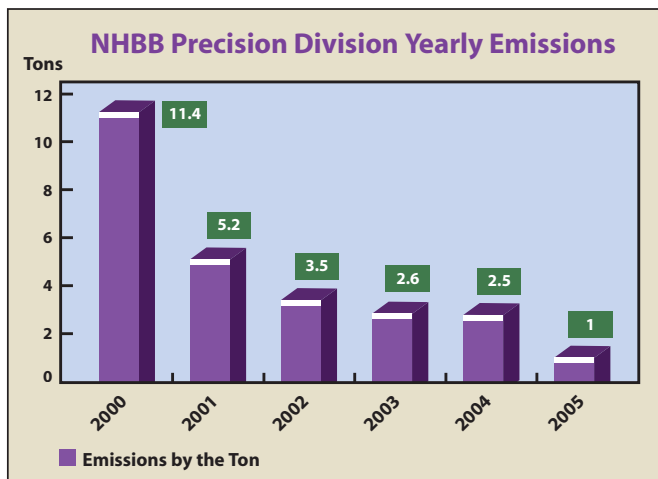
of the major raw materials used in manufacturing bearings, generating an oil mist. Any oil that does not drain back into the machine is collected in an overhead duct that is connected to a mist eliminator. This system cleans the air, ensuring a healthier work environment.”

As part of this prestigious program, NHBB is eligible for numerous benefits, including EPA recognition and regulatory incentives that cut paperwork, increase administrative flexibility and help the facility focus on environmental and, subsequently, manufacturing improvements. In addition, current members actively participate in a mentoring program, where each facility can assist another qualifying applicant with a goal of improving its overall environmental performance.

Several studies are underway to help NHBB create new and innovative projects to exceed regulations. Vegetable-based oils are being tested since they are renewable, produce less oil mist and produce lower emissions when recycled. Research is being conducted to change over to environmentally friendly citric acid and completely eliminate the use of nitric acid and sodium dichromate when treating and coating bearing rings. A completion target date of late 2007 has been planned for this change.

Lastly, NHBB is developing a community based program in which regional schools will be invited to tour the facilities and learn more about the environmental aspects and impacts of the bearing manufacturing business.

Bustillos concluded, “Through our continual environmental projects and advancements, NHBB, as an organization, has pledged to exceed all federal and community regulatory requirements, which hopefully promotes a culture of being proactive, rather than reactive when it comes to environmental awareness.”



The Expertise of Our Engineers

As new research and development continues to advance technology throughout the Rod End and Spherical Bearing industry, companies are relying more on the experience of the product application engineer.

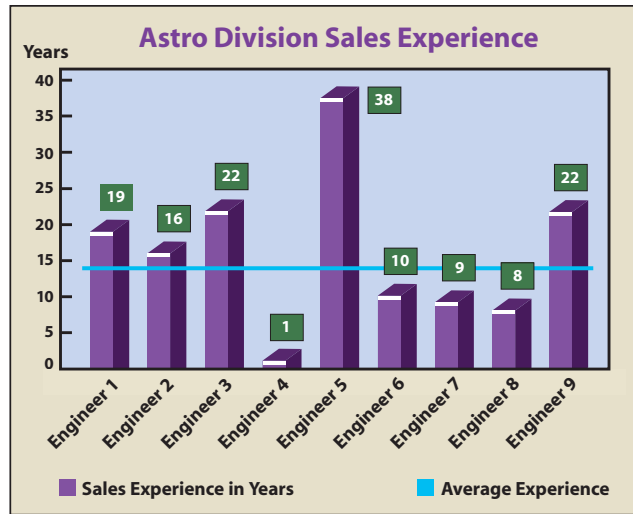
Whether they need a basic plain metal spherical bearing or complex TEFLON® lined bearing with an integral housing design, customers increasingly come to depend on the expertise of the NHBB Astro Division Product Engineering group.

With an average of 16 years experience amongst the group, the experience and education level of Astro's engineers is unprecedented in the bearing industry. "Having such experience to draw from allows us to tailor specific solutions to meet unique customer demands when an existing solution will not suffice," says Scott McNeil, Applications Engineering Manager.

Astro engineers can select from over 60 distinct TEFLON® liners to meet customer demands. Astro also offers many various construction methods for spherical bearings such as split ball, split race, swaged and load slot. Many different solid film lubricant options (dry film coatings) are available as alternatives to TEFLON® liners.

The engineering proficiency that Astro is able to provide its key customers is crucial. McNeil continues, "Our customers count on us to give them alternative solutions and specific expertise, keeping in mind both application requirements and cost. Rather than specify a new design from scratch, our engineers can point the customer towards a design they may already purchase...there is no point in designing

engineering is defined as a very expansive field, involving the application of physical principles for analysis, design, manufacturing, and maintenance. All of Astro's application engineers have at least a Bachelor of Science in Mechanical Engineering. McNeil adds, "Our enhanced level of knowledge allows us to leap ahead in what we can accomplish."



Seeking new solutions and sharing this knowledge is what keeps Astro's engineers focused and enthusiastic. McNeil concludes, "This is truly a cohesive team environment where everyone feels comfortable filling in for one another when needed and knowing that they can turn to each other for assistance on any given application."

Having access to parent company Minebea's increasingly wide range of research and development resources gives Astro an additional benefit that not all bearing companies have, the ability to anticipate new opportunities, ensuring each customer that they will be getting the most advanced and latest technology and applications available.

NHBB: Keeping Technology on the Move at Medical Design & Manufacturing West 2006

For the seventh consecutive year, the NHBB's Precision Division was a principal exhibitor at the world's largest medical design and manufacturing trade show. Held annually at the Anaheim Convention Center in Anaheim, California (January 30 – February 2), Medical Design and Manufacturing West (MD&M) played host to 2,045 exhibitors and 45,000 participants (an increase of 15% from 2005).

According to Alan Paynter, the Precision Division Sales Manager, "the medical industry has been growing by 12% annually; the medical and dental markets represent a very important segment which is tactically supported by our ultra-precision miniature and instrument bearing product offering... MD&M provides NHBB with a unique opportunity to showcase our capabilities and better appreciate the needs of our key customers, as well as to better understand the medical industry trends."

With an extensive range of engineered solutions, reliability testing equipment and a level of customer satisfaction focused on unsurpassed quality in products and services, NHBB has the in-house ability to take customer's designs from concept to final product, customizing the bearing to meet all application challenges. As a result, NHBB has been designed into more FDA approved applications than any other bearing manufacturer.



(left to right) Carroll Purvis, NHBB Product Specialist, Terrie Maddox, NHBB Sr. Sales Engineer Central Region, Mary Beth MacKenzie, NHBB Regional Sales Manager East Region, Brad King, NHBB Applications Engineer



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www.nhbb.com



Dianne Flanders

Inside Sales Rep,
Astro Division, Laconia , NH

Years at NHBB: 24

NHBB in Person

Dianne began her NHBB career as a receptionist and also worked in engineering. She obtained her B.S. in Marketing from Southern University of NH.

While Dianne’s main focus is to service the external customers, she works with internal customers as well. Responsibilities include quoting, backlog management and customer returns. She also handles foreign accounts, including export licensing and understanding the specific laws for specific products that are involved.

Challenges:

“My greatest daily challenge is to provide my customers with the best responses to their needs and the best turnaround time possible.

I enjoy problem solving, no matter how big or small the problem is. I will push until I can come up with the best solution and/or tools needed to resolve the problem.

I find it very helpful to go out into the factory daily to check on parts and get a better understanding of what needs to be done to get them into stock to ship to the customer. Understanding these processes and connecting with the machinists and engineers helps me communicate accurate information to the customer, under any circumstances, good or bad.”

A High Tech Heat Treat

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participate in supplying our principal customers with carburized bearing components...this puts NHBB in an excellent position to continue providing our customers with product that meets the increasingly demanding application requirements for today’s aerospace bearings.” Carey added that,“ carburizing process development for prime aerospace bearing materials is underway with a tentative completion date targeted for June of 2006.”

In addition, NHBB has two fixture quench furnaces that have allowed the facility to be more competitive in the larger diameter aerospace bearing market. The fixture quench process provides much better distortion control for larger diameter bearing rings. As a result, as-turned stock allowances on these sized rings have been reduced, resulting

in improved throughput times for subsequent machining operations.

NHBB is also Nadcap accredited for heat treatment, hardness testing, and metallography. There are three internal, advanced hardness testers, along with a well-equipped metallurgical laboratory, capable of fully supporting all material testing requirements. This ensures that NHBB will continue to develop and control all critical processes in house, rather than contracting these treatments and services to outside sources.

Dick Reynells, NHBB HiTech Operations Manager, adds that “this expansion and upgrade to the heat treatment facility not only advances existing operations in terms of quality, capacity, and reliability, but through strategic capital investment also provides the opportunity to participate in supplying ball and roller bearings to ever expanding aerospace applications requiring technology.”



Vacuum Carburizing Furnace



Fixture Quench Furnace