

Stieber Clutch

AIDS ATTEMPT AT WORLD RECORD IN HIGH-SPEED BIKE COMPETITION

Humans have an innate thirst for adventure and an instinctive desire to expand their knowledge through first-hand experience. By testing the limits of personal strength and endurance, humans can obtain a better understanding of themselves. One aspect of adventure is the art of competition.

Team AeroVelo, comprised of professionals and engineering students from the University of Toronto, recently pursued this quest for adventure by joining others in an attempt to set the world human-powered speed record.

Every year, teams gather from around the world to compete at the World Human-Powered Speed Challenge (WHPSC) in Battle Mountain, NV. Team AeroVelo brought their newly designed "Eta" speed bike to the 2014 competition. AeroVelo, a design and innovation lab, pursues engineering projects that foster a sense of adventure and passion in scientific development.

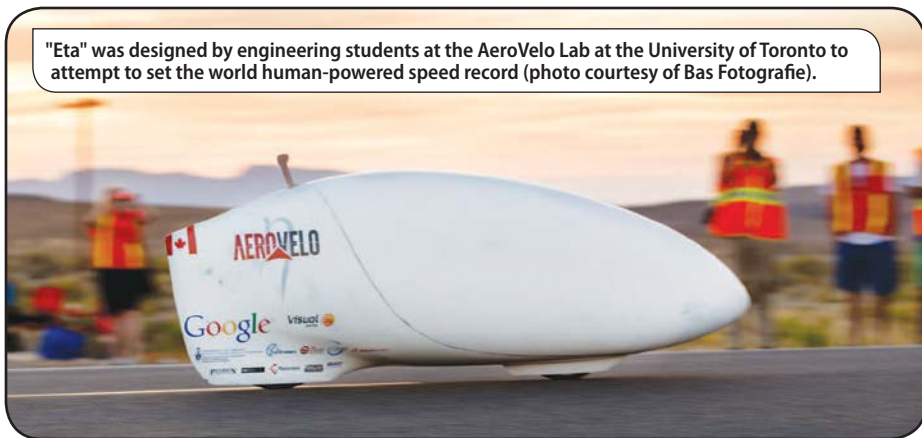
"We're very small and right now our main activities are the student summer projects, public speaking and outreach and limited consulting on wild engineering projects," stated Cameron Roberston, co-founder of AeroVelo, Inc. "AeroVelo partners with the University of Toronto's Human-Powered Vehicle Design Team (HPVDT) and shares the team workspace full-time during the summer."

HPVDT, comprised of U of T undergraduate students in aerospace, materials and mechanical engineering, focuses on the design and construction



The Stieber CSK25 overrunning clutch was an integral component of the AeroVelo drivetrain.

"Eta" was designed by engineering students at the AeroVelo Lab at the University of Toronto to attempt to set the world human-powered speed record (photo courtesy of Bas Fotografie).



of innovative, high-performance human-powered vehicles. The goal of the AeroVelo/U of T partnership is to provide students with hands-on, practical engineering design experience that promotes efficiency and sustainability while encouraging the reduction of society's impact on the environment. Each year the student team has four months to engineer and build a human-powered vehicle.

"The students' time at AeroVelo counts toward a 600-hour engineering experience required of all graduates," Robertson said. "For students, it's similar to a research internship in a lab, but the design freedom, creative opportunities and time spent in hands-on fabrication are above and beyond what is available elsewhere. This summer, all of the students have been extremely motivated and have very quickly picked up on many of the design concerns and tradeoffs in developing this year's high-powered speed bike. Students with no specialization in bicycles or aerospace have quickly become familiar with both."

"Eta," the name of AeroVelo's 2014 speed bike, is the Greek letter used in engineering as the symbol for efficiency, and represents the team's goal of building the world's fastest human-powered vehicle, capable of breaking the current ground level speed record of 133.8 km/h (83.1 mph).

The speed bike's internal components are as equally fundamen-


tal to the successful performance of the bike as the aerodynamic design. A portion of Eta's transmission is designed to use a more efficient chain than what is typically used in bicycles.

"Most bicycles have a free-wheel which allows the wheel to rotate even when the pedals and chain are stationary," said Alex Selwa, a member of the U of T student engineering team. "In our front-wheel drive design we are not using a standard bike chain and cannot use an off-the-shelf bicycle free-wheel."

The team contacted Formsprag Clutch in Warren, MI to request an overrunning clutch solution. Formsprag, an Altra Industrial Motion company, donated a Stieber CSK25 PP overrunning clutch to the AeroVelo team as part of Formsprag's Student Support Program. The CSK clutch was chosen in order to accommodate the size and load requirements of the unique hub.

"The front hub design involved fitting many different components into a small and efficient package," said Selwa. "The clutch needed to be as small as possible in order to fit inside the sprocket and stay within the width requirements of the hub. The clutch is press-fit onto the hub body and then pressed inside of the sprocket. It is responsible for driving the wheels at speeds up to 145 km/h or 90 mph."

Stieber's model CSK25 PP is a bearing-supported sprag-type clutch, delivered grease-lubricated and protected against dust particles as small as 0.3 mm. It provides instant locking/engagement when the clutch shifts from overrunning to engagement, with a maximum overrunning speed

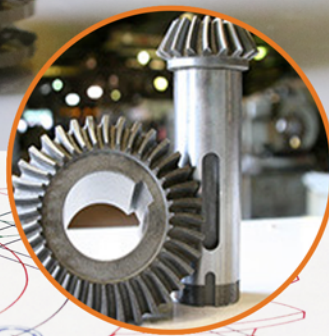


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of 5,000 rpm and a 77.5 lb. ft (105 Nm) torque capacity. The sprag-type backstop keeps the shaft from turning backwards with keyways on both the inner and outer races that prevent the bearing from rotating on the shaft. All CSK clutches feature Formchrome sprags with chromium-infused steel that produces an ultra-hard surface to maximize wear resistance.

With the help of Stieber Clutch, Team AeroVelo's Eta speed bike reached a top speed of 126 Km/h (78 mph) at the 2014 World Human-Powered Speed Challenge.

"Our goal with Eta is not simply to break a speed record," stated Todd Reichert, co-founder of AeroVelo, Inc. "Our goal is to reach such unbelievable speeds that it gets people to think twice about preconceived limits of what is possible."

For more information:

Altra Industrial Motion
23601 Hoover Rd.
Warren, MI 48089-3994
Phone: (800) 927-3262
www.altramotion.com

Marsh Bellofram

LAUNCHES TYPE 5000 PRESSURE TRANSMITTER

The Precision Controls Division of Marsh Bellofram Corporation, (Bellofram PCD) a member of the Bellofram Group of companies and an ISO9001:2008 certified designer and manufacturer of industrial air pressure regulation instrumentation, recently announced the launch of the Type 5000, a two-wire I/P pressure transmitter for industrial field service requirements.

The Type 5000 pressure transmitter converts a signal pressure input into a 4-20 mA or 10-50 mA output with 0.1% typical accuracy. Its design incorporates a temperature compensated piezoresistive transducer for the accurate gauge pressure measurements of both non-corrosive gases and liquids. The transducer is insensitive to mounting orientation and most industrial vibration inputs.

The lightweight housing of the Type 5000 includes a ¼ inch NPT pressure port and ½ inch NPT conduit port for field wiring. The arrangement of mounting holes on the transmitter housing also permits direct pipe mounting for minimum installed cost. Connections are accessible via the unit's top cover removal.

Type 5000 pressure transmitters are available with a variety of industry certifications, including NEMA 4X housing approval for explosion-proof service; FM Class I, Divisions 1 and 2, Groups B, C & D approvals for explosion-proof service; FM Class II, Divisions 1 and 2, Groups E, F & G approvals for dust ignition-proof service; and FM Class III Divisions 1 and 2 approvals. Other industry specific approvals and certifications may be available upon request.

All Marsh Bellofram products are 100% designed and manufactured in the USA at the company's manufacturing facility in Newell, WV. Standard models are typically available for shipment within just ten business days, with expedited delivery upon request.

For more information:

Marsh Bellofram Corporation
Phone: (304) 387-1200
www.marshbellofram.com

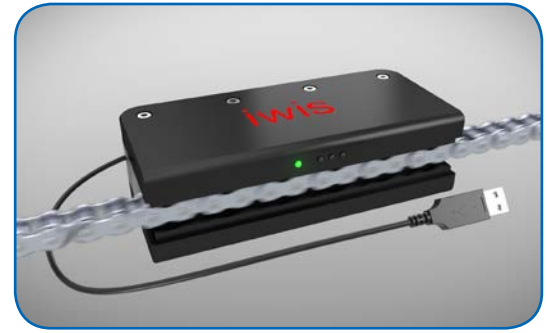


Chain manufacturer Iwis Drive Systems recently developed a new monitoring system for measuring chain elongation. The new, patented CCM (Chain Condition Monitoring) system measures the wear elongation of chains in use and warns the maintenance personnel in advance if the chain needs to be replaced.

The CCM system can be integrated in numerous chain applications and retrofitted in existing plants and machines without the need for special add-on components for the chain. The device determines the wear in a chain drive and notifies maintenance personnel where and when preventive maintenance is required. Operating state and wear status are indicated by LEDs and readings can be transmitted to a computer through USB and viewed with a special interface. Because measurement is contactless, the chain drive is not affected in any way. No additional deflection pulleys or supports are needed.

“The main benefit of the new CCM system for our customers is that maintenance personnel can react on time,” said Florian Madlener, design and development engineer at Iwis’ headquarters in Munich, Germany. “No long downtimes of plants and machinery, no risk of missing delivery deadlines, no interruption of the logistics chain. All of these contribute to avoiding financial loss through production outages. The system can also continually monitor high-precision chain applications.”

The CCM system can be used independently of chain speed. Depending on the chain size, possible chain speeds range from 0.02 m/s to over 15 m/s. The device has protection class IP67 and can be used under normal environmental conditions and at temperatures from 0 to 60°C. Calibration of the CCM system to the respective chain sizes is performed by Iwis before delivery.



Iwis supplies a product range for all drives and conveying applications. The full program comprises precision and high-performance roller chains, conveyor chains, maintenance-free and corrosion-resistant chains, accumulation chains, special-purpose conveyor chains, leaf chains, flat-top chains and modular belts for industrial applications, chains and accessories for agricultural machinery, and timing drives for the automotive industry.

For more information:

Iwis Drive Systems, LLC
Phone: (317) 821-3539
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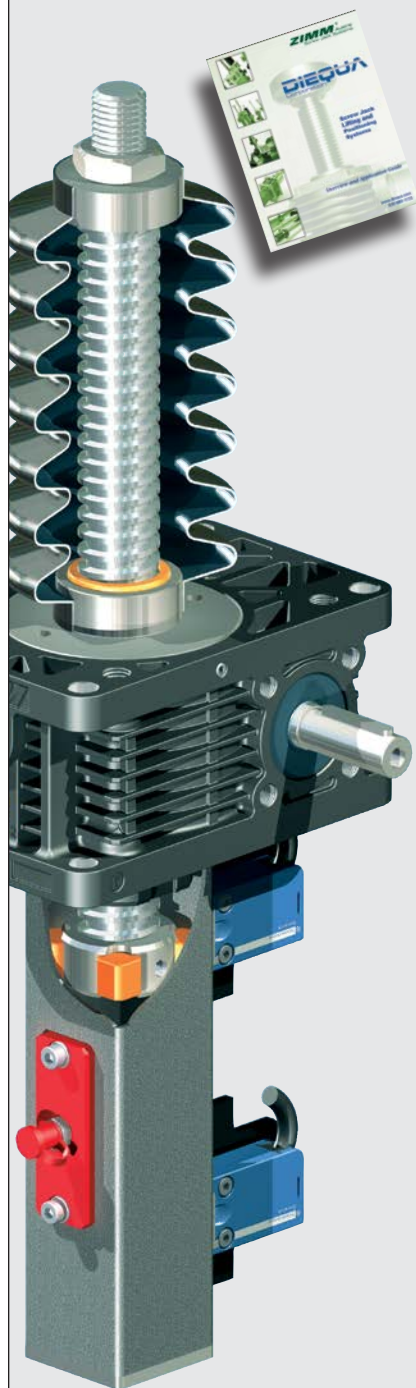


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SKF offers bearing solutions engineered for support rollers in continuous caster applications at steel mills. The primary types of SKF caster bearings – spherical roller and CARB toroidal – serve to effectively cope with the axial expansion and contraction of rolls associated with induced axial loads and temperature fluctuations. Ultimately, SKF caster bearings can eliminate induced axial loads, reduce risk of roll seizure, promote enhanced bearing reliability and service life, and increase caster productivity.

SKF spherical roller bearings feature two rows of patented self-guiding rollers with a common sphered raceway in the outer ring and an optimized internal design. These features serve to reduce friction, minimize heat generation, accommodate shaft misalignments and heavy loads, and contribute to longer bearing life.

SKF CARB toroidal types are self-aligning radial bearings merging the benefits of standard “locating/non-locating” bearing systems typically found in continuous caster applications. They are designed to accommodate misalignment (similar to spherical roller bearings) and normally supplied as full complement bearings to take advantage of their increased load rating.

All SKF caster bearings are available in a wide range of sizes and can be specified with specialized seals and otherwise customized to meet demanding application requirements.

For more information:

SKF USA, Inc.
Phone: (219) 865-2693
www.skfusa.com



RSF

ELEKTRONIK RELEASES NEW MODULAR ENCODER

RSF Elektronik recently unveiled the MSR 40 modular rotary position feedback system to machine designers who want a way to measure angle on larger rotary axes. Common applications for the MSR 40 include medical technology, general automation, textiles, and auxiliary axes in machine tool and metrology.

The MSR 40 optical kit style encoder provides a 200 micron grating pitch on a steel tape that has three ways of being applied to the axis of motion. The MSR 40 is suited for machines which require motion feedback for a full 360 degrees or a segment thereof.

The MSR 40 is available with a minimum diameter of 150 mm to a maximum of 1,150 mm; however, larger diameter versions are available upon request. The same reader head can be used for all the various diameters offered, and is available with analog 1 Volt peak to peak interface as well as digital TTL interface with up to one

hundred times interpolation.

All measuring tape versions of this encoder have a ± 30 micron per meter accuracy associated with the circumference of tape. The MOR version tape requires a small pocket to be milled from the axis in order to accommodate a clamping mechanism which ensures accuracy over the joint of the measuring tape ends. The MER version has small plastic tubes on the back of the measuring tape as a supporting structure and the measuring tape can be screwed together to complete a full 360 measurement. This version mounted to the axis has a benefit because of the tube backed measuring tape. This version is rated for a lower dynamic performance and rigidity as a consequence of simple mounting.



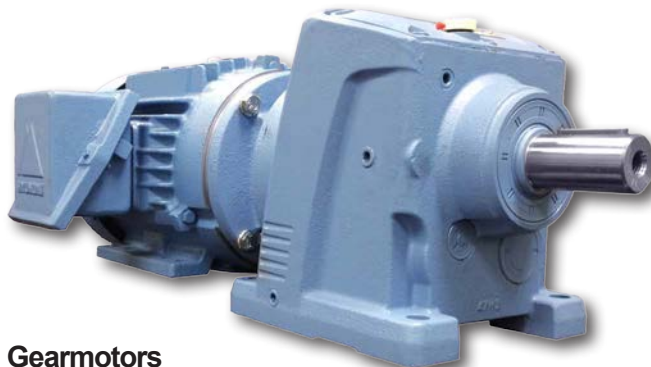
RSF Elektronik encoders are available in North America through parent company Heidanhein Corporation, and found in the metrology, machine tool, and semiconductor industries.

For more information:

RSF Elektronik
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Parker

RELEASES ETH125 ELECTRIC CYLINDER

Parker's Electromechanical Automation Division, a supplier of motion control technology, recently announced the release of the ETH125 electric cylinder.

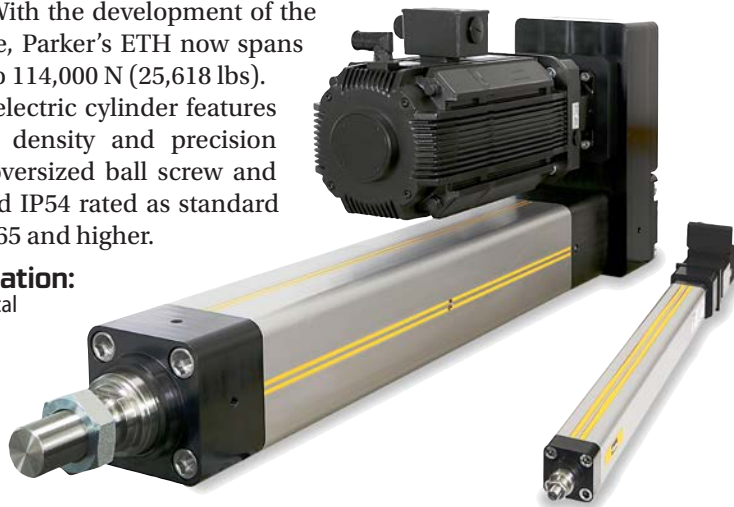
The ETH125 is the fifth and largest frame size in the series and expands this line of industrial cylinder product to serve a broader range of application requirements.

The ETH is the next generation of electric thrust cylinder product and utilizes a new integrated drive train and guidance design that has enabled Parker to maximize the overall thrust capacity within a smaller overall footprint. With the development of the 125 mm frame size, Parker's ETH now spans a thrust range up to 114,000 N (25,618 lbs).

ETH high force electric cylinder features maximized thrust density and precision position control, oversized ball screw and thrust bearings and IP54 rated as standard with options for IP65 and higher.

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Bosch Rexroth

DEVELOPS CONTROL SOLUTIONS FOR CRANE DRIVES

Rexroth recently developed a new control solution that is suitable for both simple and complex winch and crane drives

The control system from Rexroth can be connected to the customer's system using predefined interfaces. Numerous hardware variants in the form of an extensive modular system allow the designer maximum flexibility and reduce costs and errors during commissioning by means of a simple "plug-and-play" interface.

In the software, for example, the designer can access standardized modules for control functions. Integrated security features ensure compliance with the required safety level. The modular structure of the software makes using the control system very flexible, in both simple and complex applications. The designer

can choose the degree of networking, also in terms of security features, according to the specific application requirements.

For example, for applications with a hydraulic power unit and a single winch drive Bosch Rexroth offers with this solution a cost-effective and extremely compact integrated control system, based on its BODAS RC28-14/30 controller.

Originally developed for mobile applications, the controller is designed



Metcar

ANNOUNCES AVAILABILITY OF CUSTOM VANES, ROTORS AND END PLATES

Metallized Carbon Corporation, a manufacturer of oil-free, self-lubricating, carbon-graphite materials for severe service lubrication applications, recently announced the availability of custom vanes, rotors, and end plates for use in rotary vane pumps.

The carbon-graphite components provide lubrication in most environments, and are designed for pumping liquids with poor lubricating qualities, strong chemicals that attack metals, and to pump air, vacuum, combustion products and gasoline vapors.

Metallized Carbon's carbon-graphite vanes, rotors, and end plates are used in such dry running applications as automotive anti-smog pumps and gasoline vapor pick up pumps, breathable air pumps and vacuum pumps. In-liquid applications include vending machine beverage pumps, fuel and liquid chemical pumps, and medical liquid pumps.

Metallized Carbon supplies the carbon-graphite vanes, rotor, and end





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for use in harsh environments, as it can withstand temperature changes as well as vibrations and shocks. The control solution is also compact and can be installed saving space on deck for workboats or platforms.

Modifications, enhancements, and the interface to the customer's system can be tested and adjusted by the designer directly on a test stand provided by Rexroth. This saves an expensive commissioning and testing of the solution on board the ship.

Based on proven technology, field-tested components and validated software, Rexroth's control solution enables engineers to develop crane and winch systems with optional active heave compensation capabilities faster and cheaper.

For more information:

Bosch Rexroth Corporation
Phone: (800) 739-7684
www.boschrexroth-us.com

plates to rotary pump and compressor manufacture and rebuilders. The materials are chemically resistant and are compatible with FDA food and beverage regulations. They have a low wear rate running in both gas atmospheres and low viscosity liquids.

Carbon graphite vanes can withstand the rubbing of the vane tip against the housing bore and the rubbing of the side of the vane against the slots in the rotor. Lightweight carbon graphite rotors save energy and withstand the rubbing against the vane and

the end plates. Carbon graphite end plates are pressure tight and dimensionally stable so that they can make a close clearance seal with the rotor and vanes. They also withstand the rubbing of both the vanes and rotor.

These materials work best in severe service applications.

"With dimensionally stability and high strength to weight ratio, the components are available in several grades of Metcar's proprietary carbon/graphite material," said Matthew Brennan, chief operating officer of Metallized

Carbon. "Our engineers assist in selecting the optimum grade based on application, environment, housing materials, rpm and other parameters."

For more information:

Metallized Carbon Corporation
Phone: (914) 941-3738
www.metcar.com

NSK

LOW TORQUE BEARINGS IMPROVE ENERGY EFFICIENCY IN MRO SECTOR

Within the global automotive sector, NSK has worked with the industry to produce low torque bearings which help to reduce power consumption and emissions. Now these advances in engineering design are being applied to general purpose, deep groove ball bearings, which are used in a wide range of industrial applications.

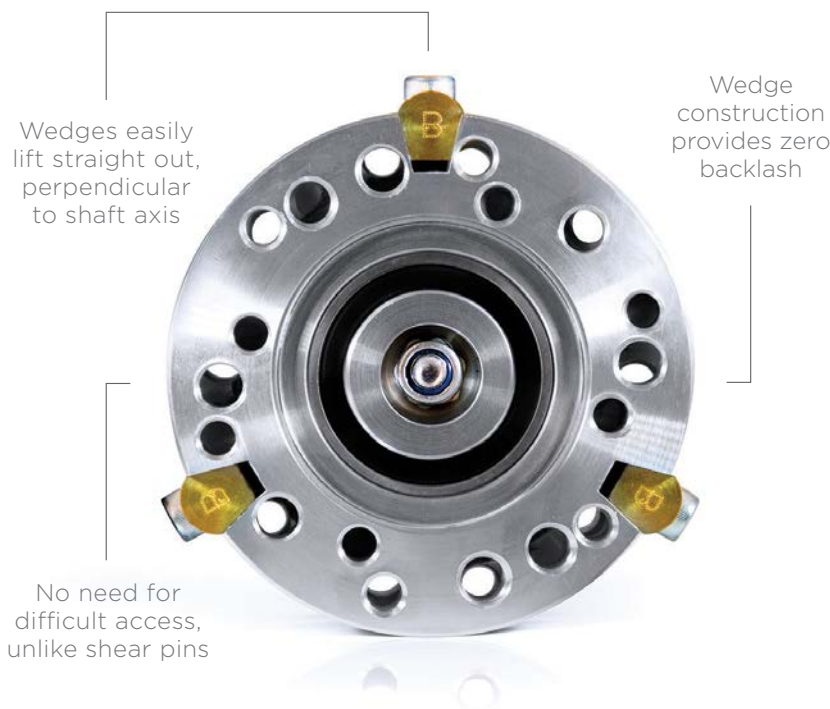


There is a worldwide focus on energy efficiency and, increasingly, production engineers are looking beyond initial procurement prices when assessing capital investment in new equipment. Instead, attention is drawn to the total cost of ownership (TCO) as well as CO2 emissions for the expected life of the machine. Most notably, this has led to changes in electric motor design and the regulations which govern it.

NSK recently developed a series of improvements for bearing design and manufacture. These have resulted in standard deep groove ball bearings demonstrating up to a 47 percent torque saving for high speed domestic appliances compared to conventional bearings of the same size.

NSK has made several developments in tribology and material technol-

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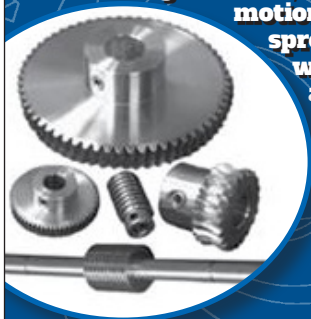
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ogy as well as advancements in steel cleanliness to produce an improved steel fatigue life. In addition, further advancements have been made in the heat treatment process which increase hardness and wear resistance characteristics.

In terms of actual bearing manufacture, NSK has modified the ball bearing raceway surface finish and geometry. This reduces internal friction which

in turn reduces power consumption, operating noise levels, heat generation and wear. This is complemented by further improvements to the lubrication and sealing properties of the NSK bearings.

For more information:

NSK Americas
Phone: (888) 446-5675
www.nskamericas.com

R+W

INTRODUCES NEW MINIATURE VIBRATION DAMPING DRIVE SHAFT

R+W America recently expanded upon its design of vibration damping drive shafts, series EZ2, with a new miniature design, size 5. The new size 5 shafts feature customer specified lengths and bore diameters, along with fully split clamping hubs for easy drop-in mounting. Speeds in excess of 5,000 rpm can be achieved without any intermediate support bearings required.

Improvements include clamping hub bore diameters from 5 mm to 1/2", with or without keyways, peak torques up to 24 Nm with an outside diameter of just 25 mm, customer specified lengths of up to 6 meters and custom application engineering datasheet with each quotation request.

Available with elastomer shore hardness values of 98A or 64D, they can compensate for axial, lateral and angular misalignment, in addition to absorbing vibration and torque spikes, while transmitting motion precisely with zero backlash.

In addition to this new smaller size there are also new larger sizes, expanding the R+W range of vibration damping drive shafts to include torque capacities up to 25,000Nm and bore diameters up to 140 mm.

For more information:

R+W America
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www.rw-america.com



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