



Products

We continued on our transformation journey as a leading global provider of engineered products and diversified industrial technologies in 2021.

Consistent with our relentless pursuit of next, we remain focused on developing digitally-enabled solutions, advanced manufacturing processes, and integrated systems to help our customers meet the demands of a changing global market. Our products and our product roadmaps are focused on delivering or accelerating automation capabilities, lighter-weight products for our end markets, and technology and equipment to ultimately enable our customers to manufacture products using recycled and biofriendly polymers.

To this end, we work closely with our aerospace and industrial customers to provide customized products and innovative solutions. For example, we intensified our global digitalization efforts by developing our digital program as an essential component within the Barnes Enterprise System (BES), with a view toward consistent, scalable solutions that drive value for Barnes. In addition, we have expanded our Innovation Hub with the addition of several advanced engineers and research scientists who are focused on advancing our injection molding technology. We are partnering with universities and industry groups that share this same vision of supporting the development of sustainable polymers and a complete plastic circular economy.

We expect that ongoing investments in research and development, BES, Innovation and TMS will continue to position Barnes as a technology leader in products and services, delivering new and exciting next-generation technology while advancing socially and environmentally responsible concepts and methods.





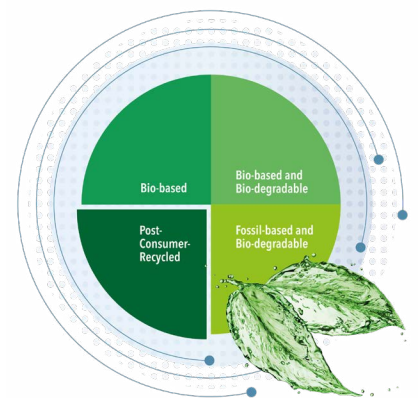
Barnes Industrial

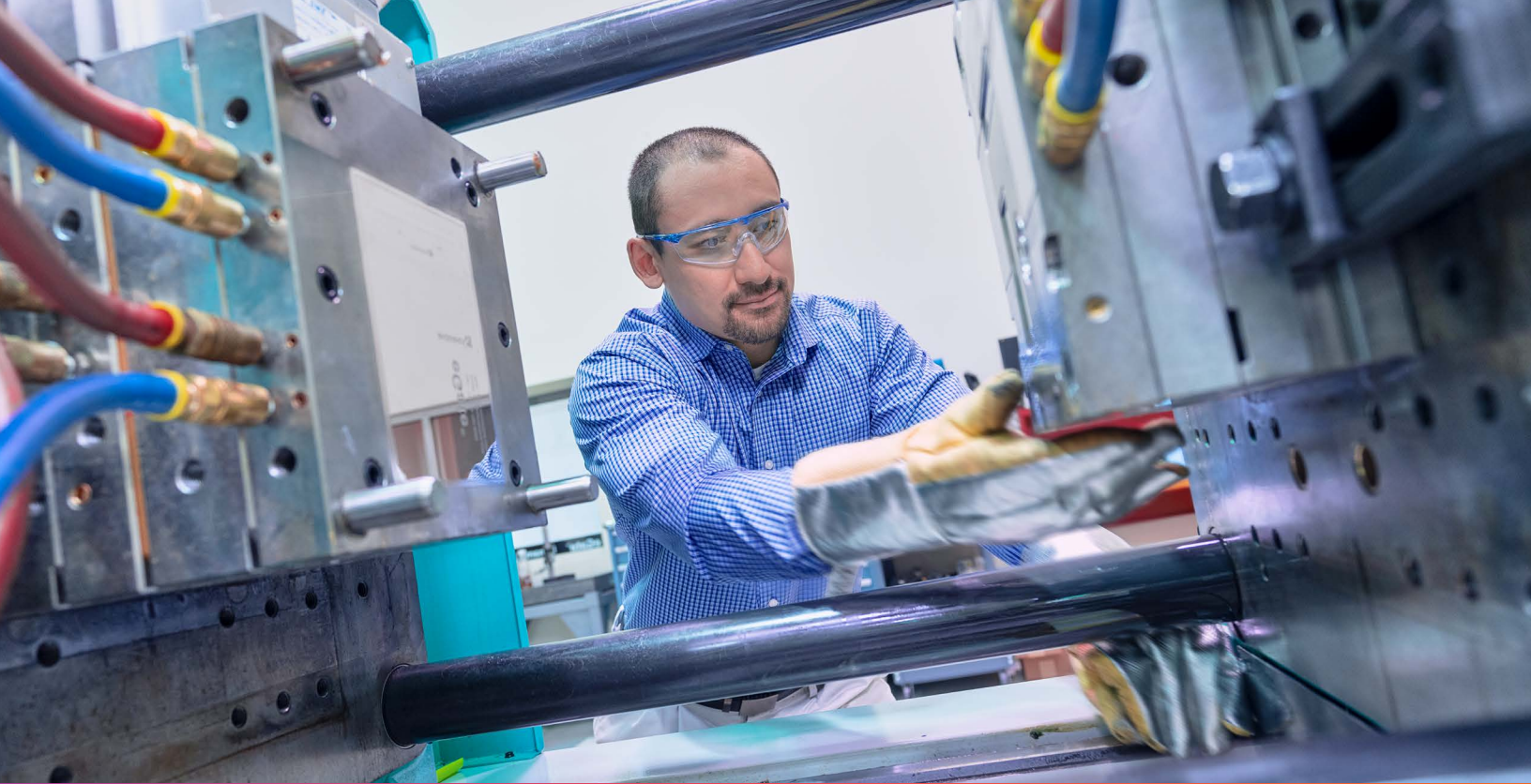
Molding Solutions

Our Molding Solutions strategic business unit continues its influence as a leading solutions provider for the plastic injection molding industry. Its focus and partnerships with injection molders in major end markets such as automotive, packaging, and medical devices, and emphasis on advanced equipment used to mitigate plastic waste and related carbon emissions, are instrumental components of its technology roadmap. Projects aimed at delivering tangible sustainability benefits involve reducing vehicle mass, improving aerodynamics, and reducing material usage through optimizing product designs, among others.

Molding Solutions continues to strengthen its partnerships across the circular economy to develop new manufacturing technologies with a sustainability focus in collaboration with many leading consortiums such as The Alliance to End Plastic Waste and The Ellen MacArthur Foundation. Molding Solutions is also actively aligning its processing technology with leading producers of new sustainable plastic materials, such as post-consumer recyclable, bio-based, and even bio-degradable compositions to produce products made of more sustainable materials that perform as well as or better than products made of current fossil-based polymers. Barnes has strategically partnered with global research centers, universities, product designers, and end-of-life converters to develop injection molding technology that minimizes waste and maximizes user performance, delivering safe and reliable solutions.

Molding Solutions showcased many exciting new manufacturing technologies resulting from these ongoing efforts at the 2021 international trade fair for plastics processing.





Sustainability is a focus area for all brands of Molding Solutions. We are very proud to be a key participant in the Digital Watermarks Initiative Holy Grail 2.0, initiated in the Spring of 2020 by AIM – European Brands Association and the Alliance to End Plastic Waste. We have been active in this initiative since 2016 under the leadership of The Procter & Gamble Company and facilitated by the Ellen MacArthur Foundation. Holy Grail is a collaborative effort designed to solve one of the most significant obstacles facing plastic recycling – inefficient sorting at recycling facilities. FOBOWA is making a key contribution to this effort to develop and introduce digital watermark technology in its injection molds. FOBOWA's injection molds offer digital watermarking capability to the injection molders that enables the sorting systems to process various plastic packaging and allow for scale-up of the sorting process associated with the circular economy.

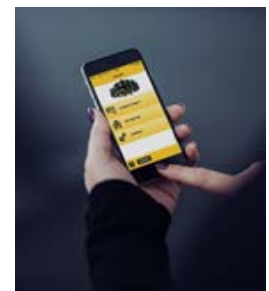
Sustainability is an increased focus in all markets today. Automotive is just another example where customers are demanding more sustainable solutions. Synventive recently launched eGate Sync, a motion controller enabling the electrical movement of the valve gate. The new eGate Sync offers injection molders a much faster “plug and play” installation on a hot runner. Unlike hydraulic or pneumatic systems, eGate Sync improves the process by leveraging electrical technology, resulting in higher quality parts with greater efficiency and reliability. The Priamus portfolio has always been at the forefront of offering intelligent process monitoring and closed-loop process control systems for injection molding. Our Priamus FILLCONTROL solution allows an injection molder to automatically balance inconsistencies in the molding process by reducing cavity-to-cavity variations. These auto-corrections are even more relevant when processing bio or regrind materials to control and balance viscosity variations. At the same time, this allows for the processing of regrind resins with a broader viscosity range. The ability to minimize personnel attendance to adjust the process – even with the complexity of high cavitation molding - is a clear benefit to customers.



Force & Motion Control

Our Force & Motion Control strategic business unit offers highly engineered, premium technologies that solve challenges associated with complex metal forming, heavy-duty suspension, and a spectrum of industrial applications. Our high-performance products and custom solutions are designed for optimum performance in less than ideal environments while offering the highest level of control in order to minimize energy consumption and mitigate waste.

Our products and systems allow for optimized energy consumption, yielding enhanced production rates and efficiencies for our customers, including those customers engaged in the manufacturing of light-weight electric vehicle components and many other sustainability focused markets. Most notable is our recent introduction of Next Generation High Speed Stamping Manifolds for high volume commercial production of batteries used in cutting-edge electric vehicles. Also, its latest technology in stamping enables faster production speeds with longer tool life while consuming less energy.



Furthermore, our unconventional Xtreme Duty Gas Springs support our customers with a shift in technology by replacing older problematic hydraulic fluid solutions. Consequently, worker safety is improved by eliminating high-pressure hydraulic lines, lessening the environmental impact of leaking hydraulic fluids, and reducing energy consumption through the elimination of pumps and motors.

Specifically focused on safety and the introduction of our new KALLER Academy, Barnes is promoting and driving safety across all levels of its product users. The KALLER Academy is an e-learning training portal where customers learn how to safely interact with our products and solutions. With the launch of KALLER Academy, we have exponentially brought awareness of product safety to our entire global customer base and beyond.

Through sound customer relationships and leveraging key Barnes tools, our Force & Motion Control business is well-positioned to support the world's sustainable technology requirements of the future. From improving the human interface to supporting foundational design components, we continue to grow and play an important role in many health, environmental, and safety-related end-uses.



Engineered Components

Our Engineered Components strategic business unit continues to offer unconventional vehicle components using advanced alloys and manufacturing principles, delivering leading engine and powertrain components, improving fuel efficiency, and supporting vehicle electrification.

Barnes continues to augment its historical product portfolio with a complementary focus on sustainable product platforms and related environmentally conscious processes. Our automotive and industrial business segments are actively involved in a number of vehicle electrification projects, engaged with systems and components for sustainable transportation related to several new technology platforms.

Our advanced engineering and proactive customer engagement supports products used in clean and greener power-generation systems, as well as mission-critical fully electric and hybrid electric vehicle components – all of which are helping to save vehicle energy and reduce CO₂ emissions.

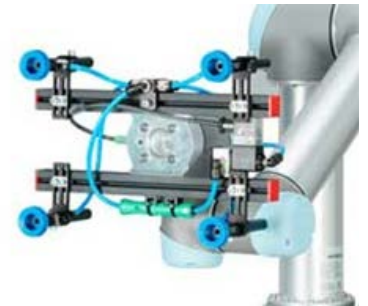
Engineered Components' new advanced products also maximizes the use of renewable and recyclable materials, supported by processing technologies that help to reduce carbon footprint, greenhouse gas emissions, and raw material waste.

Other advancements were made in industrial and automotive markets by using state-of-the-art laser welding to advance our steel ring technology and reduce significant levels of scrap over traditional stamped rings. The new process offers customers enhanced part performance for lower cost while reducing carbon emissions associated with steel production.



Automation

Our Automation strategic business unit continues to advance its robotic grippers, end-of-arm tooling systems, vacuum cups, sensors, and other automation components to deliver intelligent robotic handling and industrial automation solutions. These notable solutions are critical in end markets such as packaging, healthcare, transportation, and food and beverage. Advancements in robotic technology rapidly increase the ability to accomplish more complex tasks at higher speeds, with improved control and repeatability, and a reduction in energy consumption. With greater affordability of robotics, Gimatic's customized mission-critical systems deliver direct benefits to a growing global installed base of over two million industrial robots.



For instance, relative to Gimatic's new vacuum gripper product portfolio, the associated use of multistage vacuum pumps reduces energy consumption over traditional technologies thanks to intermittent on-off cycles, which enhances overall system efficiency.

This is an example of how environmentally focused products reinforce Gimatic's commitment to advancing its sustainability practices in four primary areas: environment, labor & human rights, ethics, and sustainable procurement. Gimatic is also focused on identifying and evaluating environmental aspects within its own operations, and utilizes an internal environmental management system registered under ISO-14001 to drive performance in this area.



Barnes Aerospace

OEM

We are proud that our employees continuously support our customers in their efforts to help lower the industry's fuel usage, carbon footprint, and overall emissions. Our Barnes Aerospace divisions that manufacture new components are continuing their work with our aerospace customers to introduce component designs that will reduce the weight of the aircraft and engine parts. For airlines, reducing the weight of the aircraft or its engines through lower-weight parts and components drives lower fuel usage and lower carbon emissions. The projects are focused on reducing the weight of the components without sacrificing strength, durability, or safety. These lower-weight components will contribute to a reduction in fuel usage of the affected airplanes each year. In 2021, as an example, our Barnes Aerospace, Ogden, Utah location continued to work with several additional design refinements to reduce the weight of a complex structural assembly. Our other facilities are engaged with customers in similar design optimization activities to drive lower part weight and higher performance.

Our sites are also working with customers to reduce the amount of excess raw material consumed in various manufacturing processes. We have implemented new fabrication process digital modeling, which allows our facilities to optimize our tooling designs, material input specifications, and forming processing parameters. Our digital modeling allows our teams to design an enhanced overall fabrication process with less material waste, lower energy utilization, reduced scrap, and optimized tool shape and design, lowering excess tool material usage. In machining applications, forgings and castings must be machined to the final part dimensions. The closer to the final part dimensions the initial forging or casting form can be, the lower the level of waste that must be recycled. We recognize the importance of working with our customers to be more efficient with our material usage as an industry and continue to actively partner with our end customers and our raw material suppliers.

Our West Chester, Ohio facility worked with one of our major customers to change the materials utilized for packaging and shipping our critical components to a more environmentally friendly material while maintaining the needed properties to protect the components during transit internationally. We are looking for other similar opportunities to reduce the environmental impact across our entire value chain.



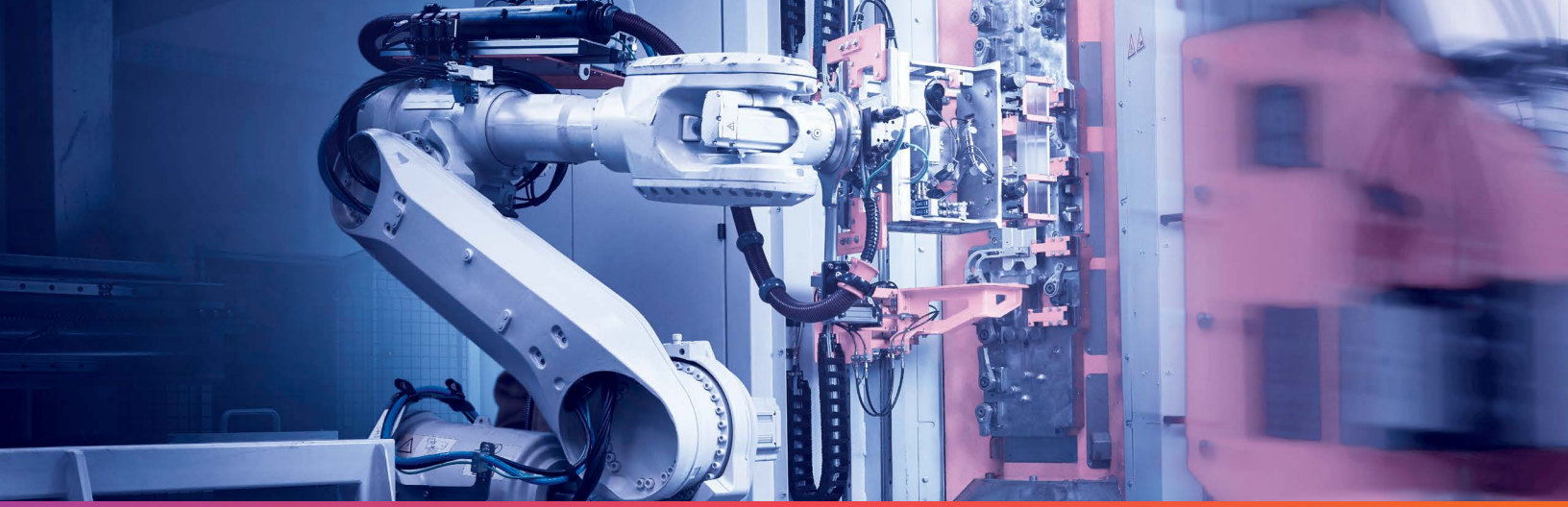
Aftermarket

Within the Barnes Aerospace Aftermarket strategic business unit, our divisions provide component repair services and collaborate closely with our engine OEM and airline customers to develop new and innovative repair methods for the various engine components that become worn as the airplane is flown. In many cases, our highly-trained MRO repair engineering teams have helped develop approaches to repair components back to the original new component conditions, instead of scrapping the worn part and replacing it with a new part. Our repairs allow these parts to avoid being scrapped and avoid all the material waste associated with manufacturing a new part. These types of novel repairs provide value for our customers and also benefit the environment by reducing the amount of waste and avoiding the resources that would be consumed to manufacture a new part.

In our West Chester, Ohio facility, we insourced a critical repair process that will avoid the carbon footprint impacts of the logistics from our facility to the supplier and back to our facility. Now with the in-house capabilities, the components will remain in our facility for the duration of the overall repair process. We also implemented a new manufacturing technology that offers enhanced part feature restoration for part cooling holes that could lead to enhanced turbine engine performance and lower fuel usage due to improved gas path cooling.

Our OEM and Aftermarket strategic business units are also working to reduce the use of consumable cutting tools by optimizing our machining programs, applying smart connected factory monitoring, and increasing the use of cutting tool regrinds to extend the tool lives. The use of additive printing – both plastic and metal-based – is also increasing within our divisions for manufacturing and inspection tooling. As 3D printing reduces the amount of material and energy used to manufacture the tools, we continue to look for innovative ways to utilize this technology.

As part of our digital strategy, our facilities are implementing smart connected factory technology for our various chemical processing lines. The smart connected factory technology allows our facilities to ensure the processing lines are operating at optimal levels. Designated employees are alerted if any problems arise during operation, which helps limit the risk of potential environmental issues as well as boosting employee safety. In addition, the technology has allowed our facilities to begin the optimization of the process parameters over time to reduce the amount of chemicals required during operation of these process lines which further reduces our on-going environmental impact.



Product Safety

At Barnes, providing the highest quality products and solutions for our customers is our business. To ensure we deliver on this commitment, we utilize the Barnes Enterprise System. BES drives every aspect of our culture and performance and provides a significant competitive advantage in the global marketplace. BES ensures that the organization is aligned on our strategy through the flow down of the Goal Deployment Process (GDP), Leadership Standard Work (LSW), Key Process Indicators (KPI's) and continuous internal assessments. A key element of continuous improvement is our focus on product quality and safety. We investigate product safety issues and strive to identify the root cause and disseminate corrective actions or field instructions to affected stakeholders, and we cooperate with regulatory authorities as appropriate. Most notable is our commitment to prevention – we establish both quality and safety through our use of robust advanced quality planning methodologies by engaging and listening to the needs of our stakeholders, both internal and external, prior to the introduction of new products and processes.