Barnes Group Inc. | Corporate Social Responsibility 2017 Making our World a Better Place.



Barnes Group Overview

Who We Are

Barnes Group Inc. (NYSE: B) is a global provider of highly engineered products, differentiated industrial technologies, and innovative solutions, serving a wide range of end markets and customers. Headquartered in Bristol, CT and founded in 1857, Barnes Group's specialized products and services are used in far-reaching applications including aerospace, transportation, manufacturing, healthcare, and packaging. Barnes Group's skilled and dedicated employees around the globe are committed to the highest performance standards and achieving consistent, sustainable profitable growth. We operate under two global business segments: Industrial and Aerospace.



Segment Overview

Industrial

The Industrial segment is a global provider of highly-engineered, high-quality precision components, products and systems for critical applications serving a diverse customer base in end-markets such as transportation, industrial equipment, consumer products, packaging, electronics, medical devices, and energy. Focused on innovative custom solutions, Industrial participates in the design phase of components and assemblies whereby customers receive the benefits of application and systems engineering, new product development, testing and evaluation, and the manufacturing of final products. Products are sold primarily through its direct sales force and global distribution channels. Industrial's Molding Solutions businesses design and manufacture customized hot runner systems, advanced mold cavity sensors and process control systems, and precision high cavitation mold assemblies - collectively, the enabling technologies for many complex injection molding applications. Industrial's Nitrogen Gas Products business provides innovative cost effective force and motion solutions for sheet metal forming, heavy duty suspension and other selective niche markets for customers worldwide. Industrial's Engineered Components businesses manufacture and supply precision mechanical products used in transportation and industrial applications, including mechanical springs, high-precision punched and fine-blanked components and retention rings.

Aerospace

Aerospace is a global manufacturer of complex fabricated and precision machined components and assemblies for original equipment manufacturer (OEM) turbine engine, airframe and industrial gas turbine builders, and the military. The Aerospace aftermarket business provides aircraft engine component maintenance, repair and overhaul (MRO) services, including services performed under our Component Repair Programs (CRPs), for many of the world's major turbine engine manufacturers, commercial airlines and the military. The Aerospace aftermarket activities also include the manufacture and delivery of aerospace aftermarket spare parts, including revenue sharing programs (RSPs) under which the Company receives an exclusive right to supply designated aftermarket parts over the life of specific aircraft engine programs.



at Barnes Group

Barnes Group is committed to corporate responsibility. We believe this allows us to create value for our stakeholders and is key to our success as an organization. Since the launch of Barnes Group's formal company-wide Corporate Social Responsibility (CSR) initiative in 2014, we continue to identify and implement ways we can benefit the environment and society while we execute our vision and strategy within our businesses. This initiative is led by our Director of Health, Safety & Environmental Affairs (HSE), with the full support of our company's Senior Leadership.

This report provides an update on our 2017 CSR performance and the goals we have set as we drive improvements in environmental sustainability, diversity and inclusion, and social and charitable impact.





At Barnes Group, we are committed to making sustainability an integral part of product and process innovation. We strive to ensure that newly designed products and processes are as resource-efficient as possible. The intention is to develop new product concepts that solve customer problems and create customer value, based on sustainable solutions and processes.

Barnes Group's Engineered Components (EC) strategic business unit (SBU), with its world-class brands: Associated Spring, Heinz Hänggi, Seeger-Orbis, and Associated Spring Raymond, is the leading global supplier of precision custom engineered and ready-to-ship solutions. Engineered Components has a breadth and depth of expertise in heavy duty truck, medical, high-tech, automotive, aerospace/defense, construction/mining, recreational vehicle and other industrial markets. EC provides a portfolio of state of the art precision solutions that range from springs, rings and engineered struts to micro-fine blanked and micro-stamped components, as well as value add assemblies. As a leading engineering provider, manufacturer and supplier, the EC organization spans across the globe with strategic locations to support our key customers. With a talented, passionate team across North/South America, Europe and Asia, EC serves its customers with superior solutions that provide them with a competitive edge in their respective markets.

Barnes Group's Molding Solutions (MS) SBU is a leading global producer of premium injection molding tooling, hot runners and related control systems for automotive, packaging, medical and consumer markets. Its brands include Synventive, Männer, Foboha, Thermoplay, Priamus and Gammaflux. The applications involve the most critical molding applications where part quality and process capability are of the highest importance to the customer. Advanced sensor, controls and software technologies are provided and in development to continue with advancing the control of molding processes. For example, synflow3 is a new product from Synventive that assists the molder by solving a variety of problems in the area of large automotive parts with high appearance and part stability requirements. MoldMind2 is a new product from Männer which monitors critical mold parameters and makes the data available to the molder for enhanced process reliability and security.

We are constantly pushing the envelope of innovation and technology across all of our SBUs to reach new performance levels across our product and process portfolio. With our strong brand capabilities, we are uniquely positioned as a leading supplier with diverse and synergetic offerings.



Cutting EdgeMicro-fineblanking and Microstamping for Medical and High Tech Devices

To meet the fast-paced medical device technology trends, Heinz Hänggi, a business of Barnes Group's Engineered Components SBU, is a world-class leader in cold-forming, micro-stamping and micro-fine-blanking processes. At Hänggi, precision is measured in microns, which uniquely positions us to form these components with superior part and dimensional characteristics. The result is superior quality when contrasted to competitive processes like MIM (porosity), EDM wire (production rate) and micro-machining (cost).

Medical Applications

Micro stamping is one of the leading implantable medical device and production processes because it enables improved device performance and reliability for a wide range of applications:

- Surgical Neurovascular Solutions
- Hearing Care
- Dental Care
- Cardiovascular Care
- Drug Delivery Systems
- Orthopedics

Hänggi's cutting edge micro-fine blanking and micro-stamping technologies are empowering new generations of high-tech digital devices. These precision engineered components (measured in microns) are custom designed for several global leaders of this industry.

Associated Spring's medical applications - also a part the EC SBU - span from precision springs to stampings, surgical sutures, hernia repair implantable solutions, needle free IV and other medical device components. Associated Spring Raymond also has expertise in medical strut applications further expanding our portfolio for this important market.



Innovative Industrial Technology for Compressor and Green Energy Markets

Barnes Engineered Components' world-class technology and research and development capabilities meet the most critical compressor component specifications. Our precision flapper and reed valve products deliver the highest quality and optimal lifecycle cost solutions for our customers. Associated Spring is recognized as a global leader in precision flapper valve components offering superior efficiency and durability in multiple industrial compressor market applications including: refrigeration, medical, 2-cycle engines, marine, recreational vehicle, heat and vacuum pumps, ride control, heavy-duty truck brake and air/gas compressors.

Our unique innovations in this market include both patented and patent pending technologies that are designed to improve our customers' industrial flapper valve performance and durability. These breakthrough product and process innovations, such as our proprietary Advanced Valve TechnologyTM (AVTTM), provide our customers with superior competitive advantages in reduced dead volume, lifecycle cost and material grain flow optimization.

Seeger-Orbis, a division of the EC SBU, is the inventor of the Retaining Ring; globally recognized in multiple markets including the wind power industry. These highly engineered rings are made from high carbon spring steel in a variety of configurations to perform critical retention of bearings and other components in wind turbine nacelles and gearbox assemblies, improving both performance and safety.





In today's global markets, automotive and industrial compressor manufacturers are seeking competitive advantages to meet the increasing regulatory and environmental requirements. Associated Spring is a world leading supplier and innovator of engineered and manufactured precision flapper valves, reed valves, assemblies and compressor components. Our expertise and proprietary patented and patent pending technologies are proven to improve performance. We are proud to partner with our customers to offer breakthrough innovations and serve them globally with our world-class team expertise and process technologies such as Clean-Edge® Blanking and Edge Radius optimization.

Clean-Edge® Blanking

Clean-Edge® Blanking is the process of stamping high-tensile, pre-tempered materials to create a maximum edge condition with minimal shear and controlled breakage. It reduces stress risers on the blanked edge, thus increasing fatigue life. This results in the lowest number of fatigue failure initiation sites, which is essential for long-term, consistent performance of stamped parts. It also minimizes burr occurrences and controls edge condition which are critical for customer requirements.

Edge Radius Advantages:

- Eliminates stress-concentrating notches/burrs
- Symmetrically finishes edge to remove stamping distortions
- Removes tensile stress from blanking operations
- Proprietary surface finish requirements for cutting components
- Controls process to prevent over-finishing

ISO Finishing™:

- Maintains equal finish on both sides of component and throughout production lots (from piece #1 to #1,000,000+)
- Engineering-approved process covering all aspects of finishing
- Creates superior finished surfaces (as smooth as <0.25 µm Rz maximum)
- ISO surface finish induces light magnitude of residual compressive stresses improving fatigue life





Synventive Product Innovation: SVG+ Market Introduction

The introduction of Synventive's Sequential Valve Gating (SVG+) technology set the new standard for hydraulic and pneumatic Sequential Valve Gating applications, which are typically for large parts such as door panels or bumpers in the automotive market. Synventive introduced the SVG+ to the market at the K Show, the largest plastics trade show in the world held in Dusseldorf, Germany in late 2016.

The SVG+ includes 3 important design enhancements: valve pin monitoring, self-cooling actuation, and upgradability to activeGate® control. Valve pin monitoring via sensor technology provides full monitoring, diagnostics, and trouble shooting from outside the machine. The SVG+ offers differentiated features and functionality to our customers, as they are provided a window into the molding process they didn't have before. This results in less downtime, less scrap, and increased reliability. The self-cooling actuator (SynCool3) eliminates any need for cooling plates or water lines and the issues associated with those. The SVG+ systems are equipped with a modular actuator design allowing for an easy upgrade to activeGate® technology if increased molding

control and improved part surface quality are required.

With this new product launch, Synventive is poised to meet the future demands in the molding industry. Our modular approach offers the option to upgrade the hot runner system with additional technology when needed to meet the quality requirements of the plastic part.

Synventive's SVG+ is an excellent example of how we bring new and exciting customer value to the marketplace.



Synventive Product Innovation: synflow3® Market Introduction

The introduction of Synventive's synflow3® technology set a new benchmark for sequential valve gating applications, which are typically for large parts such as automotive door panels, bumpers, or parts with complex geometries in the automotive market. The new synflow3® technology was introduced at Fakuma, one of the world's leading technical event for industrial plastics processing, held in Friedrichshafen, Germany in October of last year. The new technology gives molders the capabilities of previous versions of synflow® and much more.



With traditional sequential valve gate hot runner systems, the valve pins within the nozzles of the hot runner open and close at a maximum, uncontrolled speed. The inability to control the plastic flow results in stagnation and accelerations of the flow, which in turn may cause visible part surface defects.

The original synflow® technology allows valve gates to be programmed to open in a velocity-controlled manner. The next generation synflow3® delivers more advanced pin control features that allow molders to quickly and easily alter the flow of plastic into the mold solving other complex molding problems. For example, one new function of the synflow® technology is the ability to stop the opening of the valve pin at any position and hold it there for a defined amount of time. This patented process can assist the molder to provide a better balanced flow between two or more cavities or parts being molded at the same time.. The combination of controlled valve gate opening with sequential valve gating provides the highest quality molding surfaces and other benefits – meeting the current demands of molders to provide superior finished products.

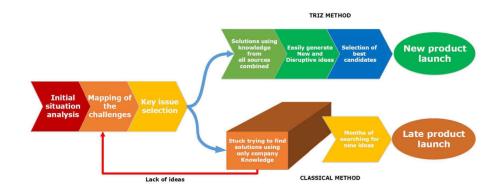
Männer Accelerates Innovation with Two Major University Partnerships

Recently, Männer embarked upon a two-year journey to establish highly valuable and sustainable collaborations with two leading university research partners. This initiative enabled their team to have access to lab equipment and the expertise of professors; the ability to resolve technical issues with a scientific approach versus "trial and error" alone; and more visibility to highly educated and motivated young talents.

Männer's first university partnership is with The Institut National des Sciences Appliquées (INSA), a leading engineering school located in Strasbourg, France. INSA has collaborated with Männer on an existing research project which focuses on the optimization of multi-material hot runner nozzle tips to achieve perfect tightness and an optimal thermal profile. TRIZ, a problem solving methodology based on logic and data (not intuition), was used for the first time during this project to advance Männer's product development process to a more scientific level. The goal of using the TRIZ method is not to find the best compromise to a technical problem, but to identify the true technical contradictions and resolve them in a novel way, considering the physics and knowledge from other industries. This method constitutes a real paradigm shift for development engineers. INSA Strasbourg is ranked the world's second leading TRIZ research institute, and has recently developed a high-end software called STEPS, embedding machine learning and knowledge management capabilities to ease the use of this "inventive design" methodology. INSA's Lead Professor of Inventive Design is now directly supporting Männer with his broad and state-of-the-art knowledge in this field.

The second university Männer partnered with is The Institute for Plastics Processing (IKV). IKV is located in Aachen, Germany and is the leading European research and training institute responsible for developing young plastics engineers. Männer has already begun to benefit from IKV's strong and interdisciplinary network in the plastics industry. There is likely no better place than IKV Aachen to recognize and learn from any disruptive or novel technology in the plastics industry. Männer's first project with IKV – the technical evaluation and benchmarking of Micro-män, Männer's own micro molding system – is close to successful completion. Following a systematic approach based on Finite Element Method (FEM) analysis, practical tests, and benchmarking against competitors, IKV delivered objective and essential data about the capability and reliability of Männer Micro-män's plasticizing unit.

Both INSA and IKV have different but complementary specialties and portfolios. By building on these well-targeted and successful first projects, Männer continues to accelerate its innovation by initiating further projects and increasing communication and "win-win" activities with their university partners.





Priamus Introduces QDaq[™] Industrial Quality Monitoring

Molding Solutions' Priamus business introduced QDac™ Quality Monitor during the recent Fakuma plastics show in Friedrichshafen, Germany. This new product serves as an easy to use and reliable industrial monitoring device for injection molding process quality control. In mold cavity pressure and temperature sensors are used to monitor key molding parameters during the molding process. The data is analyzed along with other variables to track quality and identify defects with the molded parts.

The central component of the Quality Monitor is the new embedded system QDaq[™], which monitors the process without the need for an additional PC. Due to the integrated OPC-UA interface, the Quality Monitor is the ideal IoT ("Internet of Things") platform and provides all options to transfer real quality data to a local and/or cloud server. The system can be operated with any desired web browser supported display and so compatible with PC and mobile devices. The QDac[™] may be operated with the QScreen[™] – a customized 7 inch display which can provide a complete package. As a unique feature, the software user interface was designed especially for industrial needs and specifically optimized to be intuitive and easy to use. The system is also compatible with PRIAMUS' BlueLine devices and can be extended depending on the application with BlueLine amplifiers and machine interfaces.



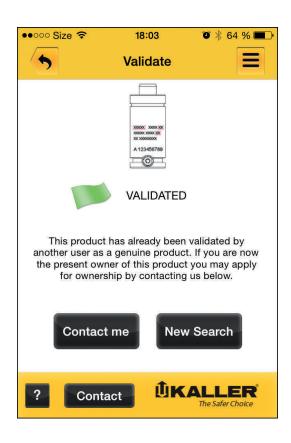
NGP Strömsholmen Develops Safety App for Customers

In response to an industry-wide issue of counterfeit springs originating in China and surfacing in metal forming dies around the globe, NGP was quick to take action to educate, combat and most importantly help protect our Kaller brand customers. These counterfeit springs, which are manufactured to resemble any brand on the market, present significant safety risks to metal forming companies. In fact, there are some NGP customers who have unintentionally purchased these counterfeit gas springs and encountered die failures and near miss incidents as a result.

To ensure our customers obtain an original KALLER product, NGP developed a Safety App where customers enter the unique serial number marked on the product and obtain immediate confirmation that it is either a validated KALLER brand product or a potential counterfeit product that needs further analysis.

Customers can now identify, verify, and manage gas springs via their smartphone or laptop. Additional functions within the app enable tracking of installed base or installed gas springs, allowing customers to organize and keep track of their individual products by storing them under "My Springs." Further, the app creates direct access to the end customer by making it easy to contact a NGP representative for assistance in case of a suspected counterfeit. It can also work as a placeholder for future tools and information, adding value to the customer.

As a result of this service innovation, KALLER customers around the globe have immediate access to validate the authenticity of the products prior to putting the tool or die in use. In addtion, ease for the customer to get in contact with a sales representative has generated new potential sales opportunities, driven business, and expanded our network. New enhancements with customer value will be added to the app in order to increase its use and build even closer contact with our end customers.

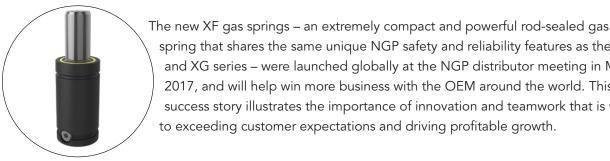


NGP Exceeds Customer Expectations with Innovative New Modular Design

When one of the top 5 tool builders in Korea contracted an automotive OEM for a large order, Nitrogen Gas Products (NGP) leveraged their Innovative XF modular design to satisfy the OEM's updated gas spring standard to win the project. The initial order was for 1,150 springs, including 100 of its new innovative XF gas springs.

To take on this challenging order from the tool builder, contracted by the OEM, NGP assembled a cross-functional team with R&D, logistics, manufacturing engineering, machine operators, and assembly personnel. The NGP team planned concurrent work streams in reverse, targeting the tight delivery schedule set by the customer, and were able to produce a plan that would work.

The NGP team decided to develop the four missing tube sizes, now called XF. They then quoted, won, and delivered the first products within four weeks, and the remaining products within eight weeks - achieving record production and shipment. To support the tight schedule, the team met daily to follow up on the status of current work and plan their next steps using visual planning techniques. In these development weeks, NGP was able to design, perform finite element calculations, manufacture, assemble, and test the four new product models. The most significant key to achieving this order was the new innovative modular design concept that NGP had been developing over the last three years, which needed only one new part to be designed per new product model. All three shipments left the Sweden facility on time, and the customer was very pleased with the support NGP offered as well as the speed used to develop these products.



spring that shares the same unique NGP safety and reliability features as the X and XG series - were launched globally at the NGP distributor meeting in May 2017, and will help win more business with the OEM around the world. This success story illustrates the importance of innovation and teamwork that is vital to exceeding customer expectations and driving profitable growth.

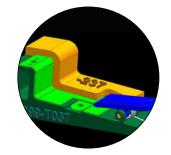
XF Gas Spring

Barnes Aerospace Implements Additive Manufacturing Applications

Additive manufacturing, or 3D printing, is revolutionizing the way parts and tools can be designed, manufactured, distributed, and repaired. 3D printing is the process of turning a digital model into a solid three-dimensional physical object, usually by adding material layer upon layer. It is a disruptive technology that changes the value proposition for speed-to-market, cost, and design functionality. In order to sustain our competitive position and improve our customer value, Barnes Aerospace has implemented additive manufacturing applications to take advantage of the benefits of 3D printing technology, thus enhancing our new product introduction (NPI) execution process.

Barnes Aerospace uses two main types of 3D printing: (a) powder-bed and (b) direct or fused deposition. In powder-bed 3D printing, computer-aided design (CAD) models of whole parts or sections of parts are sliced into thin layers. These cross sections are fed into a machine that spreads a layer of powder over a powder bed on a build platen. The machine uses lasers or electron beams as the heat source and selectively melts layers of powder that are part of the model (the layers that are not part of the model remain in place for support). After the selective melting of the layer is completed, the build platen moves down, another layer of powder is spread, and the selective melting of the next layer is performed. This process continues until the whole CAD file is completed. The solidified part is then taken out of the powder bed, and the unmelted powder particles are removed. During direct metal deposition, streams of metal powder or wire are delivered to the tip of a nozzle, melted by laser or electron beams, and deposited layer-by-layer based on the sliced CAD file. In plastic fused deposition printing, liquid plastic is deposited layer-by-layer and instantly cured by UV light until the whole model is completed.

Barnes Aerospace has employed both powder-bed and direct metal 3D printing in making prototypes and end-use tooling. The 3D printing technology helps accelerate NPI on key programs and improves safety, productivity, and quality. For example, Barnes Aerospace's machining divisions can make plastic and metal 3D prints of parts even before castings are available so the machining fixtures can be tested and grinding, milling, and turning CNC programs can be verified. Hybrid tooling that uses plastic 3D printed fixtures with metal details were built for inspection, part marking, and other key processes.



Assembly Counter-Sink Fixture



Resistance Welding Fixture

Barnes Aerospace has also been interacting with customers on how to partner in their additive manufacturing supply chain development for OEM parts and engine component repairs. Thus far, several metal coupons were 3D printed, various OEM prototypes underwent testing, and certain repairs were developed and added to our catalog of repairs. As benchmarking trials on several metal 3D printing machines were performed, the selection of machines for consideration are being updated based on developments in this fast-changing technology.

Barnes Aerospace Aftermarkert Brings Cobots to Repairs

Barnes Aerospace continues to push the envelope in connection with its usage of collaborative robots or "cobots" to enable the safe and efficient pairing of humans with robotic technology. In its Aftermarket business for example, Barnes Aerospace is evaluating and capitalizing on opportunities for our employees to train and utilize cobot "workmates" to perform ergonomically difficult tasks in ways that drive speed, efficiency and safety.

Robots in manufacturing plants are often rigid, involve complicated programming, and require surrounding cages. To ensure safety, walls or boundaries are often necessary in order to keep humans and robots separate, but this can make their working relationship cumbersome. Cobots, are one of the latest developments in the robotics industry. After a risk assessment, a cobot can work safely and effortlessly alongside humans in the workplace in a variety of applications. Additionally, it can easily be redeployed for multiple tasks, partially due to easy programming, with little or no guarding, and a very small work footprint. The goal of a cobot is to take over simple or ergonomically difficult tasks so as to free up operators to work on more skilled tasks. Like robots, cobots are very accurate and repeatable, which helps ensure product quality with ergonomic security. Once trained to work alongside a cobot, operators feel safe with their new "workmate" and can often become its programmer.

The Barnes Aerospace Aftermarket, Singapore - MRO team explored the use of industrial robots for tack welding honeycomb material in various types of seals. After several months of research and testing, the team determined the use of robots for this application was not economical and was very challenging from a programming and safety perspective. The Singapore team then turned its attention on cobots as alternative solution. The team worked to develop resistance tack weld parameters, custom tooling and fixtures, and a cobot program that meets the repair requirements. The testing was completed in late 2017 and the results were excellent. With phase I testing & evaluation complete, the team is moving into phase II which includes semi automation of tack welding the honeycomb material onto the Seal segments. The BA Singapore - MRO Division repairs thousands of seal segments annually. Utilizing a cobot for the tack welding process will improve productivity and Turn-Around-Time (TAT), and it will also help reduce potential repetitive movement type injuries.

Cobots provide the opportunity to improve the productivity and safety of our workforce while allowing operators to focus on the critical high-value tasks. Barnes Aftermarket is implementing use of cobots in other locations for variety of applications including assembly, inspection, gluing, painting operations on "quick-turn" repair services. As part of our commitment to continue developing next generation talent, our West Chester Ohio site's team employed several motivated college interns to help drive the site's various cobot projects working hand-in-hand with the site's engineering, operations, and safety team.



Barnes Aerospace's Aftermarket business is committed to leveraging innovation and new technologies to drive improved performance. Cobots will be one of a critical enablers to driving continued enhancements to workplace safety while allowing our employees to focus on the highest-valued and most critical tasks.



Health, Safety, and Environmental Affairs (HSE)

Barnes Group strives to ensure that all aspects of our operations are conducted in conformance with applicable laws and regulations, as well as with all of our corporate policies pertaining to workplace safety and protection of the environment.

In certain cases, the Company or its strategic business units (SBUs) may establish more stringent requirements as policies, procedures or directives. At the corporate level, these requirements are documented as BGI HSE Standards.

The BGI HSE Standards are consistent with our commitment to worker health and safety and to environmental protection, as well as prevailing regulatory frameworks in place around the globe. All locations are required to meet the local laws and regulation, or the BGI HSE Standards, whichever are more stringent. Furthermore, our internal corporate audit program measures and monitors progress using standard protocols, actions are tracked to closure, and results are reported to Senior Leadership.

Our past and present business operations require the use and handling of chemicals and hazardous products that subject us to extensive environmental laws and regulations pertaining to the discharge of materials into the environment, disposition of wastes, the use, shipping, labeling, and the storage of chemicals and hazardous materials. We closely monitor hazardous waste management and applicable environmental permitting and reporting for compliance with applicable laws and we strive to minimize the environmental impact of our operations through our management systems approach to HSE.

Compliance

We focus our time and resources on identifying and controlling hazards in the workplace to ensure compliance and our employees' safe return to their homes and families at the end of their work day. Across the globe in 2017, Barnes Group had one HSE non-conformance for which a fine is expected; this deficiency was related to inadequate guarding of a load tester which resulted in injury. The load tester was guarded, and the lessons learned were shared across the organization. Our goal continues to be to eliminate HSE non-compliance.



Barnes Group is committed to promoting and maintaining a safe workplace for our employees. Through initiatives such as the Critical Risk Mitigation Program, behavior-based safety, and other injury prevention activities, Barnes Group aims to eliminate or reduce hazards in the work place and prevent injuries. Since 2014, our operations have steadily reduced recordable and lost time injuries. In 2017, more than half of our manufacturing facilities worked the entire year without a lost time injury. While we had an up-tick in our overall injury rate in 2017, partially driven by improved accuracy of reporting at new acquisitions, our Segment Presidents have re-emphasized a "Safety First" tone from the top. We remain committed to the execution and implementation of our BGI HSE standards and critical risk mitigation program. We are confident that we will see improvement in 2018 and continue to empower and encourage employees to proactively identify and mitigate potential safety issues through HSE Audits and Inspections, Gemba Walks and our Near Miss program.



Reducing Exposure

AS Bristol and BA Phoenix each successfully abated asbestos-containing materials in older portions of their facilities, eliminating potential for exposure to our employees.

Waste

Barnes Group operations report waste generation data using a common online system according to the framework established in our corporate environmental standards. Centralized reporting of both non-recycled and recycled industrial process wastes began in 2014 and enabled us to identify pollution prevention and waste minimization opportunities, as well as to drive towards recycling a greater percentage of our industrial waste streams. In some cases, the solutions are simple. For example, our Associated Spring Asia facility in Singapore implemented a policy requiring all printing of documents be double-sided. In the Purchasing department alone, which previously printed two sets of each Purchase Order, the department now prints just one original copy and scans the purchase order to the Finance department. All the printers in the facility were set by default to print out double-sided instead of one-sided printing. The new policy reduced paper use and resulted in cost savings versus prior years.



ISO 14001

Consistent with our efforts to minimize the environmental impacts of our operations, 11 of our Barnes Group facilities' environmental management systems have been registered under ISO 14001.

Recycling at Associated Spring

Associated Spring Raymond Maumee, Ohio division introduced a cardboard compactor in 2016 that eliminates cardboard from going into a landfill. The cardboard is recycled and the division receives rebates for the amount of cardboard recycled. Through 2017, the division has successfully recycled 33 tons of cardboard which would have otherwise been destined for a landfill.

Recycling at Synventive

Molding Solutions' Synventive facility in Peabody, MA implemented a recycling program in March 2016 to sort recyclables such as paper, glass, plastic, and cardboard. With the program in effect for the full year 2017, the team reduced the amount of non-recycled waste destined for landfill by an impressive 32%.

Mercury Elimination at FOBOHA

Barnes Molding Solutions, FOBOHA Suzhou, China plant implemented a project to reduce mercury-containing bulbs in the CNC room and warehouse area in 2017. In the past, Suzhou plant used mercury-containing lamps, which required disposal as hazard waste. The Suzhou plant replaced the bulbs with new LED lights to eliminate the mercury and the need for special waste disposal. In addition, it reduced yearly electricity consumption by approximately around 44000 KW. The LED lights generate less heat, which is advantageous for fire prevention in the warehouse area. With a relatively small investment, this replacement project has three advantages: energy savings, hazard waste treatment elimination, and elimination of a hazardous substance from the facility.

Metal Powder Recycling

Barnes Aerospace West Chester, Ohio division continued to process metal powder waste from our grit blasting and grinding operations, preventing the material from being sent to landfills. The division successfully diverted 61 tons of material from landfills in 2015-16, and in 2017 an additional 40 tons of metal waste material that would have previously headed to the landfill was diverted and recycled.

Associated Spring Campinas, Brazil division started working with a recycling firm that processes metal powder waste from our grit blasting and grinding operations in 2016. The firm reclaims metals and resubmits the iron powder to foundry companies, preventing the material from being disposed of in landfills. Through the end of 2017, the division successfully diverted over 100 tons of material from landfill in favor of recycling.

Water

Barnes Group operations have been tracking water usage data for four years now, and we are pleased to report that our divisions successfully implemented or expanded their conservation projects in 2017 to reduce consumption. Some of the water conservation initiatives implemented include:

- Our Associated Spring Milwaukee, Wisconsin division installed a digital water meter to monitor non-contact
 cooling water used in the Flat Coil Department. The meter indicated high water consumption and identified a
 faulty self-operating temperature regulator. After replacing the regulator, the average water consumption was
 reduced by up to 10,000 gallons per month, depending on production demands. The meter and self-operating
 temperature regulator also set expectations for future consumption and temperature settings to ensure proper
 calibration and mechanical functionality.
- Our Associated Spring Mexico City division started collecting and using rain water for service activities such as cleaning the factory and floors in 2016. This effort expanded in 2017 with additional treatments and uses. In 2017, the savings versus traditional use of municipal water at the facility totaled over 600,000 liters!
- Our Associated Spring facility in Corry, Pennsylvania continued tackling non-contact cooling water uses in 2017, replacing them with air/fan cooled units, and installing electronic shutoff valves on various pieces of equipment tied into the equipment start/stop controls. This prevents water from flowing at all times, and only allows water to flow while machines are operating. As a result of these efforts in 2017, the facility achieved a one-year cost savings of more than \$25,000, together with a documented a 50% reduction in water usage versus 2016!

Water Conservation at Barnes Aerospace

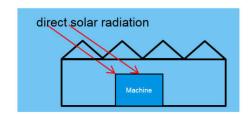
Our Barnes Aerospace facility in Ogden, Utah analyzed the manufacturer's original design drawings of its waste water treatment plant (WWTP) and air scrubber systems and discovered that, over years of continuous use, same replacement parts differed from the manufacturer's original design. The team determined that gradual design modifications were constricting the flow rates through the mixing chamber and pH analysis lines, which resulted in suboptimal performance of the environmental systems, and excessive use of caustic soda and acid. The excess use of caustic soda was also fouling flow meters on the equipment, causing premature failure of the meters and frequent replacement costs.

The team made several improvements in line with the manufacturer's original design, which solved these operational challenges, produced significant performance gains, and drastically decreased the chemical consumables. Compared to the prior year, caustic soda consumption is down by over 80%, for a cost savings of over \$35,000. In addition, the optimization back to original design specifications provided the added environmental benefit of a reduction in water usage by an estimated 15,000 gallons per year.



Barnes Group operations have been tracking energy usage for four years now, and we are pleased to report that our divisions successfully implemented conservation projects in 2017 to reduce consumption. Six facilities implemented or expanded their use of energy-efficient LED lighting and motion-sensors. In addition, the following energy conservation initiatives were implemented:

- Barnes Aerospace Phoenix, Arizona investigated and remediated air loss from leaks in their compressed air system. This effort included tightening air compressor fittings and replacement of faulty/leaking fittings to reduce energy consumption by the air compressor, and contributed to a 6.3% decrease in energy use versus prior year.
- Barnes Industrial FOBOHA in Haslach, Germany also implemented a program to minimize the energy requirement
 for the compressed air supply to production. With the help of an ultrasonic measuring device, they searched for
 leaks in production and systematically repaired them allowing for a gradual reduction of system pressure from 8.5
 bar down to 7.8 bar which is projected to save over 70,000 kWh per year.
- Associated Spring Mexico City, Mexico implemented a ventilation project without increasing energy consumption. Previously, temperatures in the manufacturing area were reaching 45°C. With the installation of 24 Eolic fans, the temperature was reduced to 38°C while avoiding electricity consumption to remove hot air.
- Associated Spring Milwaukee, Wisconsin division installed no-loss condensate drains to replace manual, lever
 operated mechanical and solenoid drains in the compressed air loop. The no-loss condensate drains sense the
 presence of condensate and purge it from the loop only when necessary, thereby reducing continuous loss of
 compressed air throughout the system. With eight no-loss condensate drains installed, the division will realize an
 average savings of over 7,000 kWh per year, and earned a one-time rebate from Wisconsin Focus on Energy.
- Barnes Industrial M\u00e4nner Bahlingen, Germany: The manufacturing of high precision mold parts requires a stable temperature (+/- 1 K), and the team determined the cooling system was consuming more energy to reach a stable temperature due to direct sun radiation on the machine through the roof skylights. A series of glass windows were replaced by aluminum panels, resulting in a very positive effect on the stability of the temperature, and a beneficial reduction of the energy consumption by the cooling system. (Pictured Below)





Energy Conservation at Männer USA

Barnes Industrial, Männer, Lawrenceville, Georgia modernized is cooling solutions in 2017. Prior to the facility's recent expansion, portable chillers were utilized to cool individual pieces of equipment. That approach to cooling machinery posed several challenges. The individual units utilized cooling fans, which increased noise levels and the amount of heated exhaust air in the shop, which in turn taxed the air conditioning system. In addition, the system used older refrigerants, and even small temperature changes could have significant effects on part quality during our precision

machining applications.

The solution was a modular, central chiller system for the facility. Noise levels dropped immediately, and temperature fluctuations in the shop were brought under control. The new system uses refrigerant R410a, and is capable of expanded capacity as our business grows, without additional changes. To conserve power and optimize efficiency, variable-frequency drives (VFDs) were added to pump motors. The central system is also located in an access-controlled room away from the manufacturing floor, thus further reducing impact to our employees.

Energy Conservation at NGP

Barnes Industrial, NGP, Strömsholmen, Sweden replaced the 20-year-old lightning in their machine shop to LED lighting in 2017. This provided significantly better light for our manufacturing employees, moving from approximately 300-400 lux to 700-800 lux brightness. With the stronger LED lighting, the team was able to reduce the number of light fixtures, thereby multiplying the efficiency savings. From an economic perspective, this environmental investment provided approximately 70% energy reduction and an estimated \$35,000 in cost savings per year.

Energy Conservation at Männer Germany

Barnes Industrial, Männer Bahlingen, Germany replaced three older compressors with three new energy-efficient, screw-type compressors equipped with variable speed drives and a heat recovery system for hot water. This investment resulted in a 14% reduction in electricity consumption (approximately 100kWh).





Employee Development and Engagement

At Barnes Group, we believe it is never too late to improve your lifestyle and to make the most of your health and well-being. Our wellness programs have been designed with this goal in mind – to provide tools, resources, and support for employees and their family members to adopt healthier lifestyles and create meaningful and lasting change towards their personal well-being. In addition, this helps ensure a stable workforce for the Company. We also support well-being by offering a diverse set of professional training and development programs.



Diversity and Inclusion

At Barnes Group, success begins with having a passionate and energized workforce. Barnes Group employs approximately 5,000 employees around the globe.

U.S. Ethnic Minorities by Category	2017
American Indian / Alaskan Native	Less than 1%
Asian	6 %
Black / Not Hispanic Origin	5%
Hispanic	6 %
Native Hawaiian or Other Pacific Islander	Less than 1%
Two or More Races	1%
White / Not Hispanic Origin	81%

To help us maintain this energized and engaged workforce, Barnes Group strives for diversity across all levels of the organization. Additionally, we look to increase women in hourly, management, and salaried leadership positions. The recruitment process is an important element in achieving a more diverse population throughout our businesses.

Representation of Women by Classification	2017
Hourly	15%
Non-Exempt	60%
Professional	31%
Management	20%
Leadership	24%



An annual event that occurs on the first Friday of October,
Manufacturing Day is an occasion during which North American
manufacturers open their doors to showcase the potential of modern
manufacturing and foster interest in manufacturing careers. Attendees
receive a first-hand look at how products are conceptualized and
manufactured via tours that covered engineering, design, quality, and
all parts of the manufacturing floors.

Over 100 students from surrounding schools joined seven Barnes Group facilities on October 6th for the sixth annual Manufacturing Day. Manufacturing Day is an opportunity for manufacturers to show their communities what they do, highlight the economic importance of manufacturing, and draw attention to rewarding manufacturing careers.



In 2017, the company redoubled its recruiting efforts in support of Global Apprenticeship Programs – attracting, hiring and training apprentices in various technical areas to help build our talent pipeline for the future. Our Apprenticeship programs will help us bolster our manufacturing skills and provide professional development and growth as well as rewarding career opportunities to technically skilled workers.

Barnes' Apprenticeship Program combines on-the-job training, technical education and related classroom or online instruction that increases an apprentice's skill level and earning potential. In the United States, this registered program provides an opportunity for the apprentice to earn a "Completion of Registered Apprenticeship" certificate, which is a nationally recognized credential that validates proficiency in an occupation that values or requires an apprenticeship. Barnes Group's respected and successful Apprenticeship Program provides opportunities for individuals to earn while they learn, and develop in-demand technical knowledge and skills for today's dynamic manufacturing industry.





Wellness

Barnes Group is committed to improving the health and well-being of our employees and their families around the globe. Our innovative health programs support a holistic approach to well-being by providing access to comprehensive tools, information, and guidance designed to improve employee health, productivity, and engagement, making our Company a stronger and healthier place to work.

Highlight | Wellness Notable Achievements

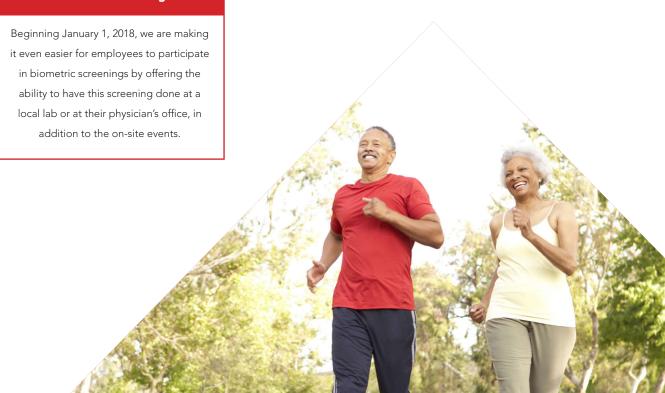
Barnes' wellness program provides a number of ways for employees to assess their current health and wellness, and offers options for those looking to improve including: self-directed workshops, health assessments, and team-based wellness challenges. Financial incentives are provided for participation and achieving health outcomes.

2017 demonstrated strong employee engagement and produced positive results in the United States:

- 61% of our facilities hosted an on-site Biometric Screening event, with 38% of all eligible employees participating, up from 32% in 2016.
- Collectively, Barnes Group wellness challenge participants walked 38,853 miles, approximately one and a half times around the globe!
- Approximately 20% of our employees completed a health risk assessment to identify potential wellness gaps in their daily lifestyle.



Biometrics Screening





Community

At Barnes Group, we believe that being a good corporate citizen begins with being a great community leader, which is why we encourage philanthropy, compassion, and change through our Barnes Group Foundation. Founded in 1945 and funded by Barnes Group, the Barnes Group Foundation is committed to the support of education, the arts, civic and youth activities, and health-related charities in the communities in which the Company operates. Since 2000, the Foundation has supported more than 400 schools, cultural centers and health-related charities, helping to ensure a legacy of community involvement for the future.



Barnes Group Foundation

The Barnes Group Foundation is a private grant-making organization supported by Barnes Group as a vehicle for providing a balanced contribution program to accomplish the Company's objective of good corporate citizenship.

The Foundation's highest priority is organizations and projects in communities where the Company has offices and other facilities. The Foundation also makes a limited number of contributions to organizations with programs that have broad impact on the community and exhibit an innovative and resourceful approach to the solution of difficult local, national, and international problems.

Year	Total	
2017	\$1,100,000	
2016	\$1,100,000	
2015	\$1,152,000	
2014	\$1,152,000	





Student Scholarship Program

The Barnes Group Foundation has established a scholarship program to assist an employee's child who plans to pursue post-secondary education in college and vocational programs. Renewable scholarships are offered each year for full-time study at any accredited post-secondary institution of the student's choice.

The scholarship is administered by Scholarship Management Service, a department of Citizens' Scholarship Foundation of America, Inc. (CSFA). CSFA is a national nonprofit educational support and student aid service organization that seeks to involve and assist the private sector in expanding educational opportunities and encouraging educational achievement. Awards are granted without regard to race, color, creed, religion, gender, disability, or national origin.

Year	
2017	\$312,350
2016	\$292,800
2015	\$353,600
2014	\$365,600

Matching Gifts Program

Barnes Group provides a 2-to-1 matching gifts program for employee donations made to qualified nonprofit organizations, up to a yearly cumulative maximum of \$4,000 per employee/spouse. Qualifying organizations must be recognized as tax-exempt under Section 501(c)(3) or Section 170(c)(1) of the Internal Revenue Service Code and fit into one or more of the following categories:

- Education
- Cultural and Arts
- Civic and Youth
- Health and Welfare

Year	
2017	\$185,362
2016	\$175,769
2015	\$149,915
2014	\$183,841



Volunteer Action Awards

The Foundation believes it is vital to the health of every community that citizens be active in local organizations. Employees who volunteer a minimum of 30 hours to assist a local charitable organization during the year are eligible to apply for a Volunteer Action Award. Volunteer Action Awards are grants of up to \$2,000 presented to the charitable organization at which the employee has donated his/her time.

2017	\$4,000
2016	\$2,000
2015	\$2,500
2014	\$6,000



Charitable Giving Program

Barnes Group also supports charitable giving at our international locations through our 1-to-1 matching program. All locations are eligible for the matching gift given for employee projects that involve the entire location and support a charitable organization or project that has a positive impact on the community.

Business	Total
Associated Spring Mexico	\$1,786
Associated Spring Brazil	\$1,276
Associated Spring Singapore	\$840
Barnes Aerospace Singapore	\$12,720



United Way Campaign

Barnes Group has a long and proud tradition of supporting the United Way through local campaigns held annually at each of our United States locations. We have earned our reputation as a great community leader, helping our neighbors in need. Through the Barnes Group Foundation, all donations made to the United Way are matched 1-to-1, increasing our total contribution.

Together, the Company and its employees have contributed over \$2 million to the United Way over the past eight years, assisting the United Way's more than 1,300 member organizations. For the 2016-2017 campaign, employees were encouraged to LIVE UNITED and support their local campaigns. Living United means being a part of the change. It takes everyone in the community working together to create a brighter future.

Barnes Group global employees once again showed their outstanding generosity and commitment to community during the *2016-2017 Barnes Group United Way Campaign*. Employees across the U.S. raised \$214,122 for the campaign, for a grand total of \$428,244



with the corporate match! In addition, Barnes Aerospace, Singapore raised \$11,729, for a total of \$23,458; Associated Spring, Mexico contributed \$2,379, for a total of \$4,758; and Associated Spring, Brazil raised \$2,379, for a total of \$4,758.

Year	
2017	\$266,243
2016	\$214,122
2015	\$229,531
2014	\$229,997







Disaster Relief

Consistent with relief campaigns we have supported in the past, the Barnes Group Foundation provided a two-for-one match for employee contributions to the American Red Cross or United Way designated for Hurricane assistance.

Hurricane Relief Donations	
Hänggi	\$5,150
US Locations	\$12,885
Total for Hurricane Relief	\$54,105



Arlette Wyss, Nautical Captain on the Catamaran Belline II in the Caribbean and daughter of Beat Wyss, HSE Manager, Heinz Hänggi, developed a plan to provide help to those affected by Hurricanes Irma and Maria. In Martinique Island, Arlette and her team loaded a total of 28 private ships with relief supplies and sailed to Saint Martin Island, affected by Hurricane Irma. Afterward, the crew sailed back to Martinique Island to load additional supplies to deliver to Dominica Island, which was devastated by Hurricane Maria. Their collaborative effort raised over \$8,000 and collected 4.3 tons of food, such as pasta, rice, milk, oil, and canned goods. In addition, 1,000 liters of drinking water, over 500 liters of gasoline fuel for generators, toiletries, medical supplies, diapers, and tarps were delivered to the victims of both hurricanes.

Relay for Life

Barnes Group employees from our Bristol and Farmington, CT facilities worked to raise money for the American Cancer Society through the Bristol Relay For Life. The team raised money by organizing fundraisers such as "Happy Hour of Hope," "The Great Chocolate Relay," and "A Night at the Museum" in partnership with local businesses. They also solicited donations and held raffles to raise a total of \$19,385, making Barnes Group the *top team fundraiser* at the Bristol Relay for the fifth year in a row! Meanwhile, the Synventive Hotrunners Relay team of Peabody, MA showed their creativity, hosting fundraising lunches with themes such as St. Patrick's Day, Red Sox Opening Day, and Cinco de Mayo. They also organized a Human Foosball Tournament as a fun and competitive fundraiser, crowning one team champion at the end of the day. These events helped the Hotrunners raise \$6,700 for the Relay For Life of Peabody. In addition, the team constructed a *Wall of Support* and Memory which displayed stars dedicated to employees' loved ones and friends who have struggled with cancer.

To round out the successful campaigns, the American Cancer Society presented the Barnes Bristol Relay team with the "Strike Out Cancer" Most Valuable Team Award at the June 9th Opening Ceremony. Over the past five years, our Barnes Relay team members and employees in CT and MA have raised over \$101,700 for the Bristol and Peabody Relays and the American Cancer Society!

Relay For Life events are overnight community fundraising walks that honor cancer survivors, remember lost loved ones, and support the fight back against one of the nation's biggest health concerns. For 32 years, Relay for Life has provided inspiration and hope for millions of cancer survivors and caregivers. Each year, more than 4 million people in 5,200 communities in the U.S., along with additional communities in 26 other countries, gather to take part in this global movement to raise awareness and funds to fight cancer.



Barnes Aerospace 5th Annual "Summer of Community"

This past summer, Barnes Aerospace (BA) rolled out their fifth annual "Summer of Community," a series of community service initiatives involving BA employees across all Barnes Aerospace locations worldwide. Barnes Aerospace created the Summer of Community in 2013 to provide opportunities for their employees to volunteer in ways that would directly benefit their local communities. Each year, employees are encouraged to champion a cause such as hunger assistance, homelessness support, children's causes, or relief for natural disasters.

This year, Barnes Aerospace divisions reached out to the local organization(s) of their choice and lent a helping hand, supporting the following events:

The Ogden Division partnered with Habitat for Humanity to help frame a house and place roof trusses for families without homes. Habitat for Humanity serves over 1,400 communities in the United States alone and functions in over 50 different countries to assist in providing affordable living for community members.

The Singapore Division focused its efforts on aiding the elderly or disabled populations by cleaning out two homes and creating new organizational systems for the residents. BA-Singapore also made donations to the Asian Women's Welfare Association, which helps over 6,000 individuals across all age groups and life stages.

The East Granby Division supported Hurricane Harvey relief efforts by hosting an ice cream social which raised \$385 for the American Red Cross. The Red Cross is currently using donor dollars to provide food, shelter, and emergency support to hurricane victims.

The Windsor Division conducted a donation drive in which employees raised funds and donated food items and toys to children at Mary's Place. Mary's Place is an organization that offers free support and counseling services to children and families who have lost a loved one. They also provide referral services to specialized therapists for their clients and are run 100% by volunteers.







The Lansing Division engaged in two volunteering events in mid-2017. In May, sixteen quality and engineering employees spent the afternoon at Hawk Island Park spreading mulch in the playground and staining playground equipment. This was the fourth year BA-Lansing assisted with the playground prep for the summer season. In June, the Quality Department hosted a hot dog grill out for Haven House during their end-of-school-year picnic. Haven House provides emergency housing and support services for families in East Lansing.

The Summer of Community volunteers were proud to be part of this coordinated team effort to "give back" across the globe, to live our Corporate Values, and to recognize our communities as key stakeholders of our business. While 2017 was a successful year for serving our communities, Barnes Aerospace strives to have even greater employee participation and impact in 2018.



Compliance and Accountability

Barnes Group's Code of Business Ethics and Conduct ("Code of Conduct") lays out the principles that guide the behavior of our employees, officers and directors as we do business around the world. Our Code of Conduct, which is available in multiple languages for our global employee population, provides guidelines, practical direction and helpful resources to promote ethical conduct and support compliance with applicable laws and regulations.

> All employees are expected to complete annual Code of Conduct training, at which time they re-affirm adherence to the Code of Conduct. A segment of our leadership also completes an annual certification process to further monitor compliance with anti-corruption policies. Certain employees are assigned, based on factors such as role and geographic location, more targeted ethics and compliance training on topics such as anti-corruption and export compliance. Barnes Group continues to enhance its employee training program based on role and risk exposure.

Barnes Group encourages employees to raise questions and concerns. We offer multiple channels for doing so, accessible at local worksites and the corporate office. Anonymous reporting tools, both online and via telephone, are available. We periodically survey our officers and business leaders on key compliance areas and provide opportunity for them to notify of concerns or conflicts of interest.

Barnes Group takes every question and concern seriously and will not tolerate any form of retaliation against any person for raising a question or concern in good faith. Employee concerns are addressed through fair examination, objective determination of the facts, and appropriate corrective action measures, if necessary.



Empowerment – We recognize that our people are the source for our success. We enable everyone to make a positive personal impact while being accountable for their behaviors and the results they deliver to our communities, customers, and stockholders.

Emotional Intelligence – We identify our own emotions and styles of learning along with those of others. We motivate others and ourselves to achieve results while also managing our relationships with understanding and reason.

Collaboration – We build inclusive teams that leverage our collective experience and expertise to find differentiated solutions for our customers.

Competitiveness – We drive relentlessly to compete on the merits of our products and services, offering highly engineered products, differentiated industrial technologies and innovative solutions.

Continuous Improvement – We create a culture that embraces change and innovation, improves processes, eliminates waste, and builds on an unwavering commitment to quality.

Workplace Fairness – We provide opportunity, dignity, and respect for our employees in a safe and mutually rewarding environment.

Globalization – We embrace the expansion of our business around the world as an opportunity, and value diversity and inclusion as we work seamlessly across borders. We partner with employees, vendors, and customers of different cultures while respecting and contributing to the communities and environments in which we operate.

Governance Barnes Group is a publicly held company that trades on the New York Stock Exchange under the ticker symbol "B". The Board of Directors is our highest governing body, and is actively engaged in risk management oversight, succession planning, and corporate governance matters. We have a standing Audit Committee, Compensation and Management Development Committee, and Corporate Governance Committee. Our Board is comprised of twelve directors, the substantial majority of whom are independent.

Barnes Group maintains a comprehensive set of policies and procedures to enable effective corporate governance. The following documents are available on the Investor Relations section of our corporate website at www.bginc.com:

- Audit Committee Charter
- California Transparency in Supply Chains Act Disclosure
- Code of Business Ethics and Conduct
- Compensation and Management Development Committee Charter
- Conflict Minerals Policy
- Corporate Governance Committee Charter
- Corporate Governance Guidelines
- Policy Regarding Reporting of Complaints and Concerns
- Political Activity Policy



Sustainability Contact:

For further questions or concerns related to Barnes Group's sustainability work, please contact:

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