



GKN POWDER METALLURGY

NOTHING SHORT OF ALCHEMY

INNOVATION

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GKN POWDER METALLURGY FOUND A WAY TO SHINE IN LIGHTWEIGHT TECHNOLOGY, ADDITIVE MANUFACTURING, AND ELECTRIFICATION.

The process of powder metallurgy (PM) has existed for over 100 years. By heating compressed metal powders to just under their melting points, metallurgists can produce high-quality parts for a variety of applications.

But the field has evolved quickly over the last two to three decades, leading many to claim it as a superior process to more expensive methods like forging and metal casting. It's also fairly sustainable, as powder metallurgy

creates advantages for material utilization, near-net shape dimensional control, and other benefits.

GKN Powder Metallurgy consists of GKN Sinter Metals, GKN Hoeganaes, and GKN Additive, and designs, manufactures, and services high-precision and high-volume products for original equipment manufacturers (OEMs), and suppliers far and wide. In fact, an easy way to understand the scope of GKN Powder Metallurgy is to look at any way you might

travel—chances are good that GKN was involved in one way or another.

“We pride ourselves on being an engineering company,” said Ryan Vollmert, Director of Purchasing in the Americas for GKN Powder Metallurgy. “Our constant focus is to provide the solutions our customers need.”

GKN Powder Metallurgy designs, manufactures, and supplies market-leading sintered metal components for automotive and industrial markets.

As stated before, there are many ways to produce an end product made of metal. GKN Powder Metallurgy's goal is to do it better.

"We face direct competition from your standard metal forming processes. Our goal is to remove or eliminate the need for further downstream processing and machining," Vollmert said.

"The challenge of going up against competitors of existing components or designs yields two directions: we can either provide the equivalent part, or engineer a solution for a larger or more complex problem or goal. Think consolidating multiple parts into a single entity, creating shapes you otherwise can't through other standard processing, or using more exotic materials."

There are many innovative industry focuses GKN Powder Metallurgy is researching and developing, including lightweight aluminum technology, hydrogen technology, and Industry 4.0. But it's the company's progress in two fields in particular—electrification and additive manufacturing—that showcase to us why it truly is an industry leader.



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ELECTRIFICATION

In general, powder metallurgy optimized components can offer less complexity and assembly, better thermal behavior, and a smaller design. This is incredibly important as the automotive industry moves toward electrification.

“We’re a significant player in the auto field—it’s the primary consumer of our products,” shared Vollmert. “Electrification is a huge focus of the auto market. Lightweight technology that offers CO2 emissions reduction go hand in hand.”

Electrification doesn’t only mean fully electric vehicles though—Vollmert is talking hybrid and even combustion engine cars as well.

“The engines and transmissions of today will

exist in a much different fashion in the short to mid-distance future,” he said. “There’s not just a push for innovations for electric vehicles. Internal combustion engines need to compete with hybrid and electric cars for the time being, meaning every manufacturer should be looking at some level of electrification.”

The path to electrification for car manufacturers is a challenging one, but solutions abound through GKN Powder Metallurgy’s ‘Design for PM’ approach.

New solutions for electric pumps, eMotor components, and pump sets enable integrated and compact systems using fewer parts, reducing assembly time. Electric engines are quieter than combustion engines,

and unveil the noise eDrive transmissions make. GKN Powder Metallurgy’s gear solution reduces noise, vibration, and harshness (NVH) through “surface-densified and topographically-optimized PM gears.”

GKN Powder Metallurgy will work with auto manufacturers as well, partnering to develop better-performing components for electrification.

“Our advanced Design for PM (DPM) approach offers an opportunity to review the design of complete sub-systems and components that are subject to the new challenges coming with electrification: reduc[ing] weight and size, [and]

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improv[ing] NVH and thermal behavior,” the website stated.

Today, one integrated PM-optimized design can take the place of many components, manufactured from a variety of metals.

“We can now use more exotic materials in different performance criteria,” Vollmert said. “We’re helping to create smaller, lighter, more efficient systems in support of the electrification of all vehicles.”

ADDITIVE MANUFACTURING

3D printing is familiar to the majority of us by now. Its

ability to print using metals, however, is fairly new.

“Being a powdered metal company, we are very familiar with this tech,” commented Vollmert. “There is a lot of effort going into being at the forefront of additive manufacturing growth in terms of the materials we are using.”

One of the focuses of GKN Powder Metallurgy’s research is scaling AM to be cost effective.

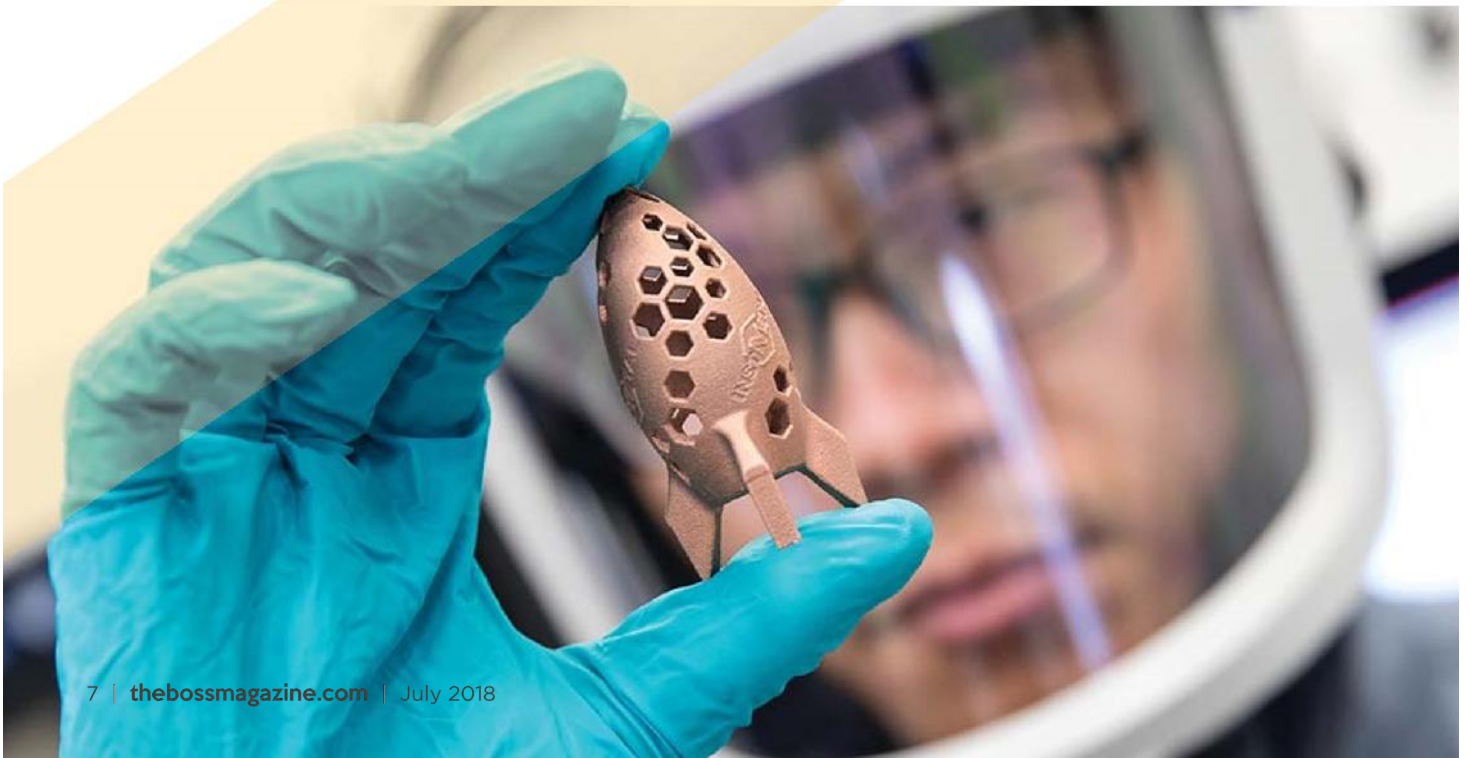
“There’s tremendous R&D going into the tech, and we have multiple concepts in

the wings. We are a global leader in the generation of materials themselves, so that gives us a leg up on some of the performance criteria.”

GKN Powder Metallurgy has largely benefitted from incorporating 3D printing into its processes in making prototypes for customers before product launch. With its InsAMetal Platform, the company offers interactive and instant 3D printing quotes.

It’s a digital business platform that can offer customers 24/7 service when ordering 3D metal

“WE CAN NOW USE MORE EXOTIC MATERIALS IN DIFFERENT PERFORMANCE CRITERIA. WE’RE HELPING TO CREATE SMALLER, LIGHTER, MORE EFFICIENT SYSTEMS IN SUPPORT OF THE ELECTRIFICATION OF ALL VEHICLES.” Ryan Vollmert, Director of Purchasing in the Americas






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printed parts. Customers upload a CAD file, InstAMetal verifies the feasibility of manufacturing the component, customers choose the material, and then a quote is provided. A new feature allows designs to be shared with customers' teams.

With AM, GKN Powder Metallurgy was able to develop a new powder material and manufacturing process fit for the automotive industry. High strength, excellent wear resistance, and toughness that is still machinable are the characteristics of 20MnCr5, a material Porsche Engineering took the time to test.

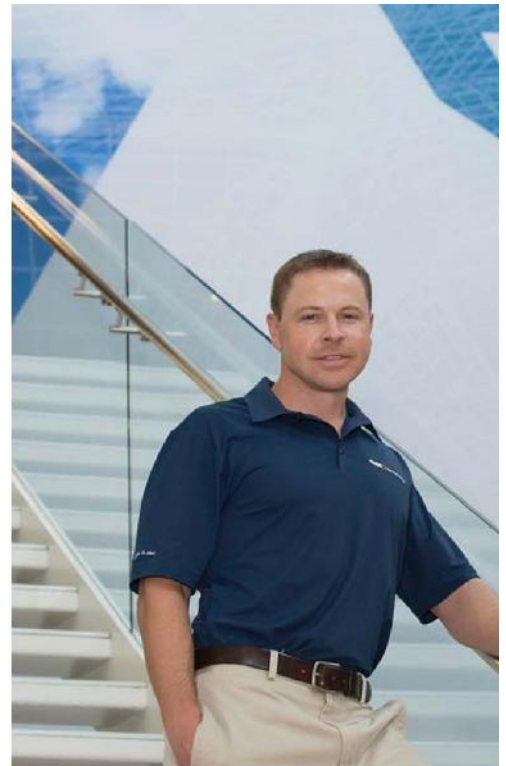
"Using the technique of structural optimization in combination with GKN Powder Metallurgy's AM and 20MnCr5, a unique design of the differential—including the ring gear—was developed," the company shared. "With this combination of weight reduction and stiffer shape of the gears, a more efficient transmission was achieved. As metal AM continues to progress and become a mainstream process, the application can be extended to not just prototyping or motorsport but also series production."

A NEW MOLD

"GKN Powder Metallurgy is truly an innovative engineering company dedicated to working with customers and finding creative solutions to challenging problems," said Vollmert. "In order to do so, we rely on a vast contingent of capable suppliers to support GKN Powder Metallurgy's external needs, including value-added processes such as machining, heat treating, and coating, as well as all the other indirect support functions needed to keep our plants running efficiently.

"We're moving toward a 'One PM' approach, where we will be seamlessly merging the sub-brands of Hoeganaes, Sinter Metals, and Additive under one Powder Metallurgy brand. We want to be seen as a metal shapes solution provider, a company that works with its partners from powder to process to part."

Already an industry leader, GKN Powder Metallurgy will be able to bring more strength to its product offerings with this internal consolidation. We can't wait to see what they do next. ■

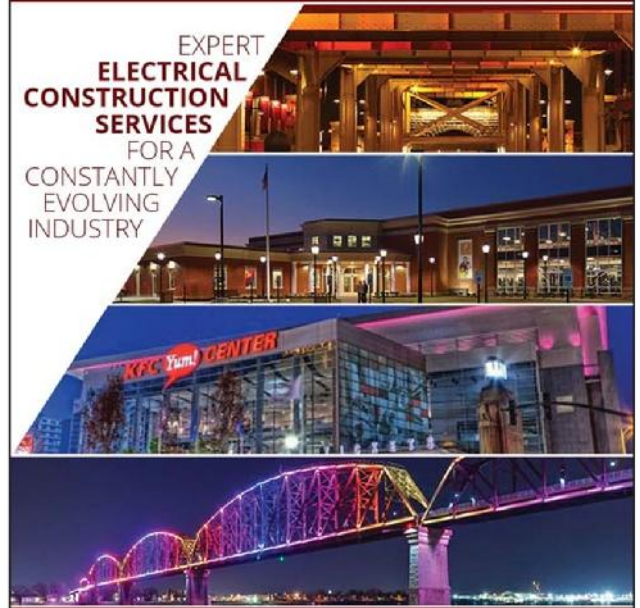


“THERE’S TREMENDOUS R&D GOING INTO THE TECH, AND WE HAVE MULTIPLE CONCEPTS IN THE WINGS. WE ARE A GLOBAL LEADER IN THE GENERATION OF MATERIALS THEMSELVES, SO THAT GIVES US A LEG UP ON SOME OF THE PERFORMANCE CRITERIA.”

Ryan Vollmert



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