



**Eric Davids**  
*Regal Beloit America*





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# Sky High Technology

Today we meet Eric Davids, Application Engineering Manager Aircraft Technology at Regal® Beloit America. Eric is located in Regal's Specialty Bearing manufacturing facility in Valparaiso, Indiana, USA and has been involved in the aerospace and specialty bearing industry for 13 years.

## **How did you get involved in the specialty bearing industry?**

Eric: "My background previously was in the aerospace industry working in multiple positions related to product design. I have been able to translate

the design requirements learned in the aerospace industry and apply them to the specialty bearing industry. The requirements related to risk aversion and bearing life can be different when comparing specialty bearings to catalog bearings."

## **What makes a bearing a specialty bearing?**

Eric: "For McGill® bearings, a specialty bearing is a bearing designed for a specific application. These specific applications for various reasons cannot accommodate a catalog

bearing. There are also applications where it is cost advantageous to design a specialty bearing over a complicated design accommodating a catalog bearing. Different bearing materials and bearing construction all can be designed to optimize the life of the bearing in the application. Examples of McGill® specialty bearings include modifying a bearing outer ring geometry to allow for anti-rotation features (for example a bolted flange). We have also worked with customers to modify roller geometry and bearing material to optimize bearing life within specific applications.”

### Why do people use specialty bearings?

“Specialty bearings are needed for applications where catalog bearings cannot adequately achieve design requirements,” says Eric. “If an overall system redesign outweighs the cost of a specialty bearing, specialty bearings have an advantage. Application examples such as extreme environment conditions related to temperature or salt water as well as critical aerospace applications are common for specialty bearings. Other examples include bearing designs where relubrication of the bearing is not possible or extremely time-consuming and expensive.”

### Where are specialty bearings used?

Eric: “Common areas for specialty bearings are in the aerospace industry. This industry has bearings that require special

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designs due to risk aversion. Also, there are special quality requirements and non-destructive testing inspections common in this industry. Traceability of the bearing back to raw material is also a common requirement. Other industries are moving in this direction for bearings that are critical to an application’s design.”

### What are some specialty materials and why do you use them?

“Bearings are generally produced from 52100 thru-hardened steel (AMS 6440) or carburized steels such as 8620 or 9310,” says Eric. “The thickness of the material and impact loading in the application are factors in the selection of thru-hardening or carburizing grade steels. For high temperature applications (approximately > 400°F or > 200°C) a tool steel known as M50 per AMS 6491 is used. Advances in steel cleanliness and processing have also allowed for an increase in bearing life. VIM-VAR 52100 thru-hardened steel (AMS 6444) is an example of a higher cleanliness steel which allows for longer bearing lives in well-lubricated environments.”

“There are also steels which provide corrosion protection. 440C steel is common but is not the most beneficial steel in regards to maximizing bearing life. Crondur®\* 30 and XD15NW are more recently developed corrosion resistant steels that provide the benefit of not only corrosion resistance but theoretically longer bearing life. BG 42 is a further corrosion resistant steel that can be used at higher

operating application temperatures.”

\* Crondur registered trademark of Energietechnik Essen GMBH.

### Why does Regal<sup>1</sup> have specialty bearings?

“McGill® bearings have been positioned over the years to ensure one of their strengths is effectively meeting the needs of customers who require specialty bearings in their applications. Our company has been providing aerospace bearings for over 60 years,” says Eric. “We have application/design engineers whose sole purpose is to design bearings for specific customer applications. Our engineers talk directly to the customers’ engineering groups. Therefore, our vast experience in the aerospace industry has helped in increasing the knowledge in manufacturing, heat treatment as well as design processes. The McGill® specialty bearing engineers and production personnel have experience in a wide range of bearing products from cylindrical roller bearings, angular contact ball bearings, gothic arch ball bearings, spherical roller bearings, and airframe cam followers.”

Eric: “The McGill® specialty bearing plant has been planned to specifically meet the production needs for specialty bearings. The plant is oriented to manufacture small manufacturing lots with various manufacturing requirements. Turning/Machining, Heat treatment, grinding, and other operations are all contained within the plant. With customer service, engineering, and marketing also





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onsite, collaboration to handle specialty bearings product is possible.”

**How do you know what features are needed in a specialty bearing?**

Eric: “From the experience gained over the years in the types of bearings created and material used, McGill® bearings engineers can review certain applications and provide guidance regarding not only the best material for an application, but also the optimum size and type of bearing needed. At Regal<sup>1</sup>, we have multiple bearing analysis programs and

capabilities including Finite Element Analysis tools to review applications and determine what bearing options are needed. We also have tools to review bearings that have been in service in applications. These tools and reviews provide a detailed look at the bearing to see if any design changes may be needed. An example of a tool regularly used would be a scanning electron microscope.”

**In conclusion do you see any new developments forthcoming in regards to specialty bearings?**

“Advancements in materials and lubrication are always being developed within the industry. The McGill® specialty bearing team is reviewing new materials by conducting rolling contact fatigue tests. We are also reviewing improvements in surface finish and the corresponding effect on bearing

life. At Regal<sup>1</sup>, we are always searching for new and innovative ways to increase bearing life within new and existing applications,” concludes Eric.

**About Regal Beloit Corporation**

*Regal Beloit Corporation (NYSE: RBC) is a leading manufacturer of electric motors, electrical motion controls, power generation and power transmission products serving markets throughout the world. The company is comprised of three business segments: Commercial and Industrial Systems, Climate Solutions and Power Transmission Solutions. Regal is headquartered in Beloit, Wisconsin, and has manufacturing, sales and service facilities throughout the United States, Canada, Latin America, Europe and Asia. For more information, visit [RegalBeloit.com](http://RegalBeloit.com)*

<sup>1</sup> References here to ‘Regal’ mean ‘Regal Beloit Corporation and its affiliates worldwide or any one of Regal Beloit Corporation or an affiliate.’