

[illegible]

Driving Growth Through Innovation.

OUR SOLUTIONS

ARE IN PRODUCTS **YOU** USE EVERYDAY.





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. Its specialized products and services are used in far-reaching applications including aerospace, transportation, manufacturing, automation, 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.

BUSINESSES AT A GLANCE



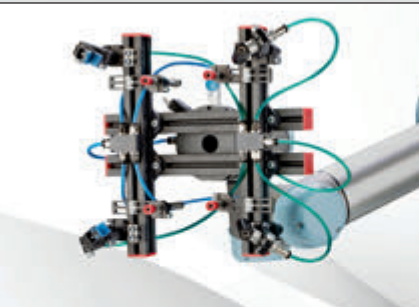
Molding Solutions

Molding Solutions' comprehensive portfolio of advanced plastic injection molding technologies and value-added services delivers premium tool-based solutions to global customers in the medical, personal care, packaging, general industrial, and transportation markets.



Force & Motion Control

Force & Motion Control is a leader in the development of nitrogen gas springs, gas-hydraulic suspension, customized gas springs, spring elements, and precision custom struts providing innovative force and motion control solutions to customers in a wide range of metal forming and other industrial markets.



Automation

Automation designs and develops robotic grippers, advanced end-of-arm tooling systems, sensors and other automation components for intelligent robotic handling solutions and industrial automation applications in end markets such as packaging, healthcare, transportation, and food and beverage.



Engineered Components

Engineered Components provides a comprehensive range of manufacturing capabilities including precision micro-stamped/fine-blanked solutions, high performance precision components, retaining and snap rings, and assemblies for industrial applications in end markets such as transportation, whitegoods, construction, and medical.



(Note: While Seeger was part of Engineered Components for all of 2019, this business was divested in early 2020.)



Aerospace

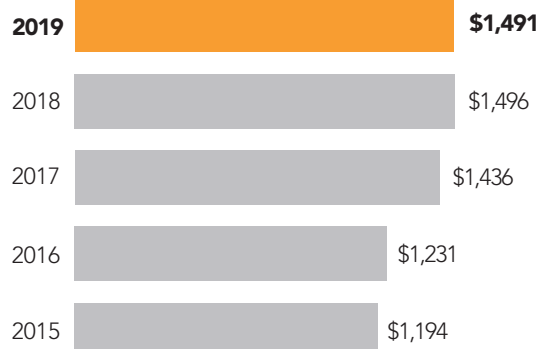
Barnes Aerospace provides superior engineering solutions, comprehensive component manufacturing, overhaul and repair services, and spare parts to the world's major engine and aircraft manufacturers, nacelle providers, commercial airlines, and the military.



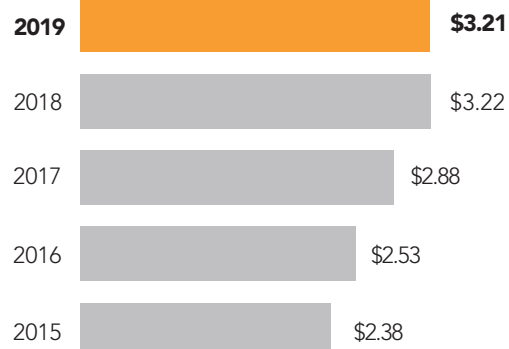
2019 FINANCIAL HIGHLIGHTS

Net Sales

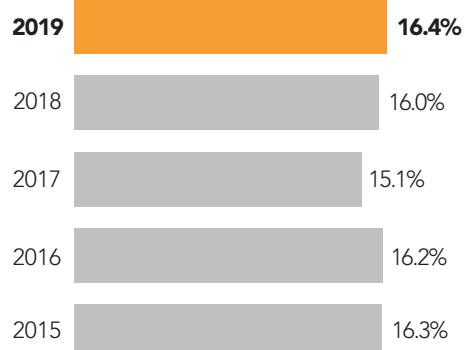
(\$ in Millions)



Adjusted EPS ⁽¹⁾

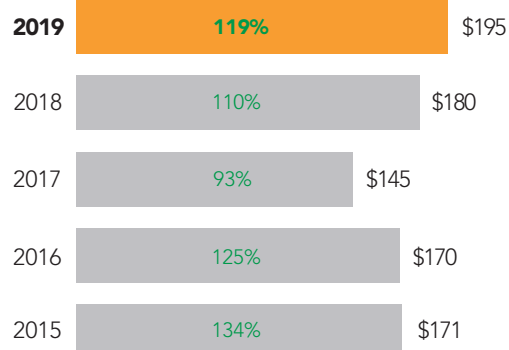


Adjusted Operating Margins ^(1, 2)



Adjusted Free Cash Flow ⁽¹⁾

(\$ in Millions)



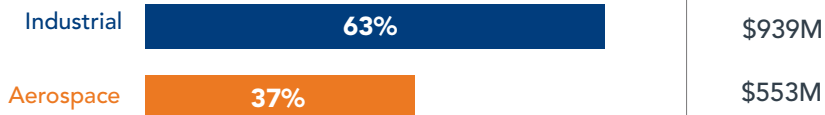
Cash Conversion

(1) References to adjusted results are non-GAAP measures. For a reconciliation to the appropriate GAAP measure, see the GAAP reconciliation on page 10.

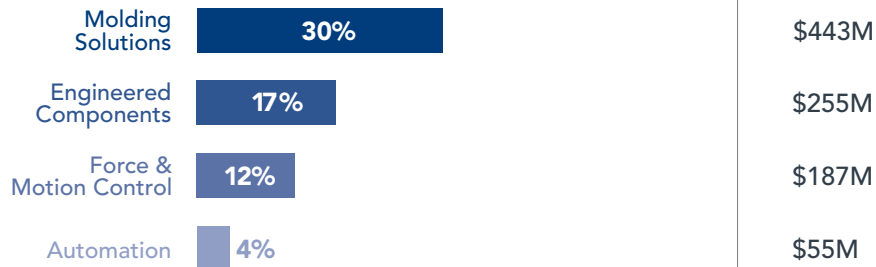
(2) Operating margin results have been adjusted on a retrospective basis to reflect the impact of the adoption of revised accounting guidance for the presentation of pension and other postretirement benefit costs in the first quarter of 2018.

REVENUE BREAKDOWN

Total Revenue



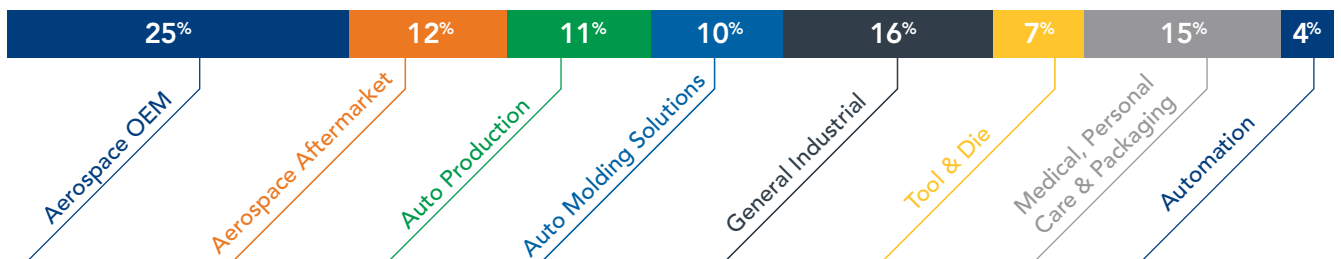
Industrial



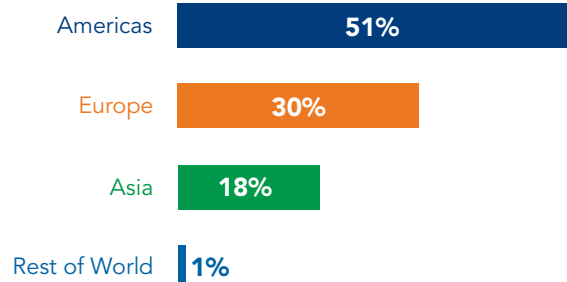
Aerospace



End Markets



Geographic Region



Letter to Shareholders

Solid Performance in an Uncertain Environment

Barnes Group made significant strides and achieved a number of accomplishments across the Company during 2019. In a year where several of our Industrial markets were challenging, excellent performance in our Aerospace business helped Barnes Group to deliver record operating income total sales that were just slightly lower than 2018's record level. Across the Company, the Barnes team decisively responded to these soft end markets and generated adjusted earnings that were among the best achieved in the Company's long history. The results attained are a testament to our talented management team, an engaged workforce, and the Barnes Enterprise System, which provides a solid foundation in support of our operations.



During the year, we made considerable headway in our journey to position the Company as a leading global provider of engineered products, diversified industrial technologies, and innovative solutions. Throughout the organization, we reinforced our key business processes of Commercial, Operational, and Financial Excellence – the fundamental components of how to run a great business – achieving Performance

Excellence across the Company. As a result, we concluded the year with evidence that the power of our ongoing transformation has structurally changed the Company for the better.

Financial Performance, Capital Deployment, and Portfolio Evolution

For 2019, total sales were down slightly from 2018 levels, with organic sales down 2%. Adjusted operating income was a record \$244 million, and adjusted operating margin increased 40 bps to 16.4%. Given the year's muted end markets in our Industrial Segment, this represents solid performance.

We continue to generate excellent cash performance and conversion. Cash provided by operating activities was \$248 million, up \$11 million from a year ago despite the effect of a discretionary \$15 million U.S. pension contribution made during the year, which reduced operating cash flow. As a focus item, working capital was a good story in 2019.

Organic investments continued in 2019 as we spent \$53 million in capital expenditures, about half of which was spent on programs to promote growth. Investments such as these support our innovation efforts and allow us to develop key enabling technologies to address new applications and end markets.

Free cash flow, which we define as cash provided by operating activities less capital expenditures, was \$195 million, up \$15 million compared to a year ago, and our adjusted cash conversion of 119% was an excellent outcome.

We returned \$83 million of capital to our shareholders through dividends and share repurchases. As dividends remain an essential piece of our capital deployment priorities, the Company has continuously paid a cash dividend to stockholders since 1934.



With respect to our business portfolio, in our Aerospace Segment, we negotiated a strategic long-term deal on the next generation aircraft, creating a foundation for future growth. In our aerospace aftermarket business we generated double-digit sales growth while elevating Operational Excellence through improved on-time delivery and turn-around-time.

In our Industrial Segment, as we continue to align our business to address specific market opportunities, we established our Force & Motion Control strategic business unit to provide broader engineering capabilities, products, and solutions to our global customers in a wide range of metal forming and other industrial end markets. In addition, we entered into a definitive agreement to divest the Seeger-Orbis business.

We believe our investments in organic growth and return of cash to shareholders represent a balanced approach to capital deployment. At the same time, we continue to seek strategic acquisition opportunities to better position the portfolio with regard to intellectual property-based businesses in good growth markets. With a healthy balance sheet and sufficient capacity, our expectation is to continue value creating capital deployment in 2020.

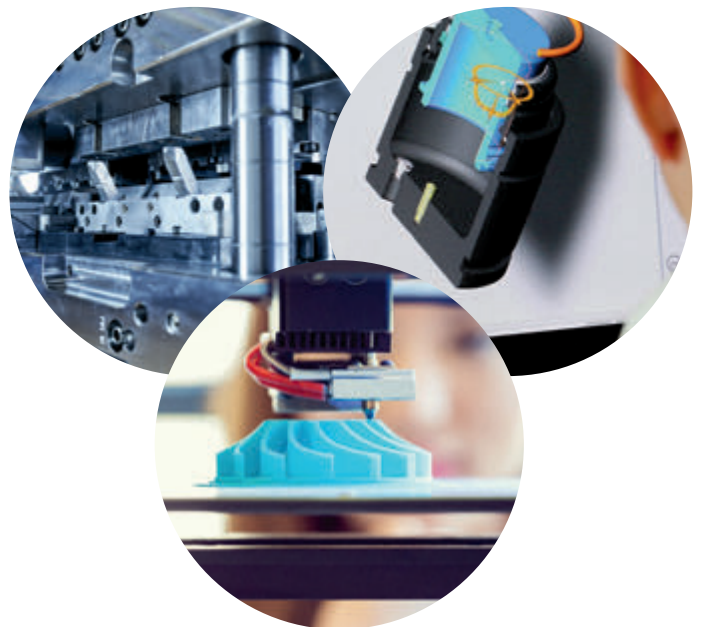
Performance Excellence Powered by the Barnes Enterprise System

As 2019 financial performance demonstrates, the organization's ability to generate solid results – even with a topline headwind – is a testament to the power of the Barnes Enterprise System (BES). Deeply ingrained in the Company's culture, BES supports our quest for continued success through Commercial, Operational, and Financial Excellence. This fully-integrated operating system is reinforced by our strategic enablers of Innovation and Talent Management and underscores all that we do.



Leveraging Barnes Group's Global Innovation Forum to further accelerate innovation across our business, we strive to advance five enterprise-wide focus areas: Smart Products, Smart Factory, 3D Printing/Additive Manufacturing, Robotics/Automation, and Digital Marketing & Sales. During the year, we realized several key achievements, including:

- Commercialized and piloted smart product offerings with launch customers, including Molding Solutions' MoldMind2™ and Force & Motion Control's ToolMind™.
- Drove higher productivity within Barnes Aerospace with innovations to optimize our machining and grinding processes and to increase the efficiency of our deburring and benching operations with robotic automation and novel tooling concepts.
- Introduced Molding Solutions' eGate® 2.0 product, providing a large electric actuation solution for valve gated hot runner systems that significantly improved performance and efficiency for our customers.
- Advanced our application of additive manufacturing into prototype production hardware and accelerated the use of 3D printed tooling to lower costs, improve quality, and enhance employee safety.



For 2020, we plan to make incremental capital investments to advance our engineering development approach by expanding our applied and fundamental research capabilities through additional scientific resources, creating a full spectrum of innovation to exceed our customer's needs for the future. Initial focus will be on our Industrial businesses and four key technology platforms: Materials, Software, Hardware, and Sensors, each of which will be integral to the technological evolution and future success of the Company. These combined technologies are expected to be at the core of the next generation of products and services that the Company will bring to market. We are excited about these investments and see these steps as key to the execution of our profitable growth strategy.

With regard to Talent Management, we remain focused on improving our systems and processes to acquire, develop, and retain top talent and skills needed to propel the Company forward. We launched our inaugural Enterprise Leadership Development Program, leveraging our "leaders as teachers" model to focus on the behaviors, tools, processes, and fundamentals for "running a great business." In addition, we further advanced our "Manufacture Your Dreams at Barnes" campaign to promote our global apprenticeship programs to the broader generation of future workers, resulting in a 43% increase in the number of interns and co-ops compared to last year. We also held our 7th annual National Manufacturing Day events across 13 of our U.S. locations, with over 530 students in attendance.

Making our World a Better Place

As a key aspect of the Barnes Group culture is the importance of being a good corporate citizen, we are committed to corporate responsibility and furthering environmental, social, and governance principles. We believe this allows us to create value for our stakeholders and is fundamental to our success as a responsible and environmentally-friendly organization.

We also believe in the power of communities and remain dedicated to the support of education, the arts, civic and youth activities, and health-related charities in our communities through the Barnes Group Foundation. 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.



Driving Growth through Innovation

The ongoing transformation of our Company is more critical than ever to sustain our competitive advantage. Barnes Group's history is one of continuously adapting to change and reinventing itself. Our vision and strategy are focused on leveraging intellectual property and innovation to establish our businesses as true market leaders in the segments we serve. We are truly excited about what the future holds as we continue to build our world-class Company and position Barnes for further success. As we look ahead to 2020 and beyond, we will employ the tools and processes of BES to effectively "sell, deliver, and realize our value." Our commitment to creating long-term, profitable growth for Barnes Group and our key stakeholders by providing superior value for our customers has never been stronger.

On behalf of our Board of Directors and our 5,700 employees around the world, we extend our sincerest gratitude to our customers, suppliers, and shareholders for their continued confidence and trust in Barnes Group.



A handwritten signature of Patrick J. Dempsey in black ink.

Patrick J. Dempsey
President and Chief
Executive Officer

A handwritten signature of Thomas O. Barnes in black ink.

Thomas O. Barnes
Chairman of the Board



References to adjusted results are non-GAAP measures. For a reconciliation to the appropriate GAAP measure, see the GAAP reconciliation on page 10.

Barnes Group Inc.
Non-GAAP Financial Measure Reconciliation
(Dollars in thousands, except per share data)
(Unaudited, See note below)

	Twelve Months Ended December 31,				
	2019	2018	2017	2016	2015
CONSOLIDATED RESULTS					
Operating Income (GAAP)	\$236,448	\$231,764	\$206,451	\$194,296	\$183,542
männer short-term purchase accounting adjustments	-	-	-	-	1,481
Thermoplay short-term purchase accounting adjustments	-	-	-	-	1,167
Seeger divestiture non-cash impairment charge	5,600	-	-	-	-
FOBOHA short-term purchase accounting adjustments	-	-	2,294	2,316	-
IGS short-term purchase accounting adjustments	-	2,887	-	-	-
Gimatic short-term purchase accounting adjustments	2,060	2,707	-	-	-
Acquisition transaction costs	-	2,350	-	1,164	970
Restructuring/reduction in force	-	-	7,460	-	4,222
Contract termination dispute charges	-	-	-	3,005	2,788
Contract termination arbitration award	-	-	-	(1,371)	-
Operating Income as adjusted (Non-GAAP) ¹	\$244,108	\$239,708	\$216,205	\$199,410	\$194,170
Operating Margin (GAAP)	15.9%	15.5%	14.4%	15.8%	15.4%
Operating Margin as adjusted (Non-GAAP) ¹	16.4%	16.0%	15.1%	16.2%	16.3%
Diluted Net Income per Share (GAAP)	\$3.07	\$3.15	\$1.09	\$2.48	\$2.19
männer short-term purchase accounting adjustments	-	-	-	-	0.02
Thermoplay short-term purchase accounting adjustments	-	-	-	-	0.01
Seeger divestiture non-cash impairment charge	0.11	-	-	-	-
FOBOHA short-term purchase accounting adjustments	-	-	0.03	0.03	-
IGS short-term purchase accounting adjustments	-	0.04	-	-	-
Gimatic short-term purchase accounting adjustments	0.03	0.04	-	-	-
Acquisition transaction costs	-	0.04	-	0.02	0.02
Restructuring/reduction in force	-	-	(0.01)	-	0.05
Contract termination dispute charges	-	-	-	0.03	0.03
Contract termination arbitration award	-	-	-	(0.03)	-
Pension lump-sum settlement charge	-	-	-	-	0.11
Tax benefit recognized for refund of withholding taxes	-	-	-	-	(0.05)
Effects of U.S. tax reform	-	(0.05)	1.77	-	-
Diluted Net Income per Share as adjusted (Non-GAAP) ¹	\$3.21	\$3.22	\$2.88	\$2.53	\$2.38

NOTES:

Results have been adjusted on a retrospective basis to reflect the impact of the adoption of revised guidance for the presentation of pension and other postretirement benefit costs in the first quarter of 2018, as presented within the Financial Supplement within the Form 8-K dated April 27, 2018.

¹ The Company has excluded the following from its historical "as adjusted" financial measurements:

2019: 1) Short-term purchase accounting adjustments related to its Gimatic acquisition and 2) the non-cash impairment charge related to the divestiture of the Seeger business.

2018: 1) \$2,613 of adjustments made in 2018 to reduce the tax expense recorded in December 2017 related to the U.S. tax reform (commonly referred to as the Tax Cuts and Jobs Act), 2) short-term purchase accounting adjustments related to its Industrial Gas Springs (IGS) and Gimatic acquisitions and 3) transaction costs related to the IGS and Gimatic acquisitions.

2017: 1) The effects of U.S. tax reform (\$96,700), 2) short-term purchase accounting adjustments related to its FOBOHA acquisition, 3) charges from restructuring actions related to the closure and consolidation of two manufacturing facilities within the Industrial segment and 4) the related pension curtailment and settlement gains included in non-operating income.

2016: 1) Transaction costs related to its FOBOHA acquisition, 2) short-term purchase accounting adjustments related to its FOBOHA acquisition, 3) charges related to the contract termination dispute and 4) operating income related to the contract termination arbitration award and the non-operating interest income awarded.

2015: 1) Short-term purchase accounting adjustments related to its männer and Thermoplay acquisitions, 2) transaction costs related to its Thermoplay and Priamus acquisitions, 3) restructuring and workforce reduction charges, 4) certain charges recorded in the Aerospace segment in the third quarter of 2015 related to a contract termination dispute following a customer sourcing decision, 5) the pension lump-sum settlement charge recorded in 2015 and 6) a tax benefit recognized in the third quarter of 2015 related to a refund of withholding taxes that were previously paid and included in tax expense in prior years.

The tax effects of these items, excluding the effects of U.S. Tax Reform in 2017 which impacted tax expense directly, were calculated based on the respective tax jurisdiction of each item. Management believes that these adjustments provide the Company and its investors with an indication of our baseline performance excluding items that are not considered to be reflective of our ongoing results. Management does not intend results excluding the adjustments to represent results as defined by GAAP, and the reader should not consider it as an alternative measurement calculated in accordance with GAAP, or as an indicator of the Company's performance. Accordingly, the measurements have limitations depending on their use.

	Twelve Months Ended December 31,				
	2019	2018	2017	2016	2015
FREE CASH FLOW (FCF):					
Net cash provided by operating activities ¹	\$248,301	\$237,199	\$203,920	\$217,646	\$217,475
Capital expenditures	(53,286)	(57,273)	(58,712)	(47,577)	(45,982)
Free cash flow ²	\$195,015	\$179,926	\$145,208	\$170,069	\$171,493
Free cash flow to net income cash conversion ratio (as adjusted):					
Net income	158,350	166,186	59,415	135,601	121,380
Non-cash impairment charge related to divestiture	5,600	-	-	-	-
Effects of U.S. tax reform	-	(2,613)	96,700	-	-
Pension lump-sum settlement charge, net of tax	-	-	-	-	6,182
Net income (as adjusted) ³	\$163,950	\$163,573	\$156,115	\$135,601	\$127,562
Free cash flow to net income cash conversion ratio (as adjusted) ³	119%	110%	93%	125%	134%

NOTES:

¹ The Company has reclassified certain components of 2015 Net cash provided by operating activities to reflect new accounting guidance related to certain aspects of share-based payments to employees.

² The Company defines free cash flow as net cash provided by operating activities less capital expenditures. The Company believes that the free cash flow metric is useful to investors and management as a measure of cash generated by business operations that can be used to invest in future growth, pay dividends, repurchase stock and reduce debt. This metric can also be used to evaluate the Company's ability to generate cash flow from business operations and the impact that this cash flow has on the Company's liquidity.

³ For the purpose of calculating the cash conversion ratio, the Company has excluded the following:

2019: The non-cash impairment charge related to the divestiture of the Seeger business from net income.

2018 & 2017: The effects of U.S. tax reform, commonly referred to as the Tax Cuts and Jobs Act, from net income.

2015: The pension lump-sum settlement charge, net of tax, from net income.

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2019

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from _____ to _____
Commission file number 1-4801

BARNES GROUP INC.

(Exact name of registrant as specified in its charter)

Delaware
(State of incorporation)
123 Main Street
Bristol
Connecticut
(Address of Principal Executive Office)



06-0247840
(I.R.S. Employer Identification No.)

06010
(Zip Code)

(860) 583-7070

Registrant's telephone number, including area code

Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	Trading Symbol	Name of Each Exchange on Which Registered
Common Stock, par value \$0.01 per share	B	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act:

None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports); and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer	<input checked="" type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
		Emerging growth company	<input type="checkbox"/>

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ☐ No ☒

The aggregate market value of the voting stock (Common Stock) held by non-affiliates of the registrant as of the close of business on June 28, 2019 was approximately \$2,624,727,684 based on the closing price of the Common Stock on the New York Stock Exchange on that date. The registrant does not have any non-voting common equity.

The registrant had outstanding 50,832,068 shares of common stock as of February 20, 2020.

Documents Incorporated by Reference

Portions of the registrant's definitive proxy statement to be delivered to stockholders in connection with the Annual Meeting of Stockholders to be held May 8, 2020 are incorporated by reference into Part III.

Barnes Group Inc.
Index to Form 10-K
Year Ended December 31, 2019

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FORWARD-LOOKING STATEMENTS

This Annual Report may contain forward-looking statements as defined in the Private Securities Litigation Reform Act of 1995. Forward-looking statements often address our expected future operating and financial performance and financial condition, and often contain words such as "anticipate," "believe," "expect," "plan," "estimate," "project," and similar terms. These forward-looking statements do not constitute guarantees of future performance and are subject to a variety of risks and uncertainties that may cause actual results to differ materially from those expressed in the forward-looking statements. These include, among others: difficulty maintaining relationships with employees, including unionized employees, customers, distributors, suppliers, business partners or governmental entities; failure to successfully negotiate collective bargaining agreements or potential strikes, work stoppages or other similar events; difficulties leveraging market opportunities; changes in market demand for our products and services; rapid technological and market change; the ability to protect and avoid infringing upon intellectual property rights; introduction or development of new products or transfer of work; higher risks in global operations and markets; the impact of intense competition; acts of terrorism, cybersecurity attacks or intrusions that could adversely impact our businesses; uncertainties relating to conditions in financial markets; currency fluctuations and foreign currency exposure; future financial performance of the industries or customers that we serve; our dependence upon revenues and earnings from a small number of significant customers; a major loss of customers; inability to realize expected sales or profits from existing backlog due to a range of factors, including changes in customer sourcing decisions, material changes, production schedules and volumes of specific programs; the impact of government budget and funding decisions; government tariffs, trade agreements and trade policies; the impact of new or revised tax laws and regulations; the adoption of laws,

directives or regulations that impact the materials processed by our products or their end markets; changes in raw material or product prices and availability; restructuring costs or savings; the continuing impact of prior acquisitions and divestitures, integration of acquired businesses; and any other future strategic actions, including acquisitions, divestitures, restructurings, or strategic business realignments, and our ability to achieve the financial and operational targets set in connection with any such actions; the outcome of pending and future legal, governmental, or regulatory proceedings and contingencies and uninsured claims; product liabilities; future repurchases of common stock; future levels of indebtedness; and numerous other matters of a global, regional or national scale, including those of a political, economic, business, competitive, environmental, regulatory and public health nature; and other risks and uncertainties described in this Annual Report. The Company assumes no obligation to update its forward-looking statements.

PART I

Item 1. Business

BARNES GROUP INC. ⁽¹⁾

Barnes Group Inc. (the “Company”) is a global provider of highly engineered products, differentiated industrial technologies, and innovative solutions, serving a wide range of end markets and customers. Its specialized products and services are used in far-reaching applications including aerospace, transportation, manufacturing, automation, healthcare, and packaging. The Company’s skilled and dedicated employees around the globe are committed to the highest performance standards and achieving consistent, sustainable profitable growth.

Our Strategy

The Company’s strategy outlines the actions that we are executing to achieve our vision. Our strategy is comprised of four pillars:

1. **Build a World-class Company Focused on High Margin, High Growth Businesses** - We pro-actively manage our business portfolio with a focus on multiple platforms and market channels, in end-markets where projected long-term growth and favorable macro-economic trends are present. By doing so, we expect to create superior value for our key stakeholders - our shareholders, customers, employees and the communities in which we operate.
2. **Leverage the Barnes Enterprise System (“BES”) as a Significant Competitive Advantage** - BES is our integrated operating system that promotes a culture of employee engagement and empowerment and drives alignment across the organization around a common vision. BES standardizes our business processes to allow us to achieve commercial, operational and financial excellence in everything we do.
3. **Expand and Protect Our Core Intellectual Property to Deliver Differentiated Solutions** - Driven by a passion for innovation, we embrace intellectual property as a core differentiator to create proprietary products, processes and systems. Through our Global Innovation Forum, we foster an environment that generates great ideas and shares best practices across the enterprise to maximize our collective strengths and create economies of scale in the development and commercialization of new and innovative products and services.
4. **Effectively Allocate Capital to Drive Top Quartile Total Shareholder Return** - We strive to be good custodians of our shareholders’ capital and to drive maximum shareholder value. We do so by investing in our core businesses to fund profitable, organic growth and by employing a disciplined capital allocation process in the strategic acquisitions we undertake.

Structure

The Company operates under two global business segments: Industrial and Aerospace. The Industrial Segment includes the Molding Solutions, Force & Motion Control, Automation and Engineered Components business units. The Aerospace segment includes the original equipment manufacturing (“OEM”) business and the aftermarket business, which includes maintenance repair and overhaul (“MRO”) services and the manufacture and delivery of aerospace aftermarket spare parts.

In the fourth quarter of 2018, the Company completed its acquisition of Gimatic S.r.l. (“Gimatic”). Gimatic designs and develops robotic grippers, advanced end-of-arm tooling systems, sensors and other automation components. Gimatic operates in end markets that include automotive, packaging, healthcare and food and beverage. Headquartered in Italy, Gimatic has a sales network extending across Europe, North America and Asia. Gimatic results have been included within the Industrial segment’s operating profit. See Note 2 of the Consolidated Financial Statements.

⁽¹⁾ As used in this annual report, “Company,” “Barnes Group,” “we” and “ours” refer to the registrant and its consolidated subsidiaries except where the context requires otherwise, and “Industrial” and “Aerospace” refer to the registrant’s segments, not to separate corporate entities.

In the third quarter of 2018, the Company completed its acquisition of the customized gas spring business of Industrial Gas Springs ("IGS"), a recognized designer, manufacturer and supplier of customized gas springs. IGS is headquartered in the United Kingdom, with distribution and assembly capabilities in the United States. Its diversified end markets include general industrial, transportation, aerospace, and medical, among others. IGS results have been included within the Industrial segment's operating profit. See Note 2 of the Consolidated Financial Statements.

In the second quarter of 2017, the Company completed its acquisition of the assets of the Gammaflux L.P. business ("Gammaflux"), a leading supplier of hot runner temperature and sequential valve gate control systems to the plastics industry. Gammaflux, which is headquartered in Sterling, Virginia and has offices in Illinois and Germany, provides temperature control solutions for injection molding, extrusion, blow molding, thermoforming, and other applications. Its end markets include packaging, electronics, automotive, household products, medical, and tool building. Gammaflux results have been included within the Industrial segment's operating profit. See Note 2 of the Consolidated Financial Statements.

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, automation, personal care, packaging, electronics, and medical devices. 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 business designs and manufactures 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. The Force & Motion Control business provides innovative cost-effective force and motion control solutions for a wide range of metal forming and other industrial markets. The Automation business designs and develops robotic grippers, advanced end-of-arm tooling systems, sensors and other automation components for intelligent robotic handling solutions and industrial automation applications. See "Part II - Item 7 - Management's Discussion and Analysis of Financial Condition and Results of Operations - Business Transformation" for additional information related to the Company's branding of the Force & Motion Control and Automation businesses. Industrial's Engineered Components business manufactures and supplies precision mechanical products used in transportation and industrial applications, including mechanical springs, and high-precision punched and fine-blanked components.

Industrial competes with a broad base of large and small companies engaged in the manufacture and sale of engineered products, precision molds, hot runner systems, robotic handling solutions and precision components. Industrial competes on the basis of quality, service, reliability of supply, engineering and technical capability, geographic reach, product breadth, innovation, design and price. Industrial has a global presence, with manufacturing, distribution and assembly operations in the United States, China, Germany, Italy, Sweden and Switzerland, among others. Industrial also has sales and service operations in the United States, China/Hong Kong, Germany, Italy and Switzerland, among others. For additional information regarding net sales by geographic area, refer to Note 22 of the Consolidated Financial Statements. Sales by Industrial to its four largest customers accounted for approximately 10% of its sales in 2019.

AEROSPACE

Aerospace is a global manufacturer of complex fabricated and precision machined components and assemblies for turbine engines, nacelles and structures for both commercial and military aircraft. The Aerospace aftermarket business provides aircraft engine component 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.

Aerospace's OEM business supplements the leading aircraft engine OEM, nacelles, and structure capabilities and competes with a large number of fabrication and machining companies. Competition is based mainly on value derived from intellectual property and trade secrets, quality, concurrent engineering and technical capability, product breadth, solutions providing new product introduction, timeliness, service and price. Aerospace's fabrication and machining operations, with facilities in Arizona, Connecticut, Mexico, Michigan, Ohio, Utah and Singapore, produce critical engine, nacelle and airframe components through technologically advanced manufacturing processes.

The Aerospace aftermarket business supplements jet engine OEMs' maintenance, repair and overhaul capabilities, and competes with the service centers of major commercial airlines and other independent service companies for the repair and overhaul of turbine engine components. The manufacture and supply of aerospace aftermarket spare parts, including those related to the RSPs, are dependent upon the reliable and timely delivery of high-quality components. Aerospace's aftermarket facilities, located in Connecticut, Ohio, Singapore and Malaysia, specialize in the repair and refurbishment of highly engineered components and assemblies such as cases, rotating life limited parts, rotating air seals, turbine shrouds, vanes and honeycomb air seals. Sales by Aerospace to its three largest customers, General Electric, Rolls-Royce and United Technologies Corporation, accounted for approximately 55%, 15% and 10% of its sales in 2019, respectively. Sales to its next three largest customers in 2019 collectively accounted for approximately 5% of its total sales.

FINANCIAL INFORMATION

The backlog of the Company's orders believed to be firm at the end of 2019 was \$1,080 million as compared with \$1,169 million at the end of 2018. Of the 2019 year-end backlog, \$815 million was attributable to Aerospace and \$265 million was attributable to Industrial. Approximately 60% of the Company's consolidated year-end backlog is scheduled to be shipped during 2020. The remainder of the Company's backlog is scheduled to be shipped after 2020.

We have a global manufacturing footprint and a technical service network to support our worldwide customer base. The global economies have a significant impact on the financial results of the business as we have significant operations outside of the United States. For a summary of net sales, operating profit and long-lived assets by reportable business segment, as well as net sales by product and services, geographic area and end markets, see Notes 4 and 22 of the Consolidated Financial Statements. For a discussion of risks attendant to the global nature of our operations and assets, see Item 1A. Risk Factors.

RAW MATERIALS

The principal raw materials used to manufacture our products are various grades and forms of steel, from rolled steel bars, plates and sheets, to high-grade valve steel wires and sheets, various grades and forms (bars, sheets, forgings, castings and powders) of stainless steels, aluminum alloys, titanium alloys, copper alloys, graphite, and iron-based, nickel-based (Inconels) and cobalt-based (Hastelloys) superalloys for complex aerospace applications. Prices for steel, titanium, Inconel, Hastelloys, as well as other specialty materials, have periodically increased due to higher demand and, in some cases, reduction of the availability of materials. If this occurs, the availability of certain raw materials used by us or in products sold by us may be negatively impacted.

RESEARCH AND DEVELOPMENT

We conduct research and development activities in our effort to provide a continuous flow of innovative new products, processes and services to our customers. We also focus on continuing efforts aimed at discovering and implementing new knowledge that significantly improves existing products and services, and developing new applications for existing products and services. Our product development strategy is driven by product design teams and collaboration with our customers, particularly within Industrial's Molding Solutions and Automation businesses. Many of the products we manufacture are customized based on our customers' specifications. Investments in research and development are important to our long-term growth, enabling us to stay ahead of changing customer and marketplace needs. We spent approximately \$16 million, \$16 million and \$15 million in 2019, 2018 and 2017, respectively, on research and development activities.

PATENTS AND TRADEMARKS

Patents and other proprietary rights, including trade secrets and unpatented know-how, are critical to certain of our business units. We are party to certain licenses of intellectual property and hold numerous patents, trademarks, and trade names that enhance our competitive position. The Company does not believe, however, that any of these licenses, patents, trademarks or trade names is individually significant to the Company or either of our segments. We maintain procedures to protect our intellectual property. Risk factors associated with our intellectual property are discussed in Item 1A. Risk Factors.

EXECUTIVE OFFICERS OF THE COMPANY

For information regarding the Executive Officers of the Company, see Part III, Item 10 of this Annual Report.

ENVIRONMENTAL

Compliance with federal, state, and local laws, as well as those of other countries, which have been enacted or adopted regulating the discharge of materials into the environment or otherwise relating to the protection of the environment has not had a material effect, and is not expected to have a material effect, upon our capital expenditures, earnings, or competitive position.

Our past and present business operations and past and present ownership and operations of real property and the use, sale, storage and handling of chemicals and hazardous products subject us to extensive and changing U.S. federal, state and local environmental laws and regulations, as well as those of other countries, pertaining to the discharge of materials into the environment, enforcement, disposition of wastes (including hazardous wastes), the use, shipping, labeling, and storage of chemicals and hazardous materials, building requirements or otherwise relating to protection of the environment. We have experienced, and expect to continue to experience, costs to comply with environmental laws and regulations. In addition, new laws and regulations, stricter enforcement of existing laws and regulations, the discovery of previously unknown contamination or the imposition of new clean-up requirements could require us to incur costs or become subject to new or increased liabilities that could have a material adverse effect on our business, financial condition, results of operations and cash flows.

We use and generate hazardous substances and wastes in our operations. In addition, many of our current and former properties are or have been used for industrial purposes. Accordingly, we monitor hazardous waste management and applicable environmental permitting and reporting for compliance with applicable laws at our locations in the ordinary course of our business. We may be subject to potential material liabilities relating to any investigation and clean-up of our locations or properties where we delivered hazardous waste for handling or disposal that may be contaminated or which may have been contaminated prior to our purchase, and to claims alleging personal injury.

AVAILABLE INFORMATION

Our Internet address is www.BGInc.com. Our annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports are available without charge on our website as soon as reasonably practicable after they are filed with, or furnished to, the U.S. Securities and Exchange Commission ("SEC"). In addition, we have posted on our website, and will make available in print to any stockholder who makes a request, our Corporate Governance Guidelines, our Code of Business Ethics and Conduct, and the charters of the Audit Committee, Compensation and Management Development Committee and Corporate Governance Committee (the responsibilities of which include serving as the nominating committee) of the Company's Board of Directors. References to our website addressed in this Annual Report are provided as a convenience and do not constitute, and should not be viewed as, an incorporation by reference of the information contained on, or available through, the website. Therefore, such information should not be considered part of this Annual Report.

Item 1A. Risk Factors

Our business, financial condition or results of operations could be materially adversely affected by any of the following risks. Please note that additional risks not presently known to us may also materially impact our business and operations.

RISKS RELATED TO OUR BUSINESS

We depend on revenues and earnings from a small number of significant customers. Any bankruptcy of or loss of or, cancellation, reduction or delay in purchases by these customers could harm our business. In 2019, our net sales to General Electric and its subsidiaries accounted for 21% of our total sales and approximately 55% of Aerospace's net sales. Aerospace's second and third largest customers, Rolls-Royce and United Technologies Corporation and their respective subsidiaries, accounted for 15% and 10%, respectively, of Aerospace's net sales in 2019. Approximately 5% of Aerospace's net sales in 2019 were to its next three largest customers. Approximately 10% of Industrial's sales in 2019 were to its four largest customers. Some of our success will depend on the business strength and viability of those customers. We cannot assure you that we will be able to retain our largest customers. Some of our customers may in the future reduce their purchases due to economic conditions or shift their purchases from us to our competitors, in-house or to other sources. Some of our long-term sales agreements provide that until a firm order is placed by a customer for a particular product, the customer may unilaterally reduce or discontinue its projected purchases without penalty, or terminate for convenience. The loss of one or more of our largest customers, any reduction, cancellation or delay in sales to these customers (including a reduction in aftermarket volume in our RSPs), our inability to successfully develop relationships with new customers, or future price concessions we make to retain customers could significantly reduce our sales and profitability.

The global nature of our business exposes us to foreign currency fluctuations that may affect our future revenues, debt levels and profitability. We have manufacturing facilities and technical service centers, and sales and distribution centers around the world, and the majority of our foreign operations use the local currency as their functional currency. These include, among others, the Brazilian real, British pound sterling, Canadian dollar, Czech koruna, Chinese renminbi, Euro, Japanese yen, Korean won, Malaysian ringgit, Mexican peso, Singaporean dollar, Swedish krona, and the Swiss franc. Since our financial statements are denominated in U.S. dollars, changes in currency exchange rates between the U.S. dollar and other currencies expose us to translation risk when the local currency financial statements are translated to U.S. dollars. Changes in currency exchange rates may also expose us to transaction risk. We may buy hedges in certain currencies to reduce or offset our exposure to currency exchange rate fluctuations; however, these transactions may not be adequate or effective to protect us against unfavorable exchange rate fluctuations. We have not engaged in any speculative hedging activities. Currency fluctuations may adversely impact our revenues and profitability in the future.

Our operations depend on our manufacturing, sales, and service facilities and information systems in various parts of the world which are subject to physical, financial, regulatory, environmental, operational and other risks that could disrupt our operations. We have a significant number of manufacturing facilities, technical service centers, and sales and distribution centers both within and outside the U.S. The global scope of our business subjects us to increased risks and uncertainties such as threats of war, terrorism and instability of governments; and economic, regulatory and legal systems in countries in which we or our customers conduct business.

Our customers' and suppliers' facilities, as well as our own facilities, are located in areas that may be affected by natural disasters, including earthquakes, windstorms and floods, which could cause significant damage and disruption to the operations of those facilities and, in turn, could have a material adverse effect on our business, financial condition, results of operations and cash flows. Additionally, some of our manufacturing equipment and tooling is custom-made and is not readily replaceable. Loss of such equipment or tooling could have a negative impact on our manufacturing business, financial condition, results of operations and cash flows.

A major catastrophe such as an earthquake, windstorm, flood or other natural disaster at any of our sites, infectious disease outbreaks, or significant labor strikes, work stoppages, political unrest, or any of the events described above, in any of the areas where we or our customers conduct operations could result in a prolonged interruption of our business. Any disruption resulting from these events could cause significant delays in the manufacture or shipment of products or the provision of repair and other services that may result in our loss of sales and customers. Although we have obtained property damage and business interruption insurance, our insurance will not cover all potential risks, and we cannot assure you that we will have adequate insurance to compensate us for all losses that result from any insured risks. Any material loss not covered by insurance could have a material adverse effect on our financial condition, results of operations and cash flows. We cannot assure you that insurance will be available in the future at a cost acceptable to us or at a cost that will not have a material adverse effect on our profitability, net income and cash flows.

The global nature of our operations and assets subjects us to financial and regulatory risks in the countries in which we and our customers, suppliers and other business counterparties operate. We have operations and assets in various parts of the world. In addition, we sell or may in the future sell our products and services to the U.S. and foreign governments and in foreign countries. As a global business, we are subject to complex laws, regulations and other conditions in the U.S. and other countries in which we operate, and associated risks, including: U.S. imposed embargoes of sales to specific countries; foreign import controls (which may be arbitrarily imposed or enforced); import regulations and duties; export regulations (which require us to comply with stringent licensing regimes); reporting requirements regarding the use of "conflict" minerals mined from certain countries; anti-dumping regulations; price and currency controls; exchange rate fluctuations; dividend remittance restrictions; expropriation of assets; war, civil uprisings and riots; government instability; government-imposed economic uncertainties, such as a prolonged U.S. federal government shutdown; government contracting requirements including cost accounting standards, including various procurement, security, and audit requirements, as well as requirements to certify to the government compliance with these requirements; the necessity of obtaining governmental approval for new and continuing products and operations; and legal systems or decrees, laws, taxes, regulations, interpretations and court decisions that are not always fully developed and that may be retroactively or arbitrarily applied. We have experienced inadvertent violations of some of these regulations, including export regulations, safety and environmental regulations, and regulations prohibiting sales of certain products, in the past, none of which has had or, we believe, will have a material adverse effect on our business. However, any significant violations of these or other regulations in the future could result in civil or criminal sanctions, and the loss of export or other licenses which could have a material adverse effect on our business. We are subject to state unclaimed property laws in the ordinary course of business, and are currently undergoing a multi-state unclaimed property audit, the timing and outcome of which cannot be specifically predicted. We may also be subject to unanticipated income taxes, excise and custom duties, import taxes, export taxes, value added taxes, or other governmental assessments, and taxes may be impacted by changes in legislation in the tax jurisdictions in which we operate. In addition, our

organizational and capital structure may limit our ability to transfer funds between countries without incurring adverse tax consequences. Any of these events could result in a loss of business or other unexpected costs that could reduce sales or profits and have a material adverse effect on our financial condition, results of operations and cash flows.

Our results could be impacted by changes in tariffs, trade agreements or other trade restrictions imposed or agreed to by the U.S. or foreign governments. We continue to monitor changes to existing and proposed bilateral or multi-lateral trade agreements and treaties with foreign countries, including the U.S.-Mexico-Canada Agreement (“USMCA”) approved by the U.S. Senate on January 16, 2020 and the U.S.-China trade deal. It remains unclear what the U.S. federal government or foreign governments will or will not do in the future with respect to tariffs or other international trade agreements and policies. An escalating trade war or other governmental action related to tariffs or international trade agreements or policies has the potential to adversely impact demand for our products, our costs, customers, suppliers and/or the U.S. or foreign economies or certain sectors thereof in which we compete and, thus, to adversely impact our businesses, financial condition, results of operations and cash flows.

Any disruption or failure in the operation of our information systems, including from conversions or integrations of information technology or reporting systems, could have a material adverse effect on our business, financial condition, results of operations and cash flows. Our information technology ("IT") systems are an integral part of our business. We depend upon our IT systems to help communicate internally and externally, process orders, manage inventory, make payments and collect accounts receivable. Our IT systems also allow us to purchase, sell and ship products efficiently and on a timely basis, to maintain cost-effective operations, and to help provide superior service to our customers. We are currently in the process of implementing enterprise resource planning ("ERP") platforms across certain of our businesses, and we expect that we will need to continue to improve and further integrate our IT systems, on an ongoing basis in order to effectively run our business. If we fail to successfully manage and integrate our IT systems, including these ERP platforms, it could adversely affect our business or operating results.

Increased cybersecurity requirements, vulnerabilities, threats and more sophisticated and targeted computer crime could pose a risk to our systems, networks, products, data and services and have a material adverse effect on our business, financial condition, results of operations and cash flows. In the ordinary course of our business, we store sensitive data, including intellectual property, our proprietary business information and that of our customers, suppliers and business partners, and personally identifiable information of our employees, in our data centers and on our networks. The secure maintenance and transmission of this information is critical to our business operations. Despite our security measures, our information technology and infrastructure may be vulnerable to attacks by hackers or breached due to employee error, malfeasance or other disruptions. Any such breach could compromise our networks and the information stored there could be accessed, altered, publicly disclosed, lost or stolen. Any such access, disclosure or other loss of information could result in legal claims or proceedings, liability under laws that protect the privacy of personal information, and regulatory penalties, disrupt our operations, and damage our reputation, which could adversely affect our business, revenues and competitive position. Further, cybersecurity and data protection laws and regulations continue to evolve in the U.S. and worldwide. This adds compliance complexity and may increase our costs of compliance and expose us to litigation, monetary damages, regulatory enforcement actions or fines in one or more jurisdictions.

We have significant indebtedness that could affect our operations and financial condition, and our failure to meet certain financial covenants required by our debt agreements may materially and adversely affect our assets, financial position and cash flows. At December 31, 2019, we had consolidated debt obligations of \$834.8 million, representing approximately 40% of our total capital (indebtedness plus stockholders' equity) as of that date. Our level of indebtedness, proportion of variable rate debt obligations and the significant debt servicing costs associated with that indebtedness may adversely affect our operations and financial condition. For example, our indebtedness could require us to dedicate a substantial portion of our cash flows from operations to payments on our debt, thereby reducing the amount of our cash flows available for working capital, capital expenditures, investments in technology and research and development, acquisitions, dividends and other general corporate purposes; limit our flexibility in planning for, or reacting to, changes in the industries in which we compete; place us at a competitive disadvantage compared to our competitors, some of whom have lower debt service obligations and greater financial resources than we do; limit our ability to borrow additional funds; or increase our vulnerability to general adverse economic and industry conditions. In addition, a majority of our debt arrangements require us to maintain certain debt and interest coverage ratios and limit our ability to incur debt, make investments or undertake certain other business activities. These requirements could limit our ability to obtain future financing and may prevent us from taking advantage of attractive business opportunities. Our ability to meet the financial covenants or requirements in our debt arrangements may be affected by events beyond our control, and we cannot assure you that we will satisfy such covenants and requirements. A breach of these covenants or our inability to comply with the restrictions could result in an event of default under our debt arrangements which, in turn, could result in an event of default under the terms of our other indebtedness. Upon the occurrence of an event of default under our debt arrangements, after the expiration of any grace periods, our lenders could

elect to declare all amounts outstanding under our debt arrangements, together with accrued interest, to be immediately due and payable. If this were to happen, we cannot assure you that our assets would be sufficient to repay in full the payments due under those arrangements or our other indebtedness or that we could find alternative financing to replace that indebtedness.

Conditions in the worldwide credit markets may limit our ability to expand our credit lines beyond current bank commitments. In addition, our profitability may be adversely affected as a result of increases in interest rates. At December 31, 2019, we and our subsidiaries had \$834.8 million aggregate principal amount of consolidated debt obligations outstanding, of which approximately 75% had interest rates that float with the market (not hedged against interest rate fluctuations). A 100 basis point increase in the interest rate on the floating rate debt in effect at December 31, 2019 would result in an approximate \$6.3 million annualized increase in interest expense.

Changes in the availability or price of materials, products and energy resources could adversely affect our costs and profitability. We may be adversely affected by the availability or price of raw materials, products and energy resources, particularly related to certain manufacturing operations that utilize steel, stainless steel, titanium, Inconel, Hastelloys and other specialty materials. The availability and price of raw materials and energy resources may be subject to curtailment or change due to, among other things, new laws or regulations, global economic or political events including strikes, terrorist attacks and war, suppliers' allocations to other purchasers, interruptions in production by suppliers, changes in exchange rates and prevailing price levels. In some instances there are limited sources for raw materials and a limited number of primary suppliers for some of our products for resale. Although we are not dependent upon any single source for any of our principal raw materials or products for resale, and such materials and products have, historically, been readily available, we cannot assure you that such raw materials and products will continue to be readily available. Disruption in the supply of raw materials, products or energy resources or our inability to come to favorable agreements with our suppliers could impair our ability to manufacture, sell and deliver our products and require us to pay higher prices. Any increase in prices for such raw materials, products or energy resources could materially adversely affect our costs and our profitability.

We maintain pension and other postretirement benefit plans in the U.S. and certain international locations. Our costs of providing defined benefit plans are dependent upon a number of factors, such as the rates of return on the plans' assets, interest rates, exchange rate fluctuations, future governmental regulation, global fixed income and equity prices, and our required and/or voluntary contributions to the plans. Declines in the stock market, prevailing interest rates, declines in discount rates, improvements in mortality rates and rising medical costs may cause an increase in our pension and other postretirement benefit expenses in the future and result in reductions in our pension fund asset values and increases in our pension and other postretirement benefit obligations. These changes have caused and may continue to cause a significant reduction in our net worth and without sustained growth in the pension investments over time to increase the value of the plans' assets, and depending upon the other factors listed above, we could be required to increase funding for some or all of these pension and postretirement plans.

We carry significant inventories and a loss in net realizable value could cause a decline in our net worth. At December 31, 2019, our inventories totaled \$232.7 million. Inventories are valued at the lower of cost or net realizable value based on management's judgments and estimates concerning future sales levels, quantities and prices at which such inventories will be sold in the normal course of business. Accelerating the disposal process or changes in estimates of future sales potential may necessitate future reduction to inventory values. See "Part II - Item 7 - Management's Discussion and Analysis of Financial Condition and Results of Operations - Critical Accounting Policies".

We have significant goodwill and an impairment of our goodwill could cause a decline in our net worth. Our total assets include substantial goodwill. At December 31, 2019, our goodwill totaled \$933.0 million. The goodwill results from our prior acquisitions, representing the excess of the purchase price we paid over the net assets of the companies acquired. We assess whether there has been an impairment in the value of our goodwill during each calendar year or more frequently if an event or change in circumstances indicates that the fair value of a reporting unit has been reduced below its carrying value. If future operating performance at one or more of our reporting units does not meet expectations or fair values fall due to significant stock market declines, we may be required to reflect a non-cash charge to operating results for goodwill impairment. The recognition of an impairment of a significant portion of goodwill would negatively affect our results of operations and total capitalization, the effect of which could be material. See "Part II - Item 7 - Management's Discussion and Analysis of Financial Condition and Results of Operations - Critical Accounting Policies".

We may not realize all of the sales expected from our existing backlog or anticipated orders. At December 31, 2019, we had \$1,080.0 million of order backlog, the majority of which related to aerospace OEM customers. There can be no assurances that the revenues projected in our backlog will be realized or, if realized, will result in profits. We consider backlog to be firm customer orders for future delivery. OEM customers may provide projections of components and assemblies that they anticipate purchasing in the future under existing programs. These projections may represent orders that are beyond lead

time and are included in backlog when supported by a long term agreement. Our customers may have the right under certain circumstances or with certain penalties or consequences to terminate, reduce or defer firm orders that we have in backlog. If our customers terminate, reduce or defer firm orders, we may be protected from certain costs and losses, but our sales will nevertheless be adversely affected. Although we strive to maintain ongoing relationships with our customers, there is an ongoing risk that orders may be canceled or rescheduled due to fluctuations in our customers' business requirements.

Also, our realization of sales from new and existing programs is inherently subject to a number of important risks and uncertainties, including whether our customers execute the launch of product programs on time, or at all, the number of units that our customers actually produce, the timing of production and manufacturing insourcing decisions made by our customers. In addition, until firm orders are placed, our customers may have the right to discontinue a program or replace us with another supplier at any time without penalty. Our failure to realize sales from new and existing programs could have a material adverse effect on our net sales, results of operations and cash flows.

We may not recover all of our up-front costs related to new or existing programs. New programs may require significant up-front investments for capital equipment, engineering, inventory, design and tooling. As OEMs in the transportation and aerospace industries have looked to suppliers to bear increasing responsibility for the design, engineering and manufacture of systems and components, they have increasingly shifted the financial risk associated with those responsibilities to the suppliers as well. This trend may continue and is most evident in the area of engineering cost reimbursement. We cannot assure you that we will have adequate funds to make such up-front investments or to recover such costs from our customers as part of our product pricing. In the event that we are unable to make such investments, or to recover them through sales or direct reimbursement from our customers, our profitability, liquidity and cash flows may be adversely affected. In addition, we incur costs and make capital expenditures for new program awards based upon certain estimates of production volumes and production complexity. While we attempt to recover such costs and capital expenditures by appropriately pricing our products, the prices of our products are based in part upon planned production volumes. If the actual production is significantly less than planned or significantly more complex than anticipated, we may be unable to recover such costs. In addition, because a significant portion of our overall costs is fixed, declines in our customers' production levels can adversely affect the level of our reported profits even if our up-front investments are recovered.

We may not realize all of the intangible assets related to the Aerospace aftermarket businesses. We participate in aftermarket Revenue Sharing Programs ("RSPs") under which we receive an exclusive right to supply designated aftermarket parts over the life of the related aircraft engine program to our customer, General Electric ("GE"). As consideration, we pay participation fees, which are recorded as intangible assets and are recognized as a reduction of sales over the estimated life of the related engine programs. Our total investments in participation fees under our RSPs as of December 31, 2019 equaled \$299.5 million, all of which have been paid. At December 31, 2019, the remaining unamortized balance of these participation fees was \$164.0 million.

We entered into Component Repair Programs ("CRPs"), also with GE, which provide for, among other items, the right to sell certain aftermarket component repair services for CFM56, CF6, CF34 and LM engines directly to other customers over the life of the engine program as one of a few GE licensed suppliers. In addition, the CRPs extended certain contracts under which the Company currently provides these services directly to GE. Our total investments in CRPs as of December 31, 2019 equaled \$111.8 million, all of which have been paid. At December 31, 2019, the remaining unamortized balance the CRPs was \$84.6 million. We recorded the CRP payments as intangible assets which are recognized as a reduction of sales over the remaining useful life of these engine programs.

The realizability of each asset is dependent upon future revenues related to the programs' aftermarket parts and services and is subject to impairment testing if circumstances indicate that its carrying amount may not be recoverable. The potential exists that actual revenues will not meet expectations due to a change in market conditions, including, for example, the replacement of older engines with new, more fuel-efficient engines or our ability to maintain market share within the aftermarket business. A shortfall in future revenues may result in the failure to realize the net amount of the investments, which could adversely affect our financial condition and results of operations. In addition, profitability could be impacted by the amortization of the participation fees and licenses, and the expiration of the international tax incentives on these programs. See "Part II - Item 7 - Management's Discussion and Analysis of Financial Condition and Results of Operations - Critical Accounting Policies".

We face risks of cost overruns and losses on fixed-price contracts. We sell certain of our products under firm, fixed-price contracts providing for a fixed price for the products regardless of the production or purchase costs incurred by us. The cost of producing products may be adversely affected by increases in the cost of labor, materials, fuel, outside processing, overhead and other factors, including manufacturing inefficiencies. Increased production costs may result in cost overruns and losses on contracts.

The departure of existing management and key personnel, a shortage of skilled employees or a lack of qualified sales professionals could materially affect our business, operations and prospects. Our executive officers are important to the management and direction of our business. Our future success depends, in large part, on our ability to retain or replace these officers and other key management personnel. Although we believe we will be able to attract and retain talented personnel and replace key personnel should the need arise, our inability to do so could have a material adverse effect on our business, financial condition, results of operations or cash flows. Because of the complex nature of many of our products and services, we are generally dependent on an educated and highly skilled workforce, including, for example, our engineering talent. In addition, there are significant costs associated with the hiring and training of sales professionals. We could be adversely affected by a shortage of available skilled employees or the loss of a significant number of our sales professionals.

If we are unable to protect our intellectual property rights effectively or if we are accused of infringing the intellectual parties rights of third parties, our financial condition and results of operations could be adversely affected. We own or are licensed under various intellectual property rights, including patents, trademarks and trade secrets. Our intellectual property rights may not be sufficiently broad or otherwise may not provide us a significant competitive advantage, and patents may not be issued for pending or future patent applications owned by or licensed to us. In addition, the steps that we have taken to maintain and protect our intellectual property may not prevent it from being improperly disclosed, challenged, invalidated, circumvented or designed-around, particularly in countries where intellectual property rights are not highly developed or protected. In some circumstances, enforcement may not be available to us because an infringer has a dominant intellectual property position or for other business reasons, or countries may require compulsory licensing of our intellectual property. We also rely on nondisclosure and noncompetition agreements with employees, consultants and other parties to protect, in part, confidential information, trade secrets and other proprietary rights. There can be no assurance that these agreements will adequately protect these intangible assets and will not be breached, that we will have adequate remedies for any breach, or that others will not independently develop substantially equivalent proprietary information. Our failure to obtain or maintain intellectual property rights that convey competitive advantage, adequately protect our intellectual property or detect or prevent circumvention or unauthorized use of such property and the cost of enforcing our intellectual property rights could adversely impact our competitive position, financial condition and results of operations. In addition, we may be the target of enforcement actions by third parties, including aggressive and opportunistic patent enforcement claims by non-practicing entities (so-called “patent trolls”). Regardless of the merit of such claims, responding to and defending against infringement claims can be expensive and time-consuming. If the Company is found to infringe any third-party rights, we could be required to pay substantial damages or we could be enjoined from offering some of our products and services.

Any product liability, warranty, contractual or other claims in excess of insurance may adversely affect our financial condition. We are exposed to potential product liability risks that are inherent in the design, manufacture and sale of our products and the products we buy from third parties and sell to our customers, and to potential warranty, contractual or other claims. For example, we may be exposed to potential liability for personal injury, property damage or death as a result of the failure of an aircraft or automotive component designed, manufactured or sold by us, or the failure of an aircraft or automotive component that has been serviced by us or of the components themselves. While we have liability insurance for certain risks, our insurance may not cover all liabilities, including potential reputational impacts. Additionally, insurance coverage may not be available in the future at a cost acceptable to us. Any material liability not covered by insurance or for which third-party indemnification is not available for the full amount of the loss could have a material adverse effect on our financial condition, results of operations and cash flows.

From time to time, we receive product warranty claims, under which we may be required to bear costs of inspection, repair or replacement of certain of our products. Warranty claims may range from individual customer claims to full recalls of all products in the field. We vigorously defend ourselves in connection with these matters. We cannot, however, assure you that the costs, charges and liabilities associated with these matters will not be material, or that those costs, charges and liabilities will not exceed any amounts reserved for them in our Consolidated Financial Statements.

Our business, financial condition, results of operations and cash flows could be adversely impacted by strikes or work stoppages. Approximately 15% of our U.S. employees are covered by collective bargaining agreements and approximately 45% of our non-U.S. employees are covered by collective bargaining agreements, trade union agreements, or national industry agreements. The Company has a national collective bargaining agreement (“CBA”) with certain unionized employees at the Bristol, Connecticut and Corry, Pennsylvania facilities of the Associated Spring business unit, covering approximately 250 employees. The current CBA will expire in August 2020, at which time we expect to negotiate a successor agreement. The local CBA for the Bristol, Connecticut facility of the Associated Spring business unit will expire in October 2020, at which time we expect to negotiate a successor agreement. We also have annual negotiations in Brazil and Mexico and, collectively, these negotiations cover approximately 300 employees in those two countries. In addition, we expect to negotiate

successor agreements to the local CBAs in Singapore, Germany and Sweden, collectively covering approximately 800 employees, given these agreements will expire in 2020. We completed negotiations resulting in wage adjustments at four locations in our Industrial Segment, collectively, covering a total of approximately 500 employees.

Although we believe that our relations with our employees are good, we cannot assure you that we will be successful in negotiating new CBAs or that such negotiations will not result in significant increases in the cost of labor, including healthcare, pensions or other benefits. Any potential strikes or work stoppages, and the resulting adverse impact on our relationships with customers, could have a material adverse effect on our business, financial condition, results of operations or cash flows. Similarly, a protracted strike or work stoppage at any of our major customers, suppliers or other vendors could materially adversely affect our business.

Changes in taxation requirements could affect our financial results. Our products are subject to import and excise duties and/or sales or value-added taxes in many jurisdictions in which we operate. Increases in indirect taxes could affect our products' affordability and therefore reduce our sales. We are also subject to income tax in numerous jurisdictions in which we generate revenues. Changes in tax laws, tax rates or tax rulings may have a significant adverse impact on our effective tax rate. Among other things, our tax liabilities are affected by the mix of pretax income or loss among the tax jurisdictions in which we operate and the potential repatriation of foreign earnings to the U.S. Further, during the ordinary course of business, we are subject to examination by the various tax authorities of the jurisdictions in which we operate which could result in an unanticipated increase in taxes. On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act (the "Act"). The Act made broad and complex changes to the U.S. Tax Code that affected 2017 through 2019 and future years, including a reduction of the corporate income tax rate, changes to the taxation of foreign unrepatriated earnings, limitations on deduction of interest and compensation expense and the introduction of the global intangible low-taxed income taxes. Further proposed and final regulations continue to be issued which impact the reporting of current and deferred income taxes. The changes may impact current and deferred income tax expense and deferred tax balances for U.S. operations as well as the potential future repatriation of foreign income. The Company made final entries for income tax expense in the Consolidated Financial Statements as of December 31, 2018. The impact of any proposed regulations related to the Act may adversely affect our financial condition, results of operations and cash flow. See "Part II- Management's Discussion and Analysis of Financial Condition and Results of Operations- U.S. Tax Reform".

Changes in accounting guidance could affect our financial results. New accounting guidance that may become applicable to us from time to time, or changes in the interpretations of existing guidance, could have a significant effect on our reported results for the affected periods. Adoption of new accounting guidance could have a material impact on our financial statements and may retroactively affect the accounting treatment of transactions completed before adoption. See Note 1 of the Consolidated Financial Statements.

RISKS RELATED TO THE INDUSTRIES IN WHICH WE OPERATE

We operate in highly competitive markets. We may not be able to compete effectively with our competitors, and competitive pressures could adversely affect our business, financial condition and results of operations. Our two global business segments compete with a number of larger and smaller companies in the markets we serve. Some of our competitors have greater financial, production, research and development, or other resources than we do. Within Aerospace, certain of our OEM customers compete with our repair and overhaul business. Some of our OEM customers in the aerospace industry also compete with us where they have the ability to manufacture the components and assemblies that we supply to them but have chosen, for capacity limitations, cost considerations or other reasons, to outsource the manufacturing to us. Our customers award business based on, among other things, price, quality, reliability of supply, service, technology and design. Our competitors' efforts to grow market share could exert downward pressure on our product pricing and margins. Our competitors may also develop products or services, or methods of delivering those products or services that are superior to our products, services or methods. Our competitors may adapt more quickly than us to new technologies or evolving customer requirements. We cannot assure you that we will be able to compete successfully with our existing or future competitors. Our ability to compete successfully will depend, in part, on our ability to continue make investments to innovate and manufacture the types of products demanded by our customers, and to reduce costs by such means as reducing excess capacity, leveraging global purchasing, improving productivity, eliminating redundancies and increasing production in low-cost countries. We have invested, and expect to continue to invest, in increasing our manufacturing footprint in low-cost countries. We cannot assure you that we will have sufficient resources to continue to make such investments or that we will be successful in maintaining our competitive position. If we are unable to differentiate our products or maintain a low-cost footprint, we may lose market share or be forced to reduce prices, thereby lowering our margins. Any such occurrences could adversely affect our financial condition, results of operations and cash flows.

The industries in which we operate have been experiencing consolidation, both in our suppliers and the customers we serve. Supplier consolidation is in part attributable to OEMs more frequently awarding long-term sole source or preferred supplier contracts to the most capable suppliers in an effort to reduce the total number of suppliers from whom components and systems are purchased. If consolidation of our existing competitors occurs, we would expect the competitive pressures we face to increase, and we cannot assure you that our business, financial condition, results of operations or cash flows will not be adversely impacted as a result of consolidation by our competitors or customers.

Original equipment manufacturers in the aerospace and transportation industries have significant pricing leverage over suppliers and may be able to achieve price reductions over time. Additionally, we may not be successful in our efforts to raise prices on our customers. There is substantial and continuing pressure from OEMs in the transportation industries, including automotive and aerospace, to reduce the prices they pay to suppliers. We attempt to manage such downward pricing pressure, while trying to preserve our business relationships with our customers, by seeking to reduce our production costs through various measures, including purchasing raw materials and components at lower prices and implementing cost-effective process improvements. Our suppliers have periodically resisted, and in the future may resist, pressure to lower their prices and may seek to impose price increases. If we are unable to offset OEM price reductions, our profitability and cash flows could be adversely affected. In addition, OEMs have substantial leverage in setting purchasing and payment terms, including the terms of accelerated payment programs under which payments are made prior to the account due date in return for an early payment discount. OEMs can unexpectedly change their purchasing policies or payment practices, which could have a negative impact on our short-term working capital.

Demand for our defense-related products depends on government spending. A portion of Aerospace's sales is derived from the military market, including single-sourced and dual-sourced sales. The military market is largely dependent upon government budgets and is subject to governmental appropriations. Although multi-year contracts may be authorized in connection with major procurements, funds are generally appropriated on a fiscal year basis even though a program may be expected to continue for several years. Consequently, programs are often only partially funded and additional funds are committed only as further appropriations are made. We cannot assure you that maintenance of or increases in defense spending will be allocated to programs that would benefit our business. Moreover, we cannot assure you that new military aircraft programs in which we participate will enter full-scale production as expected. A decrease in levels of defense spending or the government's termination of, or failure to fully fund, one or more of the contracts for the programs in which we participate could have a material adverse effect on our financial position and results of operations.

The aerospace industry is highly regulated. Complications related to aerospace regulations may adversely affect the Company. A substantial portion of our income is derived from our aerospace businesses. The aerospace industry is highly regulated in the U.S. by the Federal Aviation Administration, or FAA, and in other countries by similar regulatory agencies. We must be certified by these agencies and, in some cases, by individual OEMs in order to engineer and service systems and components used in specific aircraft models. If material authorizations or approvals were delayed, revoked or suspended, our business could be adversely affected. New or more stringent governmental regulations may be adopted, or industry oversight heightened, in the future, and we may incur significant expenses to comply with any new regulations or any heightened industry oversight. During the fourth quarter of 2019, Boeing announced a change to the near-term 737 MAX aircraft production schedule and thereby reduced supplier deliveries in 2020, with the expectation that deliveries would ramp back over a longer period of time. We will be managing our business to minimize any impact to our financial performance, however there can be no assurance that these reduced supplier deliveries will be fulfilled in future periods. The loss of such deliveries could have an adverse effect on our business.

Fluctuations in jet fuel and other energy prices may impact our operating results. Fuel costs constitute a significant portion of operating expenses for companies in the aerospace industry. Fluctuations in fuel costs could impact levels and frequency of aircraft maintenance and overhaul activities, and airlines' decisions on maintaining, deferring or canceling new aircraft purchases, in part based on the value associated with new fuel efficient technologies. Widespread disruption to oil production, refinery operations and pipeline capacity in certain areas of the U.S. can impact the price of jet fuel significantly. Conflicts in the Middle East, an important source of oil for the U.S. and other countries where we do business, cause prices for fuel to be volatile. Because we and many of our customers are in the aerospace industry, these fluctuations could have a material adverse effect on our financial condition or results of operations.

Our products and services may be rendered obsolete by new products, technologies and processes, or otherwise impacted by proposed regulations affecting product and packaging composition and disposability. Our manufacturing operations focus on highly engineered components which require extensive engineering and research and development time. Our competitive advantage may be adversely impacted if we cannot continue to introduce new products ahead of our competition, or if our products are rendered obsolete by other products or by new, different technologies and processes. The success of our new products will depend on a number of factors, including innovation, customer acceptance, the efficiency of

our suppliers in providing materials and component parts, and the performance and quality of our products relative to those of our competitors. We cannot predict the level of market acceptance or the amount of market share our new products will achieve. Additionally, we may face increased or unexpected costs associated with new product introduction, including the use of additional resources such as personnel and capital. We cannot assure that we will not experience new product introduction delays in the future.

RISKS RELATED TO RESTRUCTURING, ACQUISITIONS, JOINT VENTURES AND DIVESTITURES

Our restructuring actions could have long-term adverse effects on our business. From time to time, we have implemented restructuring activities across our businesses to adjust our cost structure, and we may engage in similar restructuring activities in the future. We may not achieve expected cost savings from workforce reductions or restructuring activities and actual charges, costs and adjustments due to these actions may vary materially from our estimates. Our ability to realize anticipated cost savings, synergies and revenue enhancements may be affected by a number of factors, including the following: our ability to effectively eliminate duplicative back office overhead and overlapping sales personnel, rationalize manufacturing capacity, synchronize information technology systems, consolidate warehousing and other facilities and shift production to more economical facilities; significant cash and non-cash integration and implementation costs or charges in order to achieve those cost savings, which could offset any such savings and other synergies resulting from our acquisitions or divestitures; and our ability to avoid labor disruption in connection with these activities. In addition, delays in implementing planned restructuring activities or other productivity improvements may diminish the expected operational or financial benefits.

Our acquisition and other strategic initiatives may not be successful. We have made a number of acquisitions in the past, including most recently the acquisitions of the Gimatic and IGS businesses, and we anticipate that we may, from time to time, acquire additional businesses, assets or securities of companies, and enter into joint ventures and other strategic relationships that we believe would provide a strategic fit with our businesses. These activities expose the Company to a number of risks and uncertainties, the occurrence of any of which could materially adversely affect our business, cash flows, financial condition and results of operations. A portion of the industries that we serve are mature industries. As a result, our future growth may depend in part on the successful acquisition and integration of acquired businesses into our existing operations. We may not be able to identify and successfully negotiate suitable acquisitions, obtain financing for future acquisitions on satisfactory terms, obtain regulatory approvals or otherwise complete acquisitions in the future.

We could have difficulties integrating acquired businesses with our existing operations. Difficulties of integration can include coordinating and consolidating separate systems, integrating the management of the acquired business, retaining market acceptance of acquired products and services, maintaining employee morale and retaining key employees, and implementing our enterprise resource planning systems and operational procedures and disciplines. Any such difficulties may make it more difficult to maintain relationships with employees, customers, business partners and suppliers. In addition, even if integration is successful, the financial performance of acquired business may not be as expected and there can be no assurance we will realize anticipated benefits from our acquisitions. We cannot assure you that we will effectively assimilate the business or product offerings of acquired companies into our business or product offerings or realize anticipated operational synergies. In connection with the integration of acquired operations or the conduct of our overall business strategies, we may periodically restructure our businesses and/or sell assets or portions of our business. Integrating the operations and personnel of acquired companies into our existing operations may result in difficulties, significant expense and accounting charges, disrupt our business or divert management's time and attention.

Acquisitions involve numerous other risks, including potential exposure to unknown liabilities of acquired companies and the possible loss of key employees and customers of the acquired business. Certain of the acquisition agreements by which we have acquired businesses require the former owners to indemnify us against certain liabilities related to the business operations before we acquired it. However, the liability of the former owners is limited and certain former owners may be unable to meet their indemnification responsibilities. We cannot assure you that these indemnification provisions will protect us fully or at all, and as a result we may face unexpected liabilities that adversely affect our financial condition. In connection with acquisitions or joint venture investments outside the U.S., we may enter into derivative contracts to purchase foreign currency in order to hedge against the risk of foreign currency fluctuations in connection with such acquisitions or joint venture investments, which subjects us to the risk of foreign currency fluctuations associated with such derivative contracts. Additionally, our final determinations and appraisals of the fair value of assets acquired and liabilities assumed in our acquisitions may vary materially from earlier estimates. We cannot assure you that the fair value of acquired businesses will remain constant.

We continually assess the strategic fit of our existing businesses and may divest or otherwise dispose of businesses that are deemed not to fit with our strategic plan or are not achieving the desired return on investment, and we cannot be certain that our business, operating results and financial condition will not be materially and adversely affected. A successful divestiture depends on various factors, including our ability to effectively transfer liabilities, contracts, facilities and

employees to any purchaser, identify and separate the intellectual property to be divested from the intellectual property that we wish to retain, reduce fixed costs previously associated with the divested assets or business, and collect the proceeds from any divestitures. In addition, if customers of the divested business do not receive the same level of service from the new owners, this may adversely affect our other businesses to the extent that these customers also purchase other products offered by us. All of these efforts require varying levels of management resources, which may divert our attention from other business operations. If we do not realize the expected benefits or synergies of any divestiture transaction, our consolidated financial position, results of operations and cash flows could be negatively impacted. In addition, divestitures of businesses involve a number of risks, including significant costs and expenses, the loss of customer relationships, and a decrease in revenues and earnings associated with the divested business. Furthermore, divestitures potentially involve significant post-closing separation activities, which could involve the expenditure of material financial resources and significant employee resources. Any divestiture may result in a dilutive impact to our future earnings if we are unable to offset the dilutive impact from the loss of revenue associated with the divestiture, as well as significant write-offs, including those related to goodwill and other intangible assets, which could have a material adverse effect on our results of operations and financial condition.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Number of Facilities - Owned

Location	Industrial	Aerospace	Other	Total
Manufacturing:				
North America	5	5	—	10
Europe	10	—	—	10
Asia	1	2	—	3
Central and Latin America	2	—	—	2
	<u>18</u>	<u>7</u>	<u>—</u>	<u>25</u>
Non-Manufacturing:				
North America	—	—	1*	1
Europe	2	—	—	2
	<u>2</u>	<u>—</u>	<u>1</u>	<u>3</u>

* The Company's Corporate office

Number of Facilities - Leased

Location	Industrial	Aerospace	Other	Total
Manufacturing:				
North America	4	4	—	8
Europe	4	—	—	4
Asia	4	6	—	10
	<u>12</u>	<u>10</u>	<u>—</u>	<u>22</u>
Non-Manufacturing:				
North America	8	2	1**	11
Europe	27	1	—	28
Asia	23	—	—	23
Central and Latin America	2	—	—	2
	<u>60</u>	<u>3</u>	<u>1</u>	<u>64</u>

** Industrial Segment headquarters and certain Shared Services groups.

Item 3. Legal Proceedings

We are subject to litigation from time to time in the ordinary course of business and various other suits, proceedings and claims are pending against us and our subsidiaries. While it is not possible to determine the ultimate disposition of each of these proceedings and whether they will be resolved consistent with our beliefs, we expect that the outcome of these proceedings, individually or in the aggregate, will not have a material adverse effect on our consolidated financial position, cash flows or results of operations.

Item 4. Mine Safety Disclosures

Not applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Market Information

The Company's common stock is traded on the New York Stock Exchange under the symbol "B". As of February 19, 2020, there were approximately 1,778 holders of record of the Company's common stock.

Dividends

Payment of future dividends will depend upon the Company's financial condition, results of operations and other factors deemed relevant by the Company's Board of Directors, as well as any limitations resulting from financial covenants under the Company's credit facilities or debt indentures. The following table sets forth , for the periods indicated, dividends declared and paid.

	2019	2018
Quarter ended March 31	\$ 0.16	\$ 0.14
Quarter ended June 30	0.16	0.16
Quarter ended September 30	0.16	0.16
Quarter ended December 31	0.16	0.16

Dividends

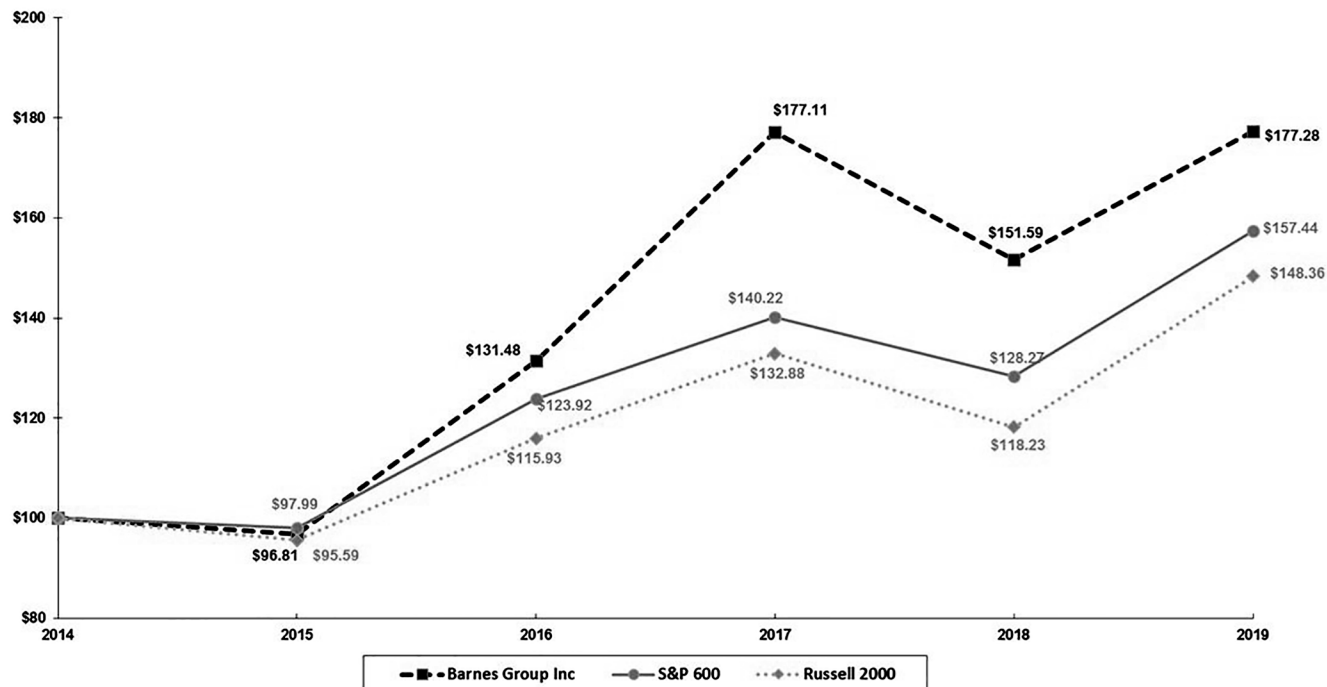
Payment of future dividends will depend upon the Company's financial condition, results of operations and other factors deemed relevant by the Company's Board of Directors, as well as any limitations resulting from financial covenants under the Company's credit facilities or debt indentures. See the table above for dividend information for 2019 and 2018.

Securities Authorized for Issuance Under Equity Compensation Plans

For information regarding Securities Authorized for Issuance Under Equity Compensation Plans, see Part III, Item 12 of this Annual Report.

Performance Graph

A stock performance graph based on cumulative total returns (price change plus reinvested dividends) for \$100 invested in the Company on December 31, 2014 is set forth below.



	2014	2015	2016	2017	2018	2019
BGI	\$100.00	\$96.81	\$131.48	\$177.11	\$151.59	\$177.28
S&P 600	\$100.00	\$97.99	\$123.92	\$140.22	\$128.27	\$157.44
Russell 2000	\$100.00	\$95.59	\$115.93	\$132.88	\$118.23	\$148.36

The performance graph includes the S&P 600 Small Cap Index and the Russell 2000 Index, both of which include the Company.

Issuer Purchases of Equity Securities

Period	Total Number of Shares (or Units) Purchased	Average Price Paid Per Share (or Unit)	Total Number of Shares (or Units) Purchased as Part of Publicly Announced Plans or Programs	Maximum Number of Shares (or Units) that May Yet Be Purchased Under the Plans or Programs ⁽²⁾
October 1-31, 2019	1,309	\$ 49.38	—	4,100,000
November 1-30, 2019	179	\$ 60.20	—	4,100,000
December 1-31, 2019	1,139	\$ 61.90	—	4,100,000
Total	2,627 ⁽¹⁾	\$ 55.54	—	

- (1) All acquisitions of equity securities during the fourth quarter of 2019 were the result of the operation of the terms of the Company's stockholder-approved equity compensation plans and the terms of the equity rights granted pursuant to those plans to pay for the related income tax upon issuance of shares. The purchase price of a share of stock used for tax withholding is the market price on the date of issuance.
- (2) At March 31, 2019, 1.5 million shares of common stock had not been purchased under the publicly announced Repurchase Program (the "Program"). On April 25, 2019, the Board of Directors of the Company increased the number of shares authorized for repurchase under the Program by 3.5 million shares of common stock (5.0 million authorized, in total). The Program permits open market purchases, purchases under a Rule 10b5-1 trading plan and privately negotiated transactions.

Item 6. Selected Financial Data

	2019 ⁽⁴⁾	2018 ⁽⁵⁾⁽⁶⁾	2017 ⁽⁷⁾⁽⁸⁾⁽⁹⁾	2016 ⁽⁷⁾⁽¹⁰⁾	2015 ⁽⁷⁾⁽¹¹⁾
Per common share ⁽¹⁾					
Net income					
Basic	3.09	3.18	1.10	2.50	2.21
Diluted	3.07	3.15	1.09	2.48	2.19
Dividends declared and paid	0.64	0.62	0.55	0.51	0.48
Stockholders' equity (at year-end)	25.00	23.44	23.61	21.72	20.94
Stock price (at year-end)	61.96	53.62	63.27	47.42	35.39
For the year (in thousands)					
Net sales	\$1,491,118	\$ 1,495,889	\$ 1,436,499	\$ 1,230,754	\$ 1,193,975
Operating income	236,448	231,764	206,451	194,296	183,542
As a percent of net sales	15.9%	15.5%	14.4%	15.8%	15.4%
Net income	\$ 158,350	\$ 166,186	\$ 59,415	\$ 135,601	\$ 121,380
As a percent of net sales	10.6%	11.1%	4.1%	11.0%	10.2%
As a percent of average stockholders' equity ⁽²⁾	13.0%	13.5%	4.7%	11.6%	10.7%
Depreciation and amortization	\$ 99,059	\$ 94,238	\$ 90,150	\$ 80,154	\$ 78,242
Capital expenditures	53,286	57,273	58,712	47,577	45,982
Weighted average common shares outstanding – basic	51,214	52,304	54,073	54,191	55,028
Weighted average common shares outstanding – diluted	51,633	52,832	54,605	54,631	55,513
Year-end financial position (in thousands)					
Working capital	\$ 421,515	\$ 448,286	\$ 452,960	\$ 306,609	\$ 359,038
Goodwill	933,022	955,524	690,223	633,436	587,992
Other intangible assets, net	581,116	636,538	507,042	522,258	528,322
Property, plant and equipment, net	356,603	370,531	359,298	334,489	308,856
Total assets	2,738,335	2,808,970	2,365,716	2,137,539	2,061,866
Long-term debt and notes payable	834,775	944,016	532,596	500,954	509,906
Stockholders' equity	1,270,528	1,203,056	1,260,321	1,168,358	1,127,753
Debt as a percent of total capitalization ⁽³⁾	39.7%	44.0%	29.7%	30.0%	31.1%
Statistics					
Employees at year-end	5,749	5,908	5,375	5,036	4,735

- (1) Net income per common share is based on the weighted average common shares outstanding during each year. Stockholders' equity per common share is calculated based on actual common shares outstanding at the end of each year.
- (2) Average stockholders' equity is calculated based on the month-end stockholders equity balances between December 31, 2018 and December 31, 2019 (13-month average).
- (3) Debt includes all interest-bearing debt and total capitalization includes interest-bearing debt and stockholders' equity.
- (4) During 2019, the Company recorded a \$5.6 million non-cash impairment charge related to the sale of the Seeger business, resulting in an \$0.11 reduction per basic and diluted shares. See Note 3 of the Consolidated Financial Statements.
- (5) During 2018, the Company completed the acquisitions of IGS and Gimatic. The results of IGS and Gimatic, from their acquisitions on July 23, 2018 and October 31, 2018, respectively, have been included within the Company's Consolidated Financial Statements for the period ended December 31, 2018.
- (6) Effective January 1, 2018, the Company adopted amended guidance related to revenue recognition. See Notes 1 and 4 of the Consolidated Financial Statements.
- (7) During 2018, the Company adopted amended guidance relating to the presentation of pension and other postretirement benefit costs, requiring that other components of expense (other than service expense) be reported separately outside of operating income. The amended guidance was applied retrospectively for the presentation of the service cost component and the other components of net periodic benefit cost in the Consolidated Statements of Income during 2017, 2016 and 2015. See Note 1 of the Consolidated Financial Statements.
- (8) During 2017, the Company completed the acquisition of the assets of the Gammaflux business. The results of Gammaflux, from the acquisition on April 3, 2017, have been included within the Company's Consolidated Financial Statements for the period ended December 31, 2017.
- (9) During 2017, the Company recorded the effects of the U.S. Tax Reform, resulting in tax expense of \$96.7 million, or \$1.79 per basic share (\$1.77 per diluted share). See Note 15 of the Consolidated Financial Statements.
- (10) During 2016, the Company completed the acquisition of FOBOHA. The results of FOBOHA, from the acquisition on August 31, 2016, have been included within the Company's Consolidated Financial Statements for the period ended December 31, 2016.
- (11) During 2015, the Company completed the acquisitions of Thermoplay and Priamus. The results of Thermoplay and Priamus, from their acquisitions on August 7, 2015 and October 1, 2015, respectively, have been included within the Company's Consolidated Financial Statements for the period ended December 31, 2015.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

The following discussion should be read in conjunction with our consolidated financial statements and related notes in this Annual Report on Form 10-K. In addition to historical information, this discussion contains forward-looking statements that involve risks, uncertainties, and assumptions that could cause actual results to differ materially from our expectations. Factors that could cause such differences include those described in the section titled "Risk Factors" and elsewhere in this report. We undertake no obligation to update any of the forward-looking statements.

OVERVIEW

Barnes Group Inc. (the "Company") achieved sales of \$1,491.1 million in 2019, a decrease of \$4.8 million, or 0.3%, from 2018. Organic sales (net sales excluding both foreign currency and acquisition impacts) decreased by \$28.9 million, or 1.9%, including a decrease of \$80.3 million, or 8.1%, at Industrial, partially offset by an increase of \$51.4 million, or 10.3%, at Aerospace. Sales in the Industrial segment were impacted by changes in foreign currency which decreased sales by approximately \$30.4 million as the U.S. dollar strengthened against foreign currencies. Within Industrial, acquisitions provided incremental sales of \$54.5 million during the 2019 period.

Operating income increased 2.0% from \$231.8 million in 2018 to \$236.4 million in 2019 and operating margin increased from 15.5% in 2018 to 15.9% in 2019. Improvements in operating profit were driven by the profit contribution of increased volumes within the Aerospace OEM and aftermarket businesses, favorable productivity and a reduction in short-term purchase accounting adjustments related to the acquisitions of Gimatic and IGS, partially offset by the reduced profit contribution of lower organic sales within Industrial. Operating margin also increased as a result of the favorable mix within the Aerospace segment, with higher volumes within the MRO and spare parts businesses.

On December 20, 2019, the Company entered into a Share Purchase and Transfer Agreement ("SPA") with the Kajo Neukirchen Group ("KNG") to sell the Seeger business, consisting of partnership interests and shares, respectively, of Seeger-Orbis GmbH & Co. OHG and Seeger-Orbis Mechanical Components (Tianjin) Co., Ltd. ("Seeger"). The Company subsequently completed the sale of Seeger, effective February 1, 2020. See Note 3 of the Consolidated Financial Statements.

The Company focused on profitable sales growth both organically and through acquisition, in addition to productivity improvements, as key strategic objectives in 2019. Industrial experienced lower growth within certain of its end markets, requiring that the Company be proactive in managing costs throughout 2019. Productivity actions partially offset the impact of lower operating profit contributions at Industrial, which were driven primarily by reduced organic sales. Management continued its focus on cash flow and working capital management in 2019 and generated \$248.3 million in cash flow from operations.

Business Transformation

Acquisitions and strategic relationships with our customers have been a key growth driver for the Company, and we continue to seek alliances which foster long-term business relationships. These acquisitions have allowed us to extend into new or adjacent markets, expand our geographic reach, and commercialize new products, processes and services. The Company continually evaluates its business portfolio to optimize product offerings and maximize value. We have significantly transformed our business with our entrance into new markets, including most recently, automation, and we continue to make strategic additions that align with our portfolio of differentiated products.

The Company has completed a number of acquisitions in the past few years. In the fourth quarter of 2018, the Company completed its acquisition of Gimatic S.r.l. ("Gimatic"). Gimatic designs and develops robotic grippers, advanced end-of-arm tooling systems, sensors and other automation components for intelligent robotic handling solutions and industrial automation applications. Headquartered in Italy, Gimatic has a sales network extending across Europe, North America and Asia. Its diversified end markets include automotive, packaging, health care, and food and beverage, among others. The Company acquired Gimatic for an aggregate purchase price of 363.4 million Euros (\$411.0 million) which includes adjustments under the terms of the Sale and Purchase Agreement, including 7.8 million Euros (\$8.8 million) related to cash acquired. The acquisition of Gimatic was financed using cash on hand and borrowings under the Company's revolving credit facility. See Note 2 of the Consolidated Financial Statements. The acquisition of Gimatic resulted in the Company's establishment of the Automation business unit, which operates within the Industrial segment.

In the third quarter of 2018, the Company completed its acquisition of Industrial Gas Springs ("IGS"), a recognized designer, manufacturer and supplier of customized gas springs. IGS is headquartered in the United Kingdom, with distribution

and assembly capabilities in the United States. Its diversified end markets include general industrial, transportation, aerospace, and medical, among others. The Company acquired IGS for an aggregate purchase price of 29.1 million British pound sterling (\$38.0 million) which includes adjustments under the terms of the Share Purchase Agreement, including 2.8 million British pound sterling (\$3.7 million) related to cash acquired. The acquisition was financed using cash on hand and borrowings under the Company's revolving credit facility. See Note 2 of the Consolidated Financial Statements.

IGS was integrated with the Nitrogen Gas Products business ("NGP"), where its complementary and diversified end markets and strong customized product application engineering allow the Company to scale and broaden NGP's technology portfolio and customer base. In a related move, the Company transferred its Associated Spring Raymond ("ASR") operations from Engineered Components to NGP. ASR provides expertise in engineering and customized solutions for motion control, pressure & vibration, and other applications. With these changes, and given the broader solutions focus of the combined business, the Company has renamed NGP the Force & Motion Control business ("FMC"), which operates in the Industrial segment. As such, FMC is a leader in the development of nitrogen gas springs, gas-hydraulic suspensions, customized gas springs, spring elements and precision custom struts, providing innovative force and motion control solutions to customers in a wide range of metal forming and other industrial markets.

Management Objectives

Management is focused on continuing the Company's transformation by executing on its profitable growth strategy comprised of the following elements:

- Build a world-class Company focused on high margin, high growth businesses
- Leverage the Barnes Enterprise System ("BES") as a significant competitive advantage
- Expand and protect our core intellectual property to deliver differentiated solutions
- Effectively allocate capital to drive top quartile total shareholder return.

The successful execution of this strategy requires making value enhancing investments in organic growth (new products, processes, systems, services, markets and customers) and strategic acquisitions while divesting of businesses or existing product lines to effectively redeploy capital. Management remains focused on a deeper deployment of BES across the Company to advance Commercial Excellence, Operational Excellence and Financial Excellence. In addition, we remain focused on optimizing two key strategic enablers that will strengthen our competitive position:

- Cultivate a culture of innovation and build upon intellectual property to drive growth
- Enhance our talent management system to recruit, develop and retain an engaged and empowered workforce.

The combined benefits from growth investment and execution of the strategic enablers is expected to generate long-term value for the Company's shareholders, customers and employees.

Our Business

The Company consists of two operating segments: Industrial and Aerospace.

Key Performance Indicators

Management evaluates the performance of its reportable segments based on the sales, operating profit, operating margins and cash generation of the respective businesses, which includes net sales, cost of sales, selling and administrative expenses and certain components of other income and other expenses, as well as the allocation of corporate overhead expenses. Each segment has standard key performance indicators ("KPIs"), a number of which are focused on employee safety-related metrics (total recordable incident rate and lost time incident rate), customer metrics (on-time-delivery and quality), internal effectiveness and productivity/efficiency metrics (sales effectiveness, global sourcing, operational excellence, functional excellence, cost of quality, days working capital and return on invested capital) and specific KPIs on profitable growth.

Key Industry Data

In both segments, management tracks a variety of economic and industry data as indicators of the health and outlook of a particular sector.

At Industrial, key data for the manufacturing operations include the Institute for Supply Management's manufacturing

PMI Composite Index (and similar indices for European and Asian-based businesses); the Federal Reserve's Industrial Production Index ("the IPI"); IHS-Markit worldwide forecasts for light vehicle production, as well as new model introductions and existing model refreshes; North American medium and heavy duty vehicle production; IC Interconnection Consulting Hotrunners Worldwide Report for Auto, Medical, Personal Care and Packaging industries; and global GDP growth forecasts.

At Aerospace, management of the aftermarket business monitors the number of aircraft in the active fleet, the number of aircraft temporarily or permanently taken out of service, aircraft utilization rates for the major airlines, engine shop visits, airline profitability, aircraft fuel costs and traffic growth. The Aerospace OEM business regularly tracks orders, backlog and deliveries for each of the major aircraft manufacturers, as well as engine purchases made for new aircraft. Management also monitors annual appropriations for the U.S. military related to purchases of new or used aircraft and engine components.

RESULTS OF OPERATIONS

Sales

<i>(\$ in millions)</i>	2019	2018	\$ Change	% Change	2017
Industrial	\$ 938.5	\$ 994.7	\$ (56.2)	(5.7)%	\$ 973.9
Aerospace	552.6	501.2	51.4	10.3 %	462.6
Total	<u>\$ 1,491.1</u>	<u>\$ 1,495.9</u>	<u>\$ (4.8)</u>	<u>(0.3)%</u>	<u>\$ 1,436.5</u>

2019 vs. 2018:

The Company reported net sales of \$1,491.1 million in 2019, a decrease of \$4.8 million, or 0.3%, from 2018. Organic sales decreased by \$28.9 million, including a decrease of \$80.3 million at Industrial, partially offset by a \$51.4 million increase at Aerospace. The decrease at Industrial was driven by organic sales declines within each of the Industrial business units, largely due to lower global auto production rates and delays in automotive model change releases, reflecting global trade uncertainty throughout the year and potential changes in regulatory requirements. Acquired businesses contributed incremental sales of \$54.5 million during the 2019 period. The impact of foreign currency translation decreased sales within Industrial by approximately \$30.4 million as the U.S. dollar strengthened against foreign currencies. The increase at Aerospace was driven primarily by sales growth within the aftermarket businesses, whereas continued growth on newer, more technologically advanced engine platforms contributed to increased sales within the OEM business. Sales within Aerospace were not significantly impacted by changes in foreign currency as these are largely denominated in U.S. dollars. The Company's international and domestic sales remained flat year-over-year. Excluding the impact of foreign currency translation on sales, however, the Company's international sales in 2019 increased 2.7%, inclusive of sales through acquisition, from 2018.

2018 vs. 2017:

The Company reported net sales of \$1,495.9 million in 2018, an increase of \$59.4 million, or 4.1%, from 2017. Organic sales increased by \$27.0 million, including an increase of \$38.6 million at Aerospace, partially offset by a decrease of \$11.6 million at Industrial. The increase at Aerospace was driven by sales growth across both the original equipment manufacturing ("OEM") business and the aftermarket businesses. Within the OEM business, increased sales were driven by continued growth on newer, more technologically advanced engine platforms. Sales within the aftermarket businesses also increased during the period. Within Industrial, decreased organic sales were primarily driven by a decrease within the Force & Motion Control and Engineered Components businesses, partially offset by increased sales volumes within the Molding Solutions business. Acquired businesses contributed incremental sales of \$18.2 million during the 2018 period. The impact of foreign currency translation increased sales within Industrial by approximately \$14.2 million as the U.S. dollar weakened against foreign currencies. Sales within Aerospace were not impacted by changes in foreign currency as these are largely denominated in U.S. dollars. The Company's international sales increased 10.1% year-over-year, while domestic sales decreased 3.7%. Excluding the impact of foreign currency translation on sales, however, the Company's international sales in 2018 increased 8.4%, inclusive of sales through acquisition, from 2017.

Expenses and Operating Income

(\$ in millions)	2019	2018	\$ Change	% Change	2017
Cost of sales	\$ 944.2	\$ 963.5	\$ (19.4)	(2.0)%	\$ 943.8
% sales	63.3%	64.4%			65.7%
Gross profit ⁽¹⁾	\$ 547.0	\$ 532.4	\$ 14.6	2.7 %	\$ 492.7
% sales	36.7%	35.6%			34.3%
Selling and administrative expenses	\$ 310.5	\$ 300.6	\$ 9.9	3.3 %	\$ 286.3
% sales	20.8%	20.1%			19.9%
Operating income	\$ 236.4	\$ 231.8	\$ 4.7	2.0 %	\$ 206.5
% sales	15.9%	15.5%			14.4%

(1) Sales less cost of sales

2019 vs. 2018:

Cost of sales in 2019 decreased 2.0% from 2018, while gross profit margin increased from 35.6% in 2018 to 36.7% in 2019. Gross profit declined at Industrial and improved at Aerospace. At Industrial, gross profit declined as a result of a lower profit contribution from reduced organic sales, partially offset by a reduction in short-term purchase accounting adjustments and favorable cost productivity actions taken during the 2019 period. The current period includes \$2.1 million of short-term purchase accounting adjustments related to the acquisition of Gimatic, whereas 2018 included \$5.6 million of short-term purchase accounting adjustments related to the acquisitions of Gimatic and IGS. Gross profit margins improved at Industrial, largely as a result of productivity actions taken within the segment. Selling and administrative expenses in 2019 increased 3.3% from the 2018 period, due to a \$5.6 million impairment charge related to the sale of the Seeger business (see Note 3) and increased costs related to the acquisition of Gimatic (owned throughout 2019), primarily the amortization of acquired intangible assets. These increases were partially offset by the absence of transaction costs of \$2.4 million related to Gimatic and IGS and due diligence costs in the prior year period, combined with the favorable cost impact of productivity actions taken by management during 2019. As a percentage of sales, selling and administrative costs increased from 20.1% in the 2018 period to 20.8% in the 2019 period. Operating income in 2019 increased 2.0% to \$236.4 million from 2018 and operating income margin increased from 15.5% to 15.9%, driven primarily by the items noted above.

2018 vs. 2017:

Cost of sales in 2018 increased 2.1% from 2017, while gross profit margin increased from 34.3% in 2017 to 35.6% in 2018. Gross profit and gross margins improved at both Industrial and Aerospace. At Industrial, gross margin in 2018 benefited from improving cost productivity, driven by the absence of both the 2017 pre-tax restructuring charges of \$7.5 million and the additional costs incurred on certain programs within Engineered Components. Incremental costs during the prior period included expedited freight, increased scrap and costs related to the transfer of work to other facilities. The 2018 period includes \$5.6 million of short-term purchase accounting adjustments related to the acquisitions of Gimatic and IGS, whereas the 2017 period includes \$2.3 million of short-term purchase accounting adjustments related to the acquisition of FOBOHA. Gross profit at Industrial also increased as a result of the items discussed above, partially offset, however, by the profit impact of lower sales volumes within certain business units. Within Aerospace, improvement in gross profit relates primarily to organic growth within each of the businesses and increased productivity, driven by improvements within production of the newer engine programs. These benefits to gross profit were partially offset by scheduled price deflation as certain newer engine programs transition into the early production stages. Increased volumes in the maintenance repair and overhaul and spare parts businesses, in particular, again contributed to the gross margin improvement during 2018. Selling and administrative expenses in 2018 increased 5.0% from the 2017 period, due primarily to corresponding increases in sales volumes, Gimatic and IGS acquisition transaction costs of \$2.4 million, the amortization of intangible assets related to the Gimatic and IGS acquisitions, and increased due diligence costs related to the acquisition of Gimatic. The 2017 period also included integration costs related to the acquisition of FOBOHA. As a percentage of sales, selling and administrative costs increased slightly from 19.9% in the 2017 period to 20.1% in the 2018 period. Operating income in 2018 increased 12.3% to \$231.8 million from 2017 and operating income margin increased from 14.4% to 15.5%, driven primarily by the items noted above.

Interest expense

2019 vs. 2018:

Interest expense in 2019 increased \$3.8 million to \$20.6 million from 2018, primarily as a result of increased borrowings during the period, partially offset by the impact of lower average interest rates.

2018 vs. 2017:

Interest expense in 2018 increased \$2.3 million to \$16.8 million from 2017, primarily as a result of increased borrowings during the period, partially offset by the impact of lower average interest rates.

Other expense (income), net

2019 vs. 2018:

Other expense (income), net in 2019 was \$9.0 million compared to \$7.4 million in 2018. Other expense (income) includes foreign currency losses of \$6.5 million in the 2019 period compared with losses of \$3.9 million in the 2018 period. Other expense (income) during the 2019 and 2018 periods also includes other components of pension expense (income) of \$(0.2) million and \$1.6 million, respectively. Note 1 of the Consolidated Financial Statements provides discussion of the guidance related to the presentation of pension and other postretirement benefit costs.

2018 vs. 2017:

Other expense (income), net in 2018 was \$7.4 million compared to \$(3.8) million in 2017. Other expense (income) in 2018 and 2017 included other components of pension expense (income) of \$1.6 million and \$(3.8) million, respectively. The \$(3.8) million impact in the 2017 period was largely attributed to pension curtailment and settlement gains resulting from the June 2017 closure of the FOBOHA facility located in Muri, Switzerland. See Note 13 of the Consolidated Financial Statements for details related to the other components of net periodic benefit cost and Note 10 for details related to the Closure. Note 1 provides discussion of the amended guidance related to the presentation of pension and other postretirement benefit costs. Foreign currency losses of \$3.9 million in the 2018 period compared with gains of \$0.8 million in the 2017 period.

Income Taxes

U.S. Tax Reform

On December 22, 2017 the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act (the "Act"). The Act made broad and complex changes to the U.S. Tax Code that affected 2017 and included, but were not limited to, requiring a one-time Transition Tax on certain unrepatriated earnings of foreign subsidiaries of the Company, which is payable over eight years, and exempted foreign dividends paid to the U.S. during the year from taxation if such earnings were included within the Transition Tax.

The Act also established new laws that affected 2018 and beyond and included, but was not limited to, (1) a reduction of the U.S. Corporate income tax rate from 35% to 21%; (2) general elimination of U.S. federal income taxes on dividends from foreign subsidiaries; (3) a new limitation on the deduction of interest expense; (4) repeal of the domestic production activity deduction; (5) additional limitations on deduction of compensation for certain executives; (6) a new provision designed to tax global intangible low-taxed income ("GILTI") which allows for the possibility of utilizing foreign tax credits ("FTCs") and a deduction up to 50% to offset the income tax liability (subject to certain limitations); (7) the introduction of the base erosion anti-abuse tax which represents a new minimum tax; (8) limitations on utilization of FTCs to reduce U.S. income tax liability; and (9) limitations on net operating losses generated after December 31, 2017 to 80% of taxable income.

The SEC issued Staff Accounting Bulletin 118 ("SAB 118") in December 2017, which provided guidance on accounting for the tax effects of the Act. SAB 118 provided a measurement period in which to finalize the accounting under Accounting Standards Codification 740, *Income Taxes* ("ASC 740"). This measurement period was not permitted to extend beyond one year from the Act enactment date. In accordance with SAB 118, we were required to reflect the income tax effects of those aspects of the Act for which the accounting under ASC 740 was complete. To the extent that our accounting for certain income tax effects of the Act was incomplete but we were capable of reasonably estimating the effects, we were permitted to record a

provisional amount in the Consolidated Financial Statements based on this estimate. All provisional adjustments relating to the Act were required to be made final as of December 22, 2018, one year following the Act's enactment.

The U.S. Department of Treasury ("U.S. Treasury") issued certain Notices and proposed regulations ("interpretative guidance") in 2018 addressing the Transition Tax component of the Act. During the year, various states also issued guidance related to calculating state tax as a result of the Act as well as clarification and guidance as to state tax treatment of the Transition Tax. The Company applied the impact of the interpretative guidance in computing its income tax expense for 2018. On January 15, 2019, the U.S. Treasury issued final regulations for Section 965 providing final guidance on the Transition Tax. The Company analyzed the final regulations and determined that they did not impact the computation of the Transition Tax completed and reported final by the Company as of December 31, 2018.

As part of our analysis of the impact of the Act, we recorded a one-time discrete tax expense of \$99.2 million as of December 31, 2017. This amount primarily consisted of net expense related to the deemed repatriation Transition Tax of \$86.7 million, combined with the impacts of reduced corporate income tax rates on our deferred tax assets of \$4.2 million, state taxation on the earnings reported under the Transition Tax of \$1.4 million and foreign income and withholding taxes of \$6.9 million related to the repatriation of certain foreign earnings. Various adjustments were made throughout 2018 as the Company applied interpretive guidance issued by the U.S. Treasury, as discussed above. A reduction in tax expense of \$2.6 million was recorded during 2018, for a final tax expense resulting from the Act of \$96.6 million. As required pursuant to SAB 118, the tax effect of the Act is final as of December 22, 2018 (one year after Enactment), and was recorded as such as of December 31, 2018. Details of each component of the Tax is as follows:

- *Deemed Repatriation Transition Tax:* The Act taxes certain unrepatriated earnings and profits ("E&P") of our foreign subsidiaries. In order to calculate the Transition Tax we determined, along with other information, the amount of our accumulated post 1986 E&P for our foreign subsidiaries, as well as the non-U.S. income tax paid by those subsidiaries on such E&P. We were capable of reasonably estimating the Transition Tax and recorded a provisional Transition Tax liability of \$86.7 million as of December 31, 2017. The U.S. Treasury issued the interpretive guidance in 2018, which provided additional guidance to assist companies in calculating the one-time Transition Tax. The Company completed the accounting and recorded a final Transition Tax of \$86.9 million. The U.S. Treasury issued Final Regulations in January 2019, applicable prospectively, and the Company determined that the Regulations did not impact the final Transition Tax expense recorded.
- *Reduction of U.S. Federal Corporate Tax Rate:* The Act reduced the U.S. Corporate income tax rate from 35% to 21%, effective January 1, 2018. Our U.S. companies remained in a net deferred tax asset position as of December 31, 2017, and, as a result of the Corporate rate reduction, we originally reduced our deferred tax assets by \$4.2 million, with a corresponding adjustment to net deferred tax expense for the year ended December 31, 2017. The Company filed the 2017 Federal Corporate Tax Return in October 2018 and claimed additional tax deductions subject to the 35% tax rate, which reduced the related tax expense from \$4.2 million to \$3.4 million.
- *State Taxation of Unrepatriated Earnings and Profits:* As a result of the Transition Tax, the Company originally recorded income as if the earnings had been repatriated, also recognizing that income may be subject to additional taxation at the state level. We were able to reasonably estimate the state taxation of these earnings and recorded a provisional expense of \$1.4 million as of December 31, 2017. Throughout 2018, various states issued guidance related to calculating the tax impacts of the Act, as well as clarifications describing how States would tax income arising from the application of provisions within the Act. As a result of the recent guidance, the Company reduced the tax expense related to the impact of the Act from \$1.4 million to \$0.6 million.
- *Indefinite Reinvestment Assertion:* Under accounting standards (ASC 740) a deferred tax liability is not recorded for the excess of the tax basis over the financial reporting (book) basis of an investment in a foreign subsidiary if the indefinite reinvestment criteria is met. On December 31, 2019, the Company's unremitted foreign earnings were approximately \$1,571.0 million. Pursuant to SAB 118, if an entity had completed all or portions of its assessment and had made a decision to repatriate and had the ability to reasonably estimate the effects of that assessment, that entity should have recorded a provisional expense and disclose the status of its efforts. The Company recorded a provisional expense of \$6.9 million in 2017 related to estimated tax to be incurred on future repatriation from foreign earnings. In 2018, the Company repatriated \$62.4 million between certain foreign entities, thereby reducing the previously recorded deferred tax liability by \$5.2 million, which was withholding tax expense incurred on the repatriation. In addition, the Company released \$1.2 million as it no longer expects to incur tax expense given it no longer intends to repatriate those earnings upon which the tax would be due.

- *Valuation Allowances:* The Company was required to assess whether its valuation allowance analysis was affected by various components of the Act, including the deemed mandatory repatriation of foreign income for the Transition Tax, future GILTI inclusions and changes to the NOL and FTC rules. The Company determined that there was no requirement to adjust or create additional valuation allowances nor release existing valuation allowances as a result of the Act.

The Act created a new requirement, effective for 2018, that certain income (i.e. GILTI) earned by Controlled Foreign Corporations (“CFCs”) be included currently in the gross income of the Company. GILTI represents the excess of the shareholders’ “net CFC tested income” over the net deemed tangible income return, which is defined in the Act as the excess of (1) 10 percent of the aggregate of the U.S. shareholders’ pro rata share of the qualified business assets of each CFC over (2) the amount of certain interest expense taken into account in the determination of the net CFC tested income. In September 2018, the U.S. Treasury issued Proposed Regulations addressing GILTI. The Company applied the Proposed Regulations and calculated a GILTI inclusion within 2018 taxable income in the U.S., which resulted in \$2.5 million of tax expense during the period. In June 2019, the U.S. Treasury issued Final and additional Proposed regulations’ addressing GILTI. The Company applied the final regulations and calculated a GILTI inclusion within 2019 taxable income in the U.S., which results in annual tax expense of \$1.4 million during the period. The Company has made an accounting election to treat taxes due on U.S. inclusions in taxable income related to GILTI as a current period expense when incurred (the “period cost method”).

2019 vs. 2018:

The Company’s effective tax rate was 23.4% in 2019, compared with 19.9% in 2018. The increase in the 2019 effective tax rate from the full year 2018 rate is primarily due to the absence of adjustments to certain international valuation reserves and final adjustments resulting from the impact of U.S. Tax Reform (see discussion above). During 2019, the Company repatriated \$153.0 million to the U.S., compared to \$228.8 million in 2018. Pursuant to the Act, neither dividend was taxable in the U.S. for federal purposes.

The Aerospace and Industrial Segments have a number of multi-year tax holidays in Singapore and China. These holidays are subject to the Company meeting certain commitments in the respective jurisdictions. Aerospace was granted an income tax holiday for operations recently established in Malaysia. The Company has discretion as to the start date of the holiday in Malaysia and currently anticipates the holiday beginning during the second half of 2020. The holiday remains effective for ten years. See Note 15 of the Consolidated Financial Statements.

In 2020, the Company expects the effective tax rate to be between 25.0% and 26.0%, an increase from the rate of 23.4% in 2019. The increase in the effective tax rate is driven primarily by the tax charges related to the completed sale of the Seeger business in 2020 (expected impact of 2.0%), in addition to the absence of current year excess tax benefit on stock awards and partially offset by the benefit resulting from the recently granted income tax holiday in Malaysia.

2018 vs. 2017:

The Company’s effective tax rate was 19.9% in 2018, compared with 69.6% in 2017. The effective tax rate in 2017 was impacted by the Act. Excluding the impact of a one-time charge of \$99.2 million of discrete tax expense related to the Act, partially offset by a benefit of \$2.5 million on the prior year repatriation, the effective tax rate would have been 20.2% for the full year 2017. The slight decrease in the 2018 effective tax rate from the full year 2017 adjusted rate is primarily due to the final adjustments resulting from the impact of U.S. Tax Reform (see discussion above), an adjustment to certain international valuation reserves, the award of overseas tax holiday and an increase in the projected change in the mix of earnings attributable to lower-taxing jurisdictions. The decrease is partially offset due to new provisions within the Act that are designed to tax GILTI, the absence of the adjustment of the Swiss valuation reserves, the absence of the settlement of tax audits and closure of tax years for various tax jurisdictions. During 2018, the Company repatriated \$228.8 million, compared to \$7.3 million in 2017. Pursuant to the Act, neither dividend was taxable in the U.S.

See Note 15 of the Consolidated Financial Statements for a reconciliation of the U.S. federal statutory income tax rate to the consolidated effective income tax rate.

Income and Income Per Share

(in millions, except per share)

	2019	2018	Change	% Change	2017
Net income	\$ 158.4	\$ 166.2	\$ (7.8)	(4.7)%	\$ 59.4
Net income per common share:					
Basic	\$ 3.09	\$ 3.18	\$ (0.09)	(2.8)%	\$ 1.10
Diluted	\$ 3.07	\$ 3.15	\$ (0.08)	(2.5)%	\$ 1.09
Weighted average common shares outstanding:					
Basic	51.2	52.3	(1.1)	(2.1)%	54.1
Diluted	51.6	52.8	(1.2)	(2.3)%	54.6

Basic and diluted net income per common share decreased for 2019 as compared to 2018. The decreases were due to a decrease in net income year over year and were partially offset by the impact of reductions in both basic and diluted weighted average common shares outstanding which decreased due to the repurchase of 2,292,100 and 900,000 shares during 2018 and 2019, respectively, as part of the Company's publicly announced Repurchase Program. The impact of the repurchased shares was partially offset by the issuance of additional shares for employee stock plans.

Financial Performance by Business Segment

Industrial

(\$ in millions)

	2019	2018	\$ Change	% Change	2017
Sales	\$ 938.5	\$ 994.7	\$ (56.2)	(5.7)%	\$ 973.9
Operating profit	114.0	130.4	(16.4)	(12.6)%	122.8
Operating margin	12.1%	13.1%			12.6%

2019 vs. 2018:

Sales at Industrial were \$938.5 million in 2019, a decrease of \$56.2 million, or 5.7%, from 2018. Acquired businesses contributed incremental sales of \$54.5 million during the 2019 period. Organic sales decreased by \$80.3 million, or 8.1%, during 2019 reflecting declines in sales within each of the businesses. Softness in automotive end markets continued to negatively impact sales volumes, largely due to lower global auto production rates and delays in automotive model change releases, reflecting global trade uncertainty throughout the year and potential changes in regulatory requirements. Increased volumes within the medical end market, however, partially offset the automotive, personal care and packaging related declines within the Molding Solutions business. Proposed environmental regulations affecting product and packaging composition and disposability have impacted sales within these end markets. The impact of foreign currency translation decreased sales by approximately \$30.4 million as the U.S. dollar strengthened against foreign currencies.

Operating profit in 2019 at Industrial was \$114.0 million, a decrease of \$16.4 million, or 12.6% from 2018, driven by the reduced profit contribution of lower organic sales, a \$5.6 million non-cash impairment charge related to the sale of the Seeger business (see Note 3) and an increase in intangible amortization as a result of the Gimatic acquisition, partially offset by favorable productivity, the profit contribution of acquisition volumes and a reduction in short-term purchase accounting adjustments. Operating profit in 2019 includes \$2.1 million of short-term purchase accounting adjustments related to the acquisition of Gimatic, whereas 2018 included \$5.6 million of short-term purchase accounting adjustments and \$2.4 million of acquisition transaction costs, both related to the acquisitions of Gimatic and IGS, in addition to due diligence costs related to the acquisition of Gimatic. Operating margin decreased from 13.1% in the 2018 period to 12.1% in the 2019 period, primarily as a result of these items.

Outlook:

In Industrial, management is focused on generating organic sales growth through the introduction of new products and services and by leveraging the benefits of its diversified products and global industrial end-markets. Our ability to generate sales growth is subject to economic conditions in the global markets served by all of our businesses. For overall industrial end-markets, the manufacturing Purchasing Managers' Index ("PMI") remains above 50 in North America as of December 31, 2019,

whereas PMI in China has fluctuated around 50 throughout 2019. PMI in Europe has remained below 50 throughout the majority of 2019, including as of December 31, 2019, indicative of a slowing economy. Global forecasted production for light vehicles has continued to decline within the European, Chinese and North American markets throughout 2019 and production is forecasted to remain flat in 2020. Within our Molding Solutions business, the global medical market remains healthy, while the automotive hot runner market remains soft given the delay in model launches by automotive original equipment manufacturers. Proposed environmental regulations affecting product and packaging composition and disposability may continue to impact sales within these end markets. Overall industrial end-markets may also be impacted by uncertainty related to current and proposed tariffs announced by the United States and the Chinese governments. Our businesses may also be impacted by the recent coronavirus outbreak in China, which management has been monitoring very closely. As noted above, our sales were negatively impacted by \$30.4 million from fluctuations in foreign currencies. To the extent that the U.S. dollar fluctuates relative to other foreign currencies, our sales may continue to be impacted by foreign currency. The relative impact on operating profit is not expected to be as significant as the impact on sales as most of our businesses have expenses primarily denominated in local currencies, where their revenues reside, however operating margins may be impacted. The Company also remains focused on sales growth through acquisition and expanding geographic reach. See Note 2 of the Consolidated Financial Statements for additional discussion regarding the Company's acquisition of Gimatic. Strategic investments in new technologies, manufacturing processes and product development are expected to provide incremental benefits over the long term.

Operating profit is largely dependent on sales volumes and mix of the businesses in the segment. Management continues to focus on improving profitability and expanding margins through leveraging organic sales growth, acquisitions, pricing initiatives, global sourcing, productivity and the evaluation of customer programs, driven by the Barnes Enterprise System. Operating profit may also be impacted by the enactment of or changes in tariffs, trade agreements and trade policies that may affect the cost and/or availability of goods, including aluminum and steel. In particular, tariffs could further increase prices of raw materials or other supplies which we will attempt to offset through mitigation actions. We continue to evaluate market conditions and remain proactive in managing costs. Costs associated with new product and process introductions, restructuring and other cost initiatives, strategic investments and the integration of acquisitions may negatively impact operating profit.

2018 vs. 2017:

Sales at Industrial were \$994.7 million in 2018, an increase of \$20.8 million, or 2.1%, from 2017. Acquired businesses contributed incremental sales of \$18.2 million during the 2018 period. Organic sales decreased by \$11.6 million, or 1.2%, during 2018, primarily a result of lower volumes within the Force & Motion Control and Engineered Components businesses, partially offset by strength in the Molding Solutions business. Softness in automotive end markets decreased volumes within each of these businesses, largely due to lower global auto production rates and delays in auto model change releases, resulting primarily from the uncertainty related to current and proposed tariffs recently announced by the United States and Chinese governments. Increased volumes within the medical and personal care end markets, however, more than offset the automotive related declines within Molding Solutions. The impact of foreign currency translation increased sales by approximately \$14.2 million as the U.S. dollar weakened against foreign currencies.

Operating profit in 2018 at Industrial was \$130.4 million, an increase of 6.1% from 2017, primarily driven by the absence of the 2017 pre-tax restructuring charges of \$7.5 million. See Note 10 of the Consolidated Financial Statements. Operating profit also benefited from improving cost productivity, primarily driven by the absence of additional costs incurred on certain programs within Engineered Components during the 2017 period. Incremental costs during the prior period included expedited freight, increased scrap and costs related to the transfer of work to other facilities. Operating profit benefits during the 2018 period were partially offset by the profit impact of lower organic sales and increased due diligence costs related to the acquisition of Gimatic. Operating profit in 2018 includes \$5.6 million of short-term purchase accounting adjustments and \$2.4 million of acquisition transaction costs, both related to Gimatic and IGS, whereas 2017 includes \$2.3 million of short-term purchase accounting adjustments related to the acquisition of FOBHOA. Operating margin increased from 12.6% in the 2017 period to 13.1% in the 2018 period primarily as a result of these items.

Aerospace

<i>(\$ in millions)</i>	2019	2018	\$ Change	% Change	2017
Sales	\$ 552.6	\$ 501.2	\$ 51.4	10.3%	\$ 462.6
Operating profit	122.5	101.4	21.1	20.8%	83.6
Operating margin	22.2%	20.2%			18.1%

2019 vs. 2018:

Aerospace recorded sales of \$552.6 million in 2019, a 10.3% increase from 2018. Sales increased within all of the Aerospace businesses. The original equipment manufacturing ("OEM") business continued to benefit from the ramp of newer, more technologically advanced engine programs. The sales increase reflects increased volume generated by these platforms. Sales within the aftermarket maintenance repair and overhaul ("MRO") and spare parts businesses increased during 2019 as airline traffic and aircraft utilization remained strong, with additional volumes being obtained largely from existing customers. Sales within the segment are largely denominated in U.S. dollars and therefore were not significantly impacted by changes in foreign currency.

Operating profit at Aerospace increased 20.8% from 2018 to \$122.5 million. The operating profit increase resulted from the profit impact of increased volumes at both the OEM and aftermarket businesses, as discussed above. Operating margin increased from 20.2% in the 2018 period to 22.2% in the 2019 period, primarily a result of volume increases across all businesses, combined with favorable mix from the MRO and spare parts businesses.

Outlook:

Sales in the Aerospace OEM business are based on the general state of the aerospace market driven by the worldwide economy and are supported by its order backlog through participation in certain strategic commercial and military engine and airframe programs. Over the next several years, the Company expects sustained strength in demand for more technologically advanced engine programs, driven by commercial aircraft production levels. Backlog at OEM was \$800.7 million at December 31, 2019, a decrease of 5.3% since December 31, 2018, at which time backlog was \$845.1 million. Backlog decreased as Aerospace customers continued to adjust orders based on their requirements. The Company believes that this activity represents normal order management. During the fourth quarter of 2019, Boeing announced a change to the near-term 737 MAX aircraft production schedule and thereby reduced supplier deliveries in 2020, with the expectation that deliveries would ramp back over a longer period of time. We will be managing our business to minimize any impact to our financial performance. Approximately 50% of OEM backlog is expected to ship in the next 12 months. The Aerospace OEM business may be impacted by changes in the content levels on certain platforms, changes in customer sourcing decisions, adjustments to customer inventory levels, commodity availability and pricing, vendor sourcing capacity and the use of alternate materials. Additional impacts may include changes in production schedules of specific engine and airframe programs, redesign of parts, quantity of parts per engine, cost schedules agreed to under contract with the engine manufacturers, as well as the pursuit and duration of new programs. Sales in the Aerospace aftermarket business may be impacted by fluctuations in end-market demand, early aircraft retirements, inventory management and changes in customer sourcing, deferred or limited maintenance activity during engine shop visits and the use of surplus (used) material during the engine repair and overhaul process. End markets are expected to grow based on the long term underlying fundamentals of the aerospace industry. Management continues to believe its Aerospace aftermarket business is competitively positioned based on well-established long-term customer relationships, including maintenance and repair contracts in the MRO business and long-term Revenue Sharing Programs ("RSPs") and Component Repair Programs ("CRPs"), expanded capabilities and current capacity levels. The MRO business may be potentially impacted by airlines that closely manage their aftermarket costs as engine performance and quality improves. Fluctuations in fuel costs and their impact on airline profitability and behaviors within the aerospace industry could also impact levels and frequency of aircraft maintenance and overhaul activities, and airlines' decisions on maintaining, deferring or canceling new aircraft purchases, in part based on the economics associated with new fuel efficient technologies.

Management is focused on growing operating profit at Aerospace primarily through leveraging organic sales growth, strategic investments, new product and process introductions, and productivity, driven by the Barnes Enterprise System. Operating profit is expected to be affected by the impact of changes in sales volume, mix and pricing, particularly as they relate to the highly profitable aftermarket RSP spare parts business, and investments made in each of its businesses. Operating profits may also be impacted by potential changes in tariffs, trade agreements and trade policies that may affect the cost and/or availability of goods. Costs associated with new product and process introductions, the physical transfer of work to other global regions, additional productivity initiatives and restructuring activities may also negatively impact operating profit.

2018 vs. 2017:

Aerospace recorded sales of \$501.2 million in 2018, an 8.3% increase from 2017. Sales increased within all of the Aerospace businesses. The OEM business continued to benefit from the ramp of newer, more technologically advanced engine programs. The sales increase reflects increased volume generated by these newer platforms, partially offset by scheduled price deflation as certain engine programs transition into the early production stages. Sales within the aftermarket MRO and spare

parts businesses increased as airline traffic and aircraft utilization remained strong, with additional volumes being obtained largely from existing customers. Sales within the segment are largely denominated in U.S. dollars and therefore were not impacted by changes in foreign currency.

Operating profit at Aerospace increased 21.2% from 2017 to \$101.4 million. The operating profit increase resulted from the profit impact of the increased volumes at both the OEM and the aftermarket businesses, as discussed above, and increased productivity, driven by improvements within production of the newer engine programs. These benefits were partially offset by scheduled price deflation as certain newer engine programs transition into the early production stages. Operating margin increased from 18.1% in the 2017 period to 20.2% in the 2018 period, primarily as a result of these items.

LIQUIDITY AND CAPITAL RESOURCES

Management assesses the Company's liquidity in terms of its overall ability to generate cash to fund its operating and investing activities. Of particular importance in the management of liquidity are cash flows generated from operating activities, capital expenditure levels, dividends, capital stock transactions, effective utilization of surplus cash positions overseas and adequate lines of credit.

The Company believes that its ability to generate cash from operations in excess of its internal operating needs is one of its financial strengths. Management continues to focus on cash flow and working capital management, and anticipates that operating activities in 2020 will generate sufficient cash to fund operations. The Company closely monitors its cash generation, usage and preservation including the management of working capital to generate cash.

In February 2017, the Company and certain of its subsidiaries entered into the fourth amendment of its fifth amended and restated revolving credit agreement (the "Amended Credit Agreement") and retained Bank of America, N.A. as the Administrative Agent for the lenders. The Amended Credit Agreement increased the facility from \$750.0 million to \$850.0 million and extended the maturity date from September 2018 to February 2022. The Amended Credit Agreement also increased the previous accordion feature from \$250.0 million, allowing the Company to request additional borrowings of up to \$350.0 million. The Company may exercise the accordion feature upon request to the Administrative Agent as long as an event of default has not occurred or is not continuing. The borrowing availability of \$850.0 million, pursuant to the terms of the Amended Credit Agreement, allows for multi-currency borrowing which includes Euro, British pound sterling or Swiss franc borrowing, up to \$600.0 million. In September 2018, the Company and one of its wholly owned subsidiaries entered into a Sale and Purchase Agreement to acquire Gimatic S.r.l (the "Acquisition"). See Note 2 of the Consolidated Financial Statements. In conjunction with the Acquisition, the Company requested additional borrowings of \$150.0 million that was provided for under the accordion feature. The Administrative Agent for the lenders approved the Company's access to the accordion feature and on October 19, 2018 the lenders formally committed the capital to fund such feature, resulting in the execution of the fifth amendment to the Amended Credit Agreement (the "Fifth Amendment"). The Fifth Amendment, effective October 19, 2018, thereby increased the borrowing availability of the existing facility to \$1,000.0 million. The Company may also request access to the residual \$200.0 million of the accordion feature. Depending on the Company's consolidated leverage ratio, and at the election of the Company, borrowings under the Amended Credit Agreement will bear interest at either LIBOR plus a margin of between 1.10% and 1.70% or the base rate, as defined in the Amended Credit Agreement, plus a margin of 0.10% to 0.70%. Multi-currency borrowings, pursuant to the Amended Credit Agreement, bear interest at their respective interbank offered rate (i.e. Euribor) or 0.00% (higher of the two rates) plus a margin of between 1.10% and 1.70%.

In October 2014, the Company entered into a Note Purchase Agreement ("Note Purchase Agreement"), among the Company and New York Life Insurance Company, New York Life Insurance and Annuity Corporation and New York Life Insurance and Annuity Corporation Institutionally Owned Life Insurance Separate Account, as purchasers, for the issuance of \$100.0 million aggregate principal amount of 3.97% senior notes due October 17, 2024 (the "3.97% Senior Notes"). The 3.97% Senior Notes are senior unsecured obligations of the Company and pay interest semi-annually on April 17 and October 17 of each year at an annual rate of 3.97%. The 3.97% Senior Notes will mature on October 17, 2024 unless earlier prepaid in accordance with their terms. Subject to certain conditions, the Company may, at its option, prepay all or any part of the 3.97% Senior Notes in an amount equal to 100% of the principal amount of the 3.97% Senior Notes so prepaid, plus any accrued and unpaid interest to the date of prepayment, plus the Make-Whole Amount, as defined in the Note Purchase Agreement, with respect to such principal amount being prepaid. The Note Purchase Agreement contains customary affirmative and negative covenants that are similar to the covenants required under the Amended Credit Agreement, as discussed below. At December 31, 2019, the Company was in compliance with all covenants under the Note Purchase Agreement.

The Company's borrowing capacity remains limited by various debt covenants in the Amended Credit Agreement and the Note Purchase Agreement (the "Agreements"). The Agreements require the Company to maintain a ratio of Consolidated

Senior Debt, as defined, to Consolidated EBITDA, as defined, of not more than 3.25 times ("Senior Debt Ratio"), a ratio of Consolidated Total Debt, as defined, to Consolidated EBITDA of not more than 3.75 times ("Total Debt Ratio") and a ratio of Consolidated EBITDA to Consolidated Cash Interest Expense, as defined, of not less than 4.25, in each case at the end of each fiscal quarter; provided that the debt to EBITDA ratios are permitted to increase for a period of four fiscal quarters after the closing of certain permitted acquisitions. A permitted acquisition is defined as an acquisition exceeding \$150.0 million, for which the acquisition of Gimatic on October 31, 2018 qualified. With the completion of a permitted acquisition, the Senior Debt Ratio cannot exceed 3.50 times and the Total Debt Ratio cannot exceed 4.25 times. The increased ratios were allowed for a period of four fiscal quarters subsequent to the close of the permitted acquisition and therefore expired in the fourth quarter of 2019. At December 31, 2019, the Company was in compliance with all covenants under the Agreements. The Company's most restrictive financial covenant is the Senior Debt Ratio which requires the Company to maintain a ratio of Consolidated Senior Debt to Consolidated EBITDA of not more than 3.25 times at December 31, 2019. The actual ratio at December 31, 2019 was 2.41 times, as defined.

In 2019, 2018 and 2017, the Company acquired 0.9 million shares, 2.3 million shares and 0.7 million shares of the Company's common stock, respectively, at a cost of \$50.3 million, \$138.3 million and \$40.8 million, respectively.

Operating cash flow may be supplemented with external borrowings to meet near-term business expansion needs and the Company's current financial commitments. The Company has assessed its credit facilities in conjunction with the Amended Credit Facility and currently expects that its bank syndicate, comprised of 14 banks, will continue to support its Amended Credit Agreement which matures in February 2022. At December 31, 2019, the Company had \$279.6 million unused and available for borrowings under its \$1,000.0 million Amended Credit Facility, subject to covenants in the Company's revolving debt agreements. At December 31, 2019, additional borrowings of \$466.5 million of Total Debt including \$293.0 million of Senior Debt would have been allowed under the financial covenants. The Company intends to use borrowings under its Amended Credit Facility to support the Company's ongoing growth initiatives. The Company believes its credit facilities and access to capital markets, coupled with cash generated from operations, are adequate for its anticipated future requirements.

The Company had \$7.7 million in borrowings under short-term bank credit lines at December 31, 2019.

In 2012, the Company entered into five-year interest rate swap agreements (the "Swaps") transacted with three banks which together converted the interest on the first \$100.0 million of the Company's one-month LIBOR-based borrowings from a variable rate plus the borrowing spread to a fixed rate of 1.03% plus the borrowing spread, for the purpose of mitigating its exposure to variable interest rates. The Swaps expired on April 28, 2017. The Company entered into a new interest rate swap agreement (the "Swap") that commenced on April 28, 2017, with one bank, and converts the interest on the first \$100.0 million of the Company's one-month LIBOR-based borrowings from a variable rate plus the borrowing spread to a fixed rate of 1.92% plus the borrowing spread. The Swap expires on January 31, 2022. At December 31, 2019, the Company's total borrowings were comprised of approximately 25% fixed rate debt and 75% variable rate debt. At December 31, 2018, the Company's total borrowings were comprised of approximately 22% fixed rate debt and 78% variable rate debt.

The United Kingdom's Financial Conduct Authority, which regulates the London Interbank Offered Rate ("LIBOR"), announced its intent to phase out the use of LIBOR by the end of 2021. The U.S. Federal Reserve, in conjunction with the Alternative Reference Rates Committee, a steering committee comprised of large U.S. financial institutions, identified the Secured Overnight Financing Rate ("SOFR") as its preferred benchmark alternative to U.S. dollar LIBOR. Published by the Federal Reserve Bank of New York, SOFR represents a measure of the cost of borrowing cash overnight, collateralized by U.S. Treasury securities, and is calculated based on directly observable U.S. Treasury-backed repurchase transactions. The Company's Amended Credit Agreement and corresponding interest rate Swap are tied to LIBOR, with both maturing in early 2022, as noted above. The Company is evaluating the potential impact of the replacement of LIBOR, but does not anticipate a material impact on our business, financial condition, results of operations and cash flows.

The funded status of the Company's pension plans is dependent upon many factors, including actual rates of return that impact the fair value of pension assets and changes in discount rates that impact projected benefit obligations. The unfunded status of the pension plans decreased from \$71.4 million at December 31, 2018 to \$55.1 million at December 31, 2019 as the increase in the fair value of the pension plan assets exceeded the increase in the projected benefit obligations ("PBOs"), following an update of certain actuarial assumptions. The Company recorded \$5.4 million of non-cash after-tax decreases in stockholders equity (through other non-owner changes to equity) when recording the current year adjustments for changes in the funded status of its pension and postretirement benefit plans as required under accounting for defined benefit and other postretirement plans. This decrease in stockholders equity resulted primarily from changes in actuarial assumptions, primarily a decrease in the discount rate, partially offset by favorable variances between expected and actual returns on pension plan assets and the amortization of actuarial losses recorded earlier. In 2019, the Company made \$15.0 million of discretionary contributions to its U.S. Qualified pension plans. The Company expects to contribute approximately \$4.4 million to its various

defined benefit pension plans in 2020. No discretionary contributions to the U.S. Qualified pension plans are currently planned in 2020. See Note 13 of the Consolidated Financial Statements.

As noted above, the U.S. government enacted the Act on December 22, 2017. The Company completed its computation of the Transition Tax as required pursuant to SAB 118 in 2018, resulting in a final net Transition Tax expense of \$86.9 million. The Company elected to pay the Transition Tax over the allowed eight year period. The installment payments for the Transition Tax are not expected to have a material impact on the liquidity or capital resources of the Company. The Company expects to make the payments through the use of available cash or borrowings under the Amended Credit Facility.

The Company completed the sale of the Seeger business to KNG, effective February 1, 2020. Pursuant to the terms of the SPA, total cash consideration was 39.6 million Euros (\$44.0 million), inclusive of 3.8 million Euros (\$4.2 million) of cash sold, subject to post-closing adjustments. The resulting tax charges are estimated to approximate 4.1 million Euros (\$4.6 million) and will be recognized in the first quarter of 2020, following the completion of the sale. Taxes are payable during 2020. The Company plans to utilize the proceeds from the sale to reduce debt under the Amended Credit Facility.

At December 31, 2019, the Company held \$93.8 million in cash and cash equivalents, the majority of which was held by foreign subsidiaries. These amounts have no material regulatory or contractual restrictions. The Act changed the impact of U.S. taxation on foreign distributions. The Company is continuously evaluating its position regarding the potential repatriation of overseas cash. The evaluation of potential repatriation is dependent upon several variables, including foreign taxation of dividends and the impact of withholding tax. The Company repatriated \$153.0 million to the U.S. during 2019.

Any future acquisitions are expected to be financed through internal cash, borrowings and equity, or a combination thereof. Additionally, we may from time to time seek to retire or repurchase our outstanding debt through cash purchases and/or exchanges for equity securities, in open market purchases, under a Rule 10b5-1 trading plan, privately negotiated transactions or otherwise. Such repurchases or exchanges, if any, will depend on prevailing market conditions, our liquidity requirements, contractual restrictions and other factors.

Cash Flow

<i>(\$ in millions)</i>	2019	2018	\$ Change	% Change	2017
Operating activities	\$ 248.3	\$ 237.2	\$ 11.1	4.7%	\$ 203.9
Investing activities	(62.2)	(493.2)	431.0	87.4%	(68.0)
Financing activities	(192.0)	215.6	(407.6)	NM	(63.8)
Exchange rate effect	(1.0)	(4.1)	3.1	75.8%	6.7
(Decrease) increase in cash	\$ (6.9)	\$ (44.6)	\$ 37.7	84.5%	\$ 78.8

NM – Not meaningful

Operating activities provided \$248.3 million in 2019 compared to \$237.2 million in 2018. Operating cash flows in the 2019 period were positively impacted by improved operating results and a reduction in cash used for working capital and negatively impacted by outflows of \$15.0 million related to discretionary contributions to the U.S. Qualified pension plans.

Investing activities used \$62.2 million in 2019 and \$493.2 million in 2018. In 2019, investing activities included capital expenditures of \$53.3 million compared to \$57.3 million in 2018. The Company expects capital spending in 2020 to approximate \$60 million. Capital expenditures relate to both maintenance needs and support of growth initiatives, which include the purchase of equipment to support new products and services, and are expected to be funded primarily through cash flows from operations. Investing activities in 2019 also included \$6.1 million of payments related to the Gimatic acquisition under the terms of the Sale and Purchase Agreement. In 2018, investing activities also included an outflow of \$430.5 million to fund the acquisition of Gimatic and a \$5.8 million participation fee payment related to the aftermarket Revenue Sharing Programs. In 2019 and 2018, investing activities included payments of \$3.5 million and \$1.0 million, respectively, related to Aerospace agreements, which are reflected in Other Investing activities.

Cash used by financing activities in 2019 included a net decrease in borrowings of \$99.4 million compared to a net increase of \$402.0 million in 2018. In 2019 and 2018, the Company borrowed 44.1 million Euro (\$49.5 million) and 179.0 million Euro (\$208.6 million), respectively, under the Amended Credit Facility through an international subsidiary. The proceeds were distributed to the Parent Company and subsequently used to pay down U.S. borrowings under the Amended Credit Agreement. Proceeds from the issuance of common stock were \$5.5 million and \$1.1 million in 2019 and 2018,

respectively. In 2019, the Company repurchased 0.9 million shares of the Company's stock at a cost of \$50.3 million, compared with the purchase of 2.3 million shares at a cost of \$138.3 million in 2018. Total cash used to pay dividends increased slightly to \$32.5 million in 2019 compared to \$32.2 million in 2018, reflecting an increase in dividends paid per share. Withholding taxes paid on stock issuances were \$6.1 million in the 2019 period and \$5.4 million in the 2018 period. Other financing cash flows during 2019 and 2018 included \$7.5 million and \$10.8 million, respectively, of net cash payments related to the settlement of foreign currency hedges related to intercompany financings.

Debt Covenants

As noted above, borrowing capacity is limited by various debt covenants in the Company's debt agreements. Following is a reconciliation of Consolidated EBITDA, a key metric in the debt covenants, to the Company's net income (in millions):

	2019
Net income	<u>\$ 158.4</u>
Add back:	
Interest expense	20.6
Income taxes	48.5
Depreciation and amortization	99.1
Adjustment for non-cash stock based compensation	13.0
Amortization of Gimatic acquisition inventory step-up	2.1
Due diligence and transaction expenses	2.1
Non-cash impairment charge (see Note 3)	5.6
Other adjustments	(2.3)
Consolidated EBITDA, as defined within the Amended Credit Agreement	<u>\$ 347.0</u>
Consolidated Senior Debt, as defined, as of December 31, 2019	\$ 834.8
Ratio of Consolidated Senior Debt to Consolidated EBITDA	2.41
Maximum	3.25
Consolidated Total Debt, as defined, as of December 31, 2019	\$ 834.8
Ratio of Consolidated Total Debt to Consolidated EBITDA	2.41
Maximum	3.75
Consolidated Cash Interest Expense, as defined, as of December 31, 2019	\$ 20.6
Ratio of Consolidated EBITDA to Consolidated Cash Interest Expense	16.82
Minimum	4.25

The Amended Credit Agreement allows for certain adjustments within the calculation of the financial covenants. Other adjustments consist of changes in accounting, restructuring charges and net losses on the sale of assets, as permitted under the Amended Credit Agreement. The Company's financial covenants are measured as of the end of each fiscal quarter. At December 31, 2019, additional borrowings of \$466.5 million of Total Debt including \$293.0 million of Senior Debt would have been allowed under the covenants. Senior Debt includes primarily the borrowings under the Amended Credit Facility, the 3.97% Senior Notes and the borrowings under the lines of credit. The Company's unused committed credit facilities at December 31, 2019 were \$279.6 million.

Contractual Obligations and Commitments

At December 31, 2019, the Company had the following contractual obligations and commitments:

(\$ in millions)	Total	Less than 1 Year	1-3 Years	3-5 Years	More than 5 Years
Long-term debt obligations ⁽¹⁾	\$ 827.1	\$ 2.0	\$ 723.1	\$ 101.9	\$ —
Estimated interest payments under long-term obligations ⁽²⁾	58.1	16.8	22.9	7.3	11.1
Operating lease obligations ⁽³⁾	37.0	11.9	13.6	4.7	6.8
Purchase obligations ⁽⁴⁾	213.3	194.4	14.6	3.6	0.7
Expected pension contributions ⁽⁵⁾	4.4	4.4	—	—	—
Expected benefit payments – other postretirement benefit plans ⁽⁶⁾	25.0	3.3	6.1	5.2	10.3
Long-term U.S. Tax Reform obligations ⁽⁷⁾	66.0	—	6.9	20.0	39.1
Total	<u>\$ 1,230.8</u>	<u>\$ 232.8</u>	<u>\$ 787.3</u>	<u>\$ 142.7</u>	<u>\$ 68.0</u>

(1) Long-term debt obligations represent the required principal payments under such agreements.

(2) Interest payments under long-term debt obligations have been estimated based on the borrowings outstanding and market interest rates as of December 31, 2019.

(3) The Company's operating lease payments included herein reflect the future minimum undiscounted fixed lease payments, which represent the basis for calculating the Company's operating lease liabilities as of December 31, 2019. Refer to Note 20 of the Consolidated Financial Statements.

(4) The amounts do not include purchase obligations reflected as current liabilities on the consolidated balance sheet. The purchase obligation amount includes all outstanding purchase orders as of the balance sheet date as well as the minimum contractual obligation or termination penalty under other contracts.

(5) The amount included in "Less Than 1 Year" reflects anticipated contributions to the Company's various pension plans. Anticipated contributions beyond one year are not determinable.

(6) Amounts reflect anticipated benefit payments under the Company's various other postretirement benefit plans based on current actuarial assumptions. Expected benefit payments, as presented above, do not extend beyond 2029. See Note 13 of the Consolidated Financial Statements.

(7) Amounts reflect anticipated long-term payments related to the Tax Cuts and Jobs Act that was enacted on December 22, 2017. Payments are allowed over an eight-year period. See Note 15 of the Consolidated Financial Statements. The amount payable in 2020 is included within accrued liabilities on the Consolidated Balance Sheets.

The above table does not reflect unrecognized tax benefits as the timing of the potential payments of these amounts cannot be determined. See Note 15 of the Consolidated Financial Statements.

OTHER MATTERS

Inflation

Inflation generally affects the Company through its costs of labor, equipment and raw materials. Increases in the costs of these items have historically been offset by price increases, commodity price escalator provisions, operating improvements, and other cost-saving initiatives.

Critical Accounting Estimates

The preparation of financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Significant accounting policies are disclosed in Note 1 of the Consolidated Financial Statements. The most significant areas involving management judgments and estimates are described below. Actual results could differ from such estimates.

Inventory Valuation: Inventories are valued at the lower of cost, determined on a first-in, first-out basis, or net realizable value. The primary components of cost included in inventories are raw material, labor and overhead. Provisions are made to reduce excess or obsolete inventories to their estimated net realizable value. The process for evaluating the value of excess and obsolete inventory often requires the Company to make subjective judgments and estimates concerning future sales levels, quantities and prices at which such inventory will be sold in the normal course of business and estimated costs. Accelerating the disposal process or changes in estimates based on future sales potential or estimated costs may necessitate future adjustments to these provisions.

Revenue recognition: The Company accounts for revenue in accordance with Accounting Standard Codification 606, Revenue from Contracts with Customers, which it adopted on January 1, 2018. Revenue is recognized by the Company when control of the product or solution is transferred to the customer. Control is generally transferred when products are shipped or delivered to customers, title is transferred, the significant risks and rewards of ownership have transferred, the Company has rights to payment and rewards of ownership pass to the customer. Customer acceptance may also be a factor in determining whether control of the product has transferred. Although revenue is generally transferred at a point in time, a certain portion of businesses with customized products or contracts in which the Company performs work on customer-owned assets requires the use of an over time recognition model as certain contracts meet one or more of the established criteria pursuant to the accounting standards governing revenue recognition. Also, service revenue is recognized as control transfers, which is concurrent with the services being performed. See Note 4 of the Consolidated Financial Statements.

Business Acquisitions, Intangible Assets and Goodwill: Assets and liabilities acquired in a business combination are recorded under the acquisition method of accounting at their estimated fair values at the dates of acquisition. At December 31, 2019, the Company had \$933.0 million and \$325.8 million of goodwill and identifiable intangible assets related to acquisitions, respectively. Goodwill represents the cost of acquisitions in excess of fair values assigned to the underlying identifiable net assets of acquired businesses. Identifiable intangible assets acquired in business acquisitions include customer relationships, patents and technology and trademarks/trade names. The fair value of acquired customer relationship intangibles was determined as of the acquisition dates based on estimates and judgments regarding expectations for the future after-tax cash flows arising from customer relationships that existed on the acquisition date over their estimated lives, less a contributory assets charge, all of which is discounted to present value using an appropriate discount rate. The fair value of the patents and technology and trademark/trade name intangible assets were determined utilizing the relief from royalty method which is a form of the income approach. Under this method, an after-tax royalty rate based on market royalty rates is applied to projected revenue associated with the patents/technology and trademark/trade name and discounted to present value using an appropriate discount rate. See Note 7 of the Consolidated Financial Statements.

Goodwill and indefinite-lived intangible assets are subject to impairment testing annually or more frequently if an event or change in circumstances indicates that the fair value of a reporting unit has been reduced below its carrying value. Management completes their annual impairment assessments during the second quarter of each year as of April 1. The Company adopted the amended guidance related to goodwill impairment testing during the second quarter of 2018, in conjunction with its annual assessment. See Note 1 of the Consolidated Financial Statements. The Company utilizes the option to first assess qualitative factors to determine whether it is necessary to perform the Step 1 quantitative goodwill impairment test in accordance with the applicable accounting standards.

Under the qualitative assessment, management considers relevant events and circumstances including but not limited to macroeconomic conditions, industry and market considerations, overall unit performance and events directly affecting a unit. If the Company determines that the Step 1 quantitative impairment test is required, management estimates the fair value of the reporting unit primarily using the income approach, which reflects management's cash flow projections, and also evaluates the fair value using the market approach. Inherent in management's development of cash flow projections are assumptions and estimates, including those related to future earnings and growth rates and the weighted average cost of capital. The Company compares the fair value of the reporting unit with the carrying value of the reporting unit. If the fair values were to fall below the carrying values, the Company would recognize a non-cash impairment charge to income from operations for the amount by which the carrying amount of any reporting unit exceeds the reporting unit's fair value, assuming the loss recognized does not exceed the total amount of goodwill for the reporting unit. Based on our assessments, the estimated fair value of the Automation reporting unit, which represents the October 2018 acquisition of Gimatic, exceeded its carrying value while the estimated fair value of each of the remaining reporting units significantly exceeded their carrying values. Other than the goodwill impairment related to the divestiture of the Seeger business, which has been discussed further below, there have been no goodwill impairments at any reporting units during 2019. Many of the factors used in assessing fair value are outside the control of management, and these assumptions and estimates can change in future periods as a result of both Company-specific and overall economic conditions. Management's quantitative assessment includes a review of the potential impacts of current and projected market conditions from a market participant's perspective on reporting units' projected cash flows, growth rates and cost of capital to assess the likelihood of whether the fair value would be less than the carrying value. The Company also completed its annual impairment testing of its trade names, indefinite-lived intangible assets, in the second quarter of 2019 and determined that there were no impairments.

The Company executed an SPA to sell Seeger in December 2019 and subsequently classified the assets and liabilities of Seeger as "held for sale" on the Consolidated Balance Sheet as of December 31, 2019. Pursuant to the required accounting guidance, the Company allocated \$15.0 million of goodwill from the Engineered Components ("EC") reporting unit to Seeger based on the estimated relative fair values of the business to be disposed of and the portion of the reporting unit that will be

retained. The Company subsequently recorded a non-cash impairment charge of \$5.6 million related to the goodwill that was allocated to Seeger. The impairment charge was recorded within Selling and Administrative expenses on the Consolidated Statement of Income in the period ended December 31, 2019. The Company assessed the goodwill within the remaining EC reporting unit and determined that there was no further impairment. See Note 3 of the Consolidated Financial Statements.

The Company assesses the impairment of the identifiable finite-lived intangible assets subject to amortization whenever significant events or significant changes in circumstances indicate their carrying value may not be recoverable. The Company did not identify any impairments related to such intangible assets during 2019.

Aerospace Aftermarket Programs: The Company participates in aftermarket RSPs under which the Company receives an exclusive right to supply designated aftermarket parts over the life of the related aircraft engine program to our customer, General Electric ("GE"). As consideration, the Company has paid participation fees, which are recorded as intangible assets. The carrying value of these intangible assets was \$164.0 million at December 31, 2019. The Company records amortization of the related asset as sales dollars are being earned based on a proportional sales dollar method. Specifically, this method amortizes each asset as a reduction to revenue based on the proportion of sales under a program in a given period to the estimated aggregate sales dollars over the life of that program which reflects the pattern in which economic benefits are realized.

The Company also participates in Component Repair Programs ("CRPs") with GE which provide for, among other items, the right to sell certain aftermarket component repair services for CFM56, CF6, CF34 and LM engines directly to other customers over the life of the engine program as one of a few GE licensed suppliers. In addition, the CRPs extended certain existing contracts under which the Company provides these services directly to GE. Our total investments in CRPs as of December 31, 2019 equaled \$111.8 million, all of which have been paid. At December 31, 2019, the carrying value of the CRPs was \$84.6 million. The Company recorded the CRP payments as an intangible asset which is recognized as a reduction of sales over the remaining life of these engine programs based on the estimated sales over the life of such programs. This method reflects the pattern in which the economic benefits of the CRPs are realized.

The recoverability of each asset is subject to significant estimates about future revenues related to the programs' aftermarket parts and services. The Company evaluates these intangible assets for recoverability and updates amortization rates on an agreement by agreement basis for the RSPs and on an individual asset basis for the CRPs. The assets are reviewed for recoverability periodically including whenever events or changes in circumstances indicate that their carrying amount may not be recoverable. Annually, the Company evaluates the remaining life of these assets to determine whether events and circumstances warrant a revision to the remaining periods of amortization. Management updates revenue projections, which includes comparing actual experience against projected revenue and industry projections. The potential exists that actual revenues will not meet expectations due to a change in market conditions, including, for example, the replacement of older engines with new, more fuel-efficient engines or the Company's ability to capture additional market share within the aftermarket business. A shortfall in future revenues may indicate a triggering event requiring a write down or further evaluation of the recoverability of the assets or require the Company to accelerate amortization expense prospectively dependent on the level of the shortfall. The Company has not identified any impairment of these assets. See Note 7 of the Consolidated Financial Statements.

Pension and Other Postretirement Benefits: Accounting policies and significant assumptions related to pension and other postretirement benefits are disclosed in Note 13 of the Consolidated Financial Statements. As discussed further below, the significant assumptions that impact pension and other postretirement benefits include discount rates, mortality rates and expected long-term rates of return on invested pension assets.

The Company selected the expected long-term rate of return of its U.S. defined benefit plans based on consideration of historical and projected rates of return on the weighted target asset mix of our pension investments. The target mix reflects a 65% equity investment target and a 35% target for fixed income and cash investments (in aggregate). The equity investment of 65% is more heavily weighted on global equity investment targets, rather than U.S. targets. The historical rates of return for the Company's defined benefit plans were calculated based upon compounded average rates of return of published indices. Management selected a long-term expected rate of return on its U.S. pension assets of 7.75%. The long-term rates of return for non-U.S. plans were selected based on actual historical rates of return of published indices that reflect the plans' target asset allocations.

The discount rate used for the Company's U.S. pension plans reflects the rate at which the pension benefits could be effectively settled. At December 31, 2019, the Company selected a discount rate of 3.40% based on a bond matching model for its U.S. pension plans. Market interest rates have decreased in 2019 as compared with 2018 and, as a result, the discount rate

used to measure pension liabilities decreased from 4.40% at December 31, 2018. The discount rates for non-U.S. plans were selected based on highly rated long-term bond indices and yield curves that match the duration of the plan's benefit obligations.

A one-quarter percentage point change in the assumed long-term rate of return on the Company's U.S. pension plans as of December 31, 2019 would impact the Company's 2020 pre-tax income by approximately \$0.9 million. A one-quarter percentage point decrease in the discount rate on the Company's U.S. pension plans as of December 31, 2019 would decrease the Company's 2020 pre-tax income by approximately \$1.0 million. The Company reviews these and other assumptions at least annually.

The Company recorded \$5.4 million of non-cash after-tax decreases in stockholders equity (through other non-owner changes to equity) when recording the current year adjustments for changes in the funded status of its pension and postretirement benefit plans as required under accounting for defined benefit and other postretirement plans. This decrease in stockholders equity resulted primarily from changes in actuarial assumptions, primarily the decrease in the discount rate, partially offset by favorable variances between expected and actual returns on pension plan assets and the amortization of actuarial losses recorded earlier. During 2019, the fair value of the Company's pension plan assets increased by \$66.3 million and the projected benefit obligation increased by \$50.0 million. The increase in the projected benefit obligation included a \$58.5 million (pre-tax) increase due to actuarial losses resulting primarily from a change in the discount rates used to measure pension liabilities, annual service and interest costs of \$5.4 million and \$18.2 million, respectively, and \$2.2 million of transfers in, resulting from employees that were hired during the period. These increases were partially offset by \$29.0 million in benefits paid during 2019 and a \$6.2 million re-classification to "liabilities held for sale", related to the sale of the Seeger business. See Note 3 of the Consolidated Financial Statements. Changes to other actuarial assumptions in 2019 did not have a material impact on our stockholders equity or projected benefit obligation. Actual pre-tax gains on total pension plan assets were \$71.7 million compared with an expected pre-tax return on pension assets of \$29.4 million. Pension expense for 2020 is expected to increase from \$3.9 million in 2019 to \$5.9 million.

Income Taxes: Recognition of the impacts of the U.S. Tax Reform required significant estimates and judgments. As noted within "Results of Operations - U.S. Tax Reform", the SEC issued SAB 118 in December 2017. The Company completed its computation of the Transition Tax as required pursuant to SAB 118 in 2018, resulting in a final net Transition Tax expense of \$86.9 million that was recorded within the Consolidated Financial Statements. See further discussion therein.

As of December 31, 2019, the Company had recognized \$21.2 million of deferred tax assets, net of valuation reserves. The realization of these benefits is dependent, in part, on the amount and timing of future taxable income in jurisdictions where the deferred tax assets reside. For those jurisdictions where the expirations date of tax loss carryforwards or the proposed operating results indicate that realization is unlikely, a valuation allowance is provided. Management currently believes that sufficient taxable income should be earned in the future to realize the deferred tax assets, net of valuation allowances recorded.

The valuation of deferred tax assets requires significant judgment. Management's assessment that the deferred tax assets will be realized represents its estimate of future results; however, there can be no assurance that such expectations will be met. Changes in management's assessment of achieving sufficient future taxable income could materially increase the Company's tax expense and could have a material adverse impact of the Company's financial condition and the results of operations.

Additionally, the Company is exposed to certain tax contingencies in the ordinary course of business and records those tax liabilities in accordance with the guidance for accounting for uncertain tax positions. For tax positions where the Company believes it is more likely than not that a tax benefit will be sustained, the Company has recorded the largest amount of tax benefit with a greater than 50% likelihood of being realized. For those income tax positions where it is more likely than not that a tax benefit will not be sustained, no tax benefit is recognized in the financial statements. See Note 15 of the Consolidated Financial Statements.

A significant portion of revenue is generated by foreign locations. Current guidance requires the recognition of a tax liability under the assumption that foreign earnings will be repatriated in the future, unless the Company can assert that the earnings are indefinitely reinvested. Management's annual assessment in determining whether the earnings are indefinitely reinvested is based on an analysis of U.S. cash requirements and working capital requirements of the foreign operations, including capital expenditures, combined with any limitations, such as dividend restrictions or local law limits, which would limit possible repatriation. The Company has recognized a deferred tax liability for U.S. taxes of \$0.5 million on \$10.2 million of undistributed earnings of its international subsidiaries, earned before 2017 and the application of the Transition Tax implemented by the Act. All remaining earnings are considered indefinitely reinvested as defined per the indefinite reversal criterion within the accounting guidance for income taxes.

Stock-Based Compensation: The Company accounts for its stock-based employee compensation plans at fair value on the grant date and recognizes the related cost in its consolidated statement of income in accordance with accounting standards related to share-based payments. The fair values of stock options are estimated using the Black-Scholes option-pricing model based on certain assumptions. The fair values of service and performance based share awards are estimated based on the fair market value of the Company's stock price on the grant date. The fair values of market based performance share awards are estimated using the Monte Carlo valuation method. See Note 14 of the Consolidated Financial Statements.

EBITDA

Earnings before interest expense, income taxes, and depreciation and amortization ("EBITDA") for 2019 was \$326.5 million compared to \$318.6 million in 2018. EBITDA is a measurement not in accordance with generally accepted accounting principles ("GAAP"). The Company defines EBITDA as net income plus interest expense, income taxes, and depreciation and amortization which the Company incurs in the normal course of business. The Company does not intend EBITDA to represent cash flows from operations as defined by GAAP, and the reader should not consider it as an alternative to net income, net cash provided by operating activities or any other items calculated in accordance with GAAP, or as an indicator of the Company's operating performance. The Company's definition of EBITDA may not be comparable with EBITDA as defined by other companies. The Company believes EBITDA is commonly used by financial analysts and others in the industries in which the Company operates and, thus, provides useful information to investors. Accordingly, the calculation has limitations depending on its use.

Following is a reconciliation of EBITDA to the Company's net income (in millions):

	2019	2018
Net income	\$ 158.4	\$ 166.2
Add back:		
Interest expense	20.6	16.8
Income taxes	48.5	41.3
Depreciation and amortization	99.1	94.2
EBITDA	<u>\$ 326.5</u>	<u>\$ 318.6</u>

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

Market risk is the potential economic loss that may result from adverse changes in the fair value of financial instruments. The Company's financial results could be impacted by changes in interest rates and foreign currency exchange rates, and commodity price changes. The Company uses financial instruments to hedge its exposure to fluctuations in interest rates and foreign currency exchange rates. The Company does not use derivatives for speculative or trading purposes.

The Company's long-term debt portfolio consists of fixed-rate and variable-rate instruments and is managed to reduce the overall cost of borrowing while also minimizing the effect of changes in interest rates on near-term earnings. The Company's primary interest rate risk is derived from its outstanding variable-rate debt obligations. Financial instruments have been used by the Company to hedge its exposures to fluctuations in interest rates.

In April 2012, the Company entered into five-year interest rate swap agreements (the "Swaps") transacted with three banks which together converted the interest on the first \$100.0 million of borrowings under the Company's Amended Credit Agreement from a variable rate plus the borrowing spread to a fixed rate of 1.03% plus the borrowing spread for the purpose of mitigating its exposure to variable interest rates. The Swaps expired on April 28, 2017. The Company entered into a new interest rate swap agreement (the "Swap") that commenced on April 28, 2017, with one bank, and converts the interest on the first \$100.0 million of borrowings from a variable rate plus the borrowing spread to a fixed rate of 1.92% plus the borrowing spread. The Swap expires on January 31, 2022. The result of a hypothetical 100 basis point increase in the interest rate on the average bank borrowings of the Company's variable-rate debt during 2019 would have reduced annual pretax profit by \$7.0 million.

At December 31, 2019, the fair value of the Company's fixed-rate debt was \$111.1 million, compared with its carrying amount of \$106.7 million. The Company estimates that a 100 basis point decrease in market interest rates at December 31, 2019 would have increased the fair value of the Company's fixed rate debt to \$115.9 million.

The Company has manufacturing, sales and distribution facilities around the world and thus makes investments and conducts business transactions denominated in various currencies. The Company is exposed primarily to financial instruments denominated in currencies other than the functional currency at its international locations. A 10% adverse change in foreign currencies relative to the U.S. dollar at December 31, 2019 would have resulted in a \$2.1 million loss in the fair value of those financial instruments. At December 31, 2019, the Company held \$93.8 million of cash and cash equivalents, the majority of which is held by foreign subsidiaries.

Foreign currency commitments and transaction exposures are managed at the operating units as an integral part of their businesses in accordance with a corporate policy that addresses acceptable levels of foreign currency exposures.

Additionally, to reduce foreign currency exposure, management generally maintains the majority of foreign cash and short-term investments in functional currency and uses forward currency contracts for non-functional currency denominated monetary assets and liabilities and anticipated transactions in an effort to reduce the effect of the volatility of changes in foreign exchange rates on the income statement. Management assesses the strength of currencies in certain countries such as Brazil and Mexico, relative to the U.S. dollar, and may elect during periods of local currency weakness to invest excess cash in U.S. dollar-denominated instruments.

The Company's exposure to commodity price changes relates to certain manufacturing operations that utilize high-grade steel spring wire, stainless steel, titanium, Inconel, Hastelloys and other specialty metals. The Company attempts to manage its exposure to price increases through its procurement and sales practices.

The results of the Company could be impacted by changes in tariffs, trade agreements or other trade restrictions imposed or agreed to by the U.S. or foreign governments. See "Part I - Item 1A - Risk Factors" for additional disclosure related to this market risk.

Item 8. Financial Statements and Supplementary Data

BARNES GROUP INC.
CONSOLIDATED STATEMENTS OF INCOME
(Dollars in thousands, except per share data)

	Years Ended December 31,		
	2019	2018	2017
Net sales	\$ 1,491,118	\$ 1,495,889	\$ 1,436,499
Cost of sales	944,154	963,524	943,779
Selling and administrative expenses	310,516	300,601	286,269
	1,254,670	1,264,125	1,230,048
Operating income	236,448	231,764	206,451
Interest expense	20,629	16,841	14,571
Other expense (income), net	8,975	7,428	(3,819)
Income before income taxes	206,844	207,495	195,699
Income taxes	48,494	41,309	136,284
Net income	\$ 158,350	\$ 166,186	\$ 59,415
Per common share:			
Basic	\$ 3.09	\$ 3.18	\$ 1.10
Diluted	\$ 3.07	\$ 3.15	\$ 1.09
Weighted average common shares outstanding:			
Basic	51,213,518	52,304,190	54,073,407
Diluted	51,633,169	52,831,606	54,605,298

See accompanying notes.

BARNES GROUP INC.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(Dollars in thousands)

	Years Ended December 31,		
	2019	2018	2017
Net income	\$ 158,350	\$ 166,186	\$ 59,415
Other comprehensive (loss) income, net of tax			
Unrealized (loss) gain hedging activities, net of tax ⁽¹⁾	(949)	673	299
Foreign currency translation adjustments, net of tax ⁽²⁾	(13,689)	(50,017)	83,404
Defined benefit pension and other postretirement benefits, net of tax ⁽³⁾	(5,357)	(15,426)	10,726
Total other comprehensive (loss) income, net of tax	(19,995)	(64,770)	94,429
Total comprehensive income	\$ 138,355	\$ 101,416	\$ 153,844

(1) Net of tax of \$(326), \$207 and \$232 for the years ended December 31, 2019, 2018 and 2017, respectively.

(2) Net of tax of \$(108), \$(210) and \$610 for the years ended December 31, 2019, 2018 and 2017, respectively.

(3) Net of tax of \$(1,420), \$(4,606) and \$4,469 for the years ended December 31, 2019, 2018 and 2017, respectively.

See accompanying notes.

BARNES GROUP INC.
CONSOLIDATED BALANCE SHEETS
(Dollars in thousands)

	December 31,	
	2019	2018
Assets		
Current assets		
Cash and cash equivalents	\$ 93,805	\$ 100,719
Accounts receivable, less allowances (2019 – \$5,197; 2018 – \$5,010)	348,974	382,253
Inventories	232,706	265,990
Prepaid expenses and other current assets	67,532	57,184
Assets held for sale	21,373	—
Total current assets	764,390	806,146
Deferred income taxes	21,235	20,474
Property, plant and equipment, net	356,603	370,531
Goodwill	933,022	955,524
Other intangible assets, net	581,116	636,538
Other assets	53,924	19,757
Assets held for sale	28,045	—
Total assets	\$ 2,738,335	\$ 2,808,970
Liabilities and Stockholders' Equity		
Current liabilities		
Notes and overdrafts payable	\$ 7,724	\$ 2,137
Accounts payable	118,509	143,419
Accrued liabilities	209,992	206,782
Long-term debt – current	2,034	5,522
Liabilities held for sale	4,616	—
Total current liabilities	342,875	357,860
Long-term debt	825,017	936,357
Accrued retirement benefits	93,358	104,302
Deferred income taxes	88,408	106,559
Long-term tax liability	66,012	72,961
Other liabilities	45,148	27,875
Liabilities held for sale	6,989	—
Commitments and contingencies (Note 23)		
Stockholders' equity		
Common stock – par value \$0.01 per share		
Authorized: 150,000,000 shares		
Issued: at par value (2019 – 63,872,756 shares; 2018 – 63,367,133 shares)	639	634
Additional paid-in capital	489,282	470,818
Treasury stock, at cost (2019 – 13,051,256 shares; 2018 – 12,033,580 shares)	(498,074)	(441,668)
Retained earnings	1,489,176	1,363,772
Accumulated other non-owner changes to equity	(210,495)	(190,500)
Total stockholders' equity	1,270,528	1,203,056
Total liabilities and stockholders' equity	\$ 2,738,335	\$ 2,808,970

See accompanying notes.

BARNES GROUP INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(Dollars in thousands)

	Years Ended December 31,		
	2019	2018	2017
Operating activities:			
Net income	\$ 158,350	\$ 166,186	\$ 59,415
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	99,059	94,238	90,150
Loss (gain) on disposition of property, plant and equipment	236	71	(246)
Stock compensation expense	13,306	12,158	12,279
Effect of U.S. Tax Reform on deferred tax assets	—	—	4,152
Non-cash impairment charge related to divestiture	5,600	—	—
Changes in assets and liabilities, net of the effects of acquisitions:			
Accounts receivable	29,212	(10,960)	(50,082)
Inventories	11,482	(12,369)	(173)
Prepaid expenses and other current assets	(10,640)	(2,890)	(4,241)
Accounts payable	(22,546)	12,489	12,018
Accrued liabilities	2,336	(580)	14,439
Deferred income taxes	(12,025)	(18,876)	3,589
Long-term retirement benefits	(16,233)	1,632	(16,349)
Long-term tax liability	(6,949)	(6,809)	79,770
Other	(2,887)	2,909	(801)
Net cash provided by operating activities	248,301	237,199	203,920
Investing activities:			
Proceeds from disposition of property, plant and equipment	577	1,374	2,594
Capital expenditures	(53,286)	(57,273)	(58,712)
Business acquisitions, net of cash acquired	(6,061)	(430,487)	(8,922)
Revenue Sharing Program payments	—	(5,800)	—
Other	(3,450)	(1,000)	(3,000)
Net cash used in investing activities	(62,220)	(493,186)	(68,040)
Financing activities:			
Net change in other borrowings	5,490	(5,145)	(25,304)
Payments on long-term debt	(341,419)	(433,904)	(73,161)
Proceeds from the issuance of long-term debt	236,552	841,036	129,118
Proceeds from the issuance of common stock	5,492	1,131	2,408
Common stock repurchases	(50,347)	(138,275)	(40,791)
Dividends paid	(32,544)	(32,206)	(29,551)
Withholding taxes paid on stock issuances	(6,059)	(5,395)	(5,380)
Other	(9,158)	(11,678)	(21,090)
Net cash (used) provided by financing activities	(191,993)	215,564	(63,751)
Effect of exchange rate changes on cash flows	(1,002)	(4,148)	6,714
(Decrease) increase in cash and cash equivalents	(6,914)	(44,571)	78,843
Cash and cash equivalents at beginning of year	100,719	145,290	66,447
Cash and cash equivalents at end of year	\$ 93,805	\$ 100,719	\$ 145,290

See accompanying notes.

BARNES GROUP INC.
CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY
(Dollars and shares in thousands)

	Common Stock (Number of Shares)	Common Stock (Amount)	Additional Paid-In Capital	Treasury Stock (Number of Shares)	Treasury Stock	Retained Earnings	Accumulated Other Non-Owner Changes to Equity	Total Stockholders' Equity
January 1, 2017	62,692	\$ 627	\$ 443,235	8,890	\$ (251,827)	\$ 1,177,151	\$ (200,828)	\$ 1,168,358
Comprehensive income						59,415	94,429	153,844
Dividends declared (\$0.55 per share)						(29,551)		(29,551)
Common stock repurchases				677	(40,791)			(40,791)
Employee stock plans	342	3	14,130	89	(5,380)	(292)		8,461
December 31, 2017	63,034	630	457,365	9,656	(297,998)	1,206,723	(106,399)	1,260,321
Comprehensive income						166,186	(64,770)	101,416
Dividends declared (\$0.62 per share)						(32,206)		(32,206)
Common stock repurchases				2,292	(138,275)			(138,275)
Reclassification pursuant to accounting guidance related to U.S. Tax Reform (Note 1)						19,331	(19,331)	—
Cumulative effect of change in Revenue Recognition accounting guidance (Note 1)						4,295		4,295
Employee stock plans	333	4	13,453	86	(5,395)	(557)		7,505
December 31, 2018	63,367	634	470,818	12,034	(441,668)	1,363,772	(190,500)	1,203,056
Comprehensive income						158,350	(19,995)	138,355
Dividends declared (\$0.64 per share)						(32,544)		(32,544)
Common stock repurchases				900	(50,347)			(50,347)
Employee stock plans	506	5	18,464	117	(6,059)	(402)		12,008
December 31, 2019	<u>63,873</u>	<u>\$ 639</u>	<u>\$ 489,282</u>	<u>13,051</u>	<u>\$ (498,074)</u>	<u>\$ 1,489,176</u>	<u>\$ (210,495)</u>	<u>\$ 1,270,528</u>

See accompanying notes.

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
(All dollar amounts included in the notes are stated in thousands except per share data
and the tables in Note 22)

1. Summary of Significant Accounting Policies

General: The preparation of consolidated financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates. Certain reclassifications have been made to prior year amounts to conform to current year presentation. See "Recently Adopted Accounting Standards" below, which discusses the Company's application of the amended guidance related to the classification of pension and other postretirement benefit costs.

Consolidation: The accompanying consolidated financial statements include the accounts of the Company and all of its subsidiaries. Intercompany transactions and account balances have been eliminated.

Revenue recognition: The Company accounts for revenue in accordance with Accounting Standard Codification 606, Revenue from Contracts with Customers, which it adopted on January 1, 2018. Revenue is recognized by the Company when control of the product or solution is transferred to the customer. Control is generally transferred when products are shipped or delivered to customers, title is transferred, the significant risks and rewards of ownership have transferred, the Company has rights to payment and rewards of ownership pass to the customer. Customer acceptance may also be a factor in determining whether control of the product has transferred. Although revenue is generally transferred at a point in time, a certain portion of businesses with customized products or contracts in which the Company performs work on customer-owned assets requires the use of an over time recognition model as certain contracts meet one or more of the established criteria pursuant to the accounting standards governing revenue recognition. Also, service revenue is recognized as control transfers, which is concurrent with the services being performed. See Note 4. Management fees related to the Aerospace Aftermarket Revenue Sharing Programs ("RSPs") are satisfied through an agreed upon reduction from the sales price of each of the related spare parts. These fees recognize our customer's necessary performance of engine program support activities, such as spare parts administration, warehousing and inventory management, and customer support, and are not separable from our sale of products, and accordingly, they are reflected as a reduction to sales, rather than as costs incurred, when revenues are recognized.

Cash and cash equivalents: Cash in excess of operating requirements is invested in short-term, highly liquid, income-producing investments. All highly liquid investments purchased with an original maturity of three months or less are considered cash equivalents. Cash equivalents are carried at cost which approximates fair value.

Inventories: Inventories are valued at the lower of cost, determined on a first-in, first-out basis, or net realizable value. The primary components of cost included in inventories are raw material, labor and overhead. Provisions are made to reduce excess or obsolete inventories to their estimated net realizable value. The process for evaluating the value of excess and obsolete inventory often requires the Company to make subjective judgments and estimates concerning future sales levels, quantities and prices at which such inventory will be sold in the normal course of business and estimated costs. Accelerating the disposal process or changes in estimates based on future sales potential or estimated costs may necessitate future adjustments to these provisions.

Property, plant and equipment: Property, plant and equipment is stated at cost. Depreciation is recorded using a straight-line method of depreciation over estimated useful lives, generally ranging from 20 to 50 years for buildings and four to 12 years for machinery and equipment. The Company assesses the impairment of property, plant and equipment subject to depreciation whenever events or changes in circumstances indicate the carrying value may not be recoverable.

Goodwill: Goodwill represents the excess purchase cost over the fair value of net assets of companies acquired in business combinations. Goodwill is considered an indefinite-lived asset. Goodwill is subject to impairment testing in accordance with accounting standards governing such on an annual basis, in the second quarter, or more frequently if an event or change in circumstances indicates that the fair value of a reporting unit has been reduced below its carrying value. Other than the goodwill impairment related to the divestiture of the Seeger business, which has been discussed further below, there have been no goodwill impairments at any reporting units during 2019. Based on the assessments performed during 2019, there was no goodwill impairment.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

The Company executed a Share Purchase and Transfer Agreement to sell its Seeger business in December 2019 and classified the assets and liabilities of Seeger as "held for sale" on the Consolidated Balance Sheet as of December 31, 2019. Pursuant to the required accounting guidance, the Company allocated \$15,000 of goodwill within the Engineered Components ("EC") reporting unit to Seeger based on the estimated relative fair values of the business to be disposed of and the portion of the reporting unit that will be retained. The Company subsequently recorded a non-cash impairment charge of \$5,600 related to the goodwill that was allocated to Seeger. The impairment charge was recorded within Selling and Administrative expenses on the Consolidated Statement of Income in the period ended December 31, 2019. The Company assessed the goodwill within the remaining EC reporting unit and determined that there was no further impairment. See Note 3.

Leases: As a result of the adoption of the amended guidance related to lease accounting, the Company established accounting policies and procedures to address the reporting of the Company's right-of-use assets and related lease liabilities. Refer to "Recently Adopted Accounting Standards" within Note 1 herein, as well as Note 20 for additional details relating to the adoption of the amended lease guidance.

Aerospace Aftermarket Programs: The Company participates in aftermarket RSPs under which the Company receives an exclusive right to supply designated aftermarket parts over the life of the related aircraft engine program. As consideration, the Company has paid participation fees, which are recorded as long-lived intangible assets. The Company records amortization of the related intangible asset as sales dollars are being earned based on a proportional sales dollar method. Specifically, this method amortizes each asset as a reduction to revenue based on the proportion of sales under a program in a given period to the estimated aggregate sales dollars over the life of that program. This method reflects the pattern in which the economic benefits of the RSPs are realized.

The Company also entered into Component Repair Programs ("CRPs") that provide for, among other items, the right to sell certain aftermarket component repair services for CFM56, CF6, CF34 and LM engines directly to other customers as one of a few GE licensed suppliers. In addition, the CRPs extended certain existing contracts under which the Company currently provides these services directly to GE. The Company recorded the consideration for these rights as an intangible asset that is amortized as a reduction to sales over the remaining life of these engine programs based on the estimated sales over the life of such programs. This method reflects the pattern in which the economic benefits of the CRPs are realized.

The recoverability of each asset is subject to significant estimates about future revenues related to the program's aftermarket parts and services. The Company evaluates these intangible assets for recoverability and updates amortization rates on an agreement by agreement basis for the RSPs and on an individual asset program basis for the CRPs. The assets are reviewed for recoverability periodically including whenever events or changes in circumstances indicate that their carrying amount may not be recoverable. Annually, the Company evaluates the remaining useful life of these assets to determine whether events and circumstances warrant a revision to the remaining periods of amortization. Management updates revenue projections, which includes comparing actual experience against projected revenue and industry projections. The potential exists that actual revenues will not meet expectations due to a change in market conditions including, for example, the replacement of older engines with new, more fuel-efficient engines or the Company's ability to maintain market share within the Aftermarket business. A shortfall in future revenues may indicate a triggering event requiring a write down or further evaluation of the recoverability of the assets or require the Company to accelerate amortization expense prospectively dependent on the level of the shortfall. The Company has not identified any impairment of these assets.

Other Intangible Assets: Other intangible assets consist primarily of the Aerospace Aftermarket Programs, as discussed above, customer relationships, tradenames, patents and proprietary technology. These intangible assets, with the exception of certain tradenames, have finite lives and are amortized over the periods in which they provide benefit. The Company assesses the impairment of long-lived assets, including identifiable intangible assets subject to amortization, whenever significant events or significant changes in circumstances indicate the carrying value may not be recoverable. Tradenames with indefinite lives are subject to impairment testing in accordance with accounting standards governing such on an annual basis, in the second quarter, or more frequently if an event or change in circumstances indicates that the fair value of the asset has been reduced below its carrying value. Based on the assessments performed during 2019, there were no impairments of other intangible assets. See Note 7.

Derivatives: Accounting standards related to the accounting for derivative instruments and hedging activities require that all derivative instruments be recorded on the balance sheet at fair value. Foreign currency contracts may qualify as fair value hedges of unrecognized firm commitments, cash flow hedges of recognized assets and liabilities or anticipated transactions, or a hedge of a net investment. Changes in the fair market value of derivatives that qualify as fair value hedges or cash flow hedges are recorded directly to earnings or accumulated other non-owner changes to equity, depending on the designation. Amounts

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recorded to accumulated other non-owner changes to equity are reclassified to earnings in a manner that matches the earnings impact of the hedged transaction. Any ineffective portion, or amounts related to contracts that are not designated as hedges, are recorded directly to earnings. The Company's policy for classifying cash flows from derivatives is to report the cash flows consistent with the underlying hedged item.

Foreign currency: Assets and liabilities are translated at year-end rates of exchange; revenues and expenses are translated at average rates of exchange. The resulting translation gains or losses are reflected in accumulated other non-owner changes to equity within stockholders' equity. Net foreign currency transaction losses of \$6,485 and \$3,879 in 2019 and 2018, respectively, and a net foreign currency transaction gain of \$756 in 2017, were included in other expense (income), net in the Consolidated Statements of Income.

Research and Development: Costs are incurred in connection with efforts aimed at discovering and implementing new knowledge that is critical to developing new products, processes or services, significantly improving existing products or services, and developing new applications for existing products and services. Research and development expenses for the creation of new and improved products, processes and services were \$15,666, \$16,193 and \$14,765, for the years 2019, 2018 and 2017, respectively, and are included in selling and administrative expense.

Pension and Other Postretirement Benefits: The Company accounts for its defined benefit pension plans and other postretirement plans by recognizing the overfunded or underfunded status of the plans, calculated as the difference between plan assets and the projected benefit obligation related to each plan, as an asset or liability on the Consolidated Balance Sheets. Benefit costs associated with the plans primarily include current service costs, interest costs and the amortization of actuarial losses, partially offset by expected returns on plan assets, which are determined based upon actuarial valuations. Settlement and curtailment losses (gains) may also impact benefit costs. The Company regularly reviews actuarial assumptions, including discount rates and the expected return on plan assets, which are updated at the measurement date, December 31st. The impact of differences between actual results and the assumptions are generally accumulated within Other Comprehensive Income and amortized over future periods, which will affect benefit costs recognized in such periods. See Note 13.

Stock-Based Compensation: Stock-based employee compensation plans are accounted for based on their fair value on the grant date and the related cost is recognized in the Consolidated Statements of Income in accordance with accounting standards related to share-based payments. The fair values of stock options are estimated using the Black-Scholes option-pricing model based on certain assumptions. The fair values of service and performance based share awards are estimated based on the fair market value of the Company's stock price on the grant date. The fair values of market based performance share awards are estimated using the Monte Carlo valuation method. See Note 14.

Income Taxes: Deferred tax assets and liabilities are recognized for future tax effects attributable to temporary differences, operating loss carryforwards and tax credits. The measurement of deferred tax assets and liabilities is determined using tax rates from enacted tax law of the period in which the temporary differences, operating loss carryforwards and tax credits are expected to be realized. The effect of the change in income tax rates is recognized in the period of the enactment date. The guidance related to accounting for income taxes requires that deferred tax assets be reduced by a valuation allowance if, based on all available evidence, it is more likely than not that the deferred tax asset will not be realized. The Company is exposed to certain tax contingencies in the ordinary course of business and records those tax liabilities in accordance with the guidance for accounting for uncertain tax positions. See Note 15.

Recent Accounting Standards

The Financial Accounting Standards Board ("FASB") establishes changes to accounting principles under U.S. GAAP through the use of Accounting Standards Updates ("ASUs") to the FASB's Accounting Standards Codification. The Company evaluates the applicability and potential impacts of recent ASUs on its Consolidated Financial Statements and related disclosures.

Recently Adopted Accounting Standards

In February 2016, the FASB amended its guidance related to lease accounting. The amended guidance required lessees to recognize a majority of their leases on the balance sheet as a right-of-use ("ROU") asset and a lease liability. Lessees are permitted to make an accounting policy election to not recognize an asset and liability for leases with a term of twelve months or less. Lease expense will be recorded in a manner similar to current accounting, with leases being classified as either finance

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or operating in nature. The guidance is effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2018. Early adoption was permitted.

The Company adopted the new standard using the modified retrospective approach on January 1, 2019. The Company elected an available transition method that uses the effective date of the amended guidance as the date of initial application. The FASB made available several practical expedients in adopting the amended lease accounting guidance. The Company elected the package of practical expedients permitted under the transition guidance within the amended guidance, which among other things, allowed registrants to carry forward historical lease classification. The Company elected the practical expedient that allows the combination of both lease and non-lease components as a single component and account for it as a lease for all classes of underlying assets. The Company elected not to apply the amended guidance to short term leases with an initial term of 12 months or less. The Company recognizes those lease payments in the Consolidated Statements of Income on a straight-line basis over the lease term. The Company elected to use a single discount rate for a portfolio of leases with reasonably similar characteristics.

The most significant impact of the guidance was the recognition of ROU assets and related lease liabilities for operating leases on the Consolidated Balance Sheet. The Company recognized ROU assets and related lease liabilities of \$31,724 and \$32,579 respectively, related to operating lease commitments, as of January 1, 2019. The operating lease ROU asset represents the lease liability, plus any lease payments made at or before the commencement date, less any lease incentives received. The amended guidance did not have a material impact on the Company's cash flows or results of operations. See Note 20.

In May 2014, the FASB amended its guidance related to revenue recognition. The amended guidance established a single comprehensive model for entities to use in accounting for revenue arising from contracts with customers and supersedes most of the existing revenue recognition guidance, including industry-specific guidance. The amended guidance clarified that an entity recognizes revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. In applying the amended guidance, an entity (1) identifies the contract(s) with a customer; (2) identifies the performance obligations in the contract; (3) determines the transaction price; (4) allocates the transaction price to the contract's performance obligations; and (5) recognizes revenue when (or as) the entity satisfies a performance obligation. The amended guidance applied to all contracts with customers except those that are within the scope of other topics in the FASB Accounting Standards Codification. Companies had the option of using either a full retrospective or modified retrospective approach to the amended guidance.

The Company adopted the amended guidance, Accounting Standard Codification 606, Revenue from Contracts with Customers ("ASC 606"), and related amendments, using the modified retrospective approach on January 1, 2018, at which time it became effective for the Company. The Company recognized the cumulative effect of initially applying the new revenue standard to all contracts that were not completed on the date of adoption as an adjustment to the opening balance of retained earnings.

A majority of revenue continues to be recognized when products are shipped. Under the amended guidance, however, a certain portion of our businesses with customized products or contracts in which we perform work on customer-owned assets require the use of an "over time" recognition model as certain of these contracts meet one or more of the criteria established in the amended guidance. Revenue recognition on contracts requiring over time accounting recognition created unbilled receivables (contract assets) and reduced inventory on the Company's Consolidated Balance Sheet. Adoption of the amended guidance also resulted in the recognition of customer advances for which the Company has received an unconditional right to payment. Since the related performance obligations have not been satisfied, however, the Company recognized these customer advances as trade receivables, with a corresponding contract liability of equal amount. Under the previous guidance, the Company recognized customer advances when payment was received. See Note 4.

In August 2016, the FASB amended its guidance related to the Statement of Cash Flows. The amended guidance clarifies how certain cash receipts and cash payments should be presented on the statement of cash flows. The guidance was effective for annual periods beginning after December 15, 2017 and interim periods within those fiscal years. The Company adopted the guidance during the first quarter of 2018 and the adoption did not have an impact on its Statement of Cash Flows.

In January 2017, the FASB amended its guidance related to goodwill impairment testing. The amended guidance simplifies the subsequent measurement of goodwill, eliminating Step 2 from the goodwill impairment test. Under the amended guidance, companies should perform their annual goodwill impairment test by comparing the fair value of a reporting unit with its carrying amount. Companies would recognize an impairment charge for the amount by which the carrying amount exceeds the reporting unit's fair value, assuming the loss recognized does not exceed the total amount of goodwill for the reporting unit. The

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amended guidance was effective for fiscal years beginning after December 15, 2019. Early adoption was permitted. The Company elected to early adopt this amended guidance during the second quarter of 2018 in connection with its annual goodwill impairment testing and it did not have an impact on the Company's Consolidated Financial Statements.

In March 2017, the FASB amended its guidance related to the presentation of pension and other postretirement benefit costs. The amended guidance requires the bifurcation of net periodic benefit cost for pension and other postretirement plans. The service cost component of expense requires presentation with other employee compensation costs in operating income, consistent with the earlier guidance. The other components of expense, however, are reported separately outside of operating income. The amended guidance also allows only the service cost component of net benefit cost to be eligible for capitalization. The guidance was effective for annual periods beginning after December 15, 2017 and interim periods within that reporting period. The Company adopted the amended guidance during the first quarter of 2018. The amended guidance was applied retrospectively for the presentation of the service cost component and the other components of net periodic benefit cost in the Statements of Income. Additionally, the amended guidance was applied prospectively for the capitalization of the service cost component of net periodic benefit cost. The amended guidance allows for a practical expedient that permits the use of amounts previously disclosed in the pension and other postretirement benefit plan note within the prior comparative periods as the estimation basis for applying the retrospective presentation requirements. The Company elected this practical expedient for prior period presentation. During the twelve month period ended December 31, 2017, the adoption of this amended guidance resulted in the reclassification of \$(3,827) of net periodic benefit cost from compensation costs (included in Cost of Sales and Selling and Administrative expenses) to other expense (income), net on the Statements of Income. This reclassification included all components of net periodic benefit cost other than the service cost component, with the primary drivers relating to the pension curtailment and settlement gains of (\$7,217) and (\$230), respectively, resulting from the June 2017 closure of the FOBOHA facility located in Muri, Switzerland. See Note 13 for additional detail related to the curtailment and settlements gains and Note 10 for additional details related to the restructure of the Muri, Switzerland facility.

In February 2018, the FASB issued guidance related to the impacts of the tax legislation commonly referred to as the Tax Cuts and Jobs Act (the "Act"). The guidance permits the reclassification of certain income tax effects of the Act from Accumulated Other Comprehensive Income to Retained Earnings (stranded tax effects). The stranded tax effects resulted from the December 31, 2017 remeasurement of deferred income taxes that was recorded through the Consolidated Statements of Income, with no corresponding adjustment to Accumulated Other Comprehensive Income having been initially recognized. The guidance is effective for annual periods beginning after December 15, 2018, and interim periods within that reporting period. Early adoption is permitted. The Company elected to early adopt this amended guidance during the first quarter of 2018 using specific identification and as a result reclassified \$19,331 from Accumulated Other Comprehensive Income to Retained Earnings on the Consolidated Balance Sheets. This reclassification relates only to the change in the U.S. Corporate income tax rate.

In August 2018, the FASB issued new guidance related to a customer's accounting for implementation, set-up, and other upfront costs incurred in a cloud computing arrangement that is hosted by a vendor (for example, a service contract). Pursuant to the new guidance, customers apply the same criteria for capitalizing implementation costs in a hosting arrangement as they would for an arrangement that has a software license. The new guidance is effective for fiscal years beginning after December 15, 2019, and interim periods within those fiscal years. Early adoption was permitted, including adoption in any interim period for which financial statements have not been issued. The FASB provided the option of applying the guidance retrospectively or prospectively to all implementation costs incurred after the date of adoption. The Company elected to early adopt this guidance, prospectively, during the third quarter of 2018, and it did not have a material impact on the Consolidated Financial Statements.

In August 2017, the FASB amended its guidance related to hedge accounting. The amended guidance makes more financial and nonfinancial hedging strategies eligible for hedge accounting, amends presentation and disclosure requirements and changes the assessment of effectiveness. The guidance also more closely aligns hedge accounting with management strategies, simplifies application and increases the transparency of hedging. The amended guidance is effective January 1, 2019, with early adoption permitted in any interim period. The Company adopted the amended guidance on January 1, 2019 and it did not have a material impact on the Consolidated Financial Statements, however it did result in amendments to certain disclosures required pursuant to the earlier guidance. See Note 11.

Recently Issued Accounting Standards

In August 2018, the FASB amended its guidance related to disclosure requirements for employers that sponsor defined benefit pension or other postretirement plans. The amended requirements serve to remove, add and otherwise clarify certain existing disclosures. The amended guidance is effective for fiscal years ending after December 15, 2020. The guidance requires

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application on a retrospective basis to all periods presented. The Company is currently evaluating the impact that the guidance may have on the disclosures within its Consolidated Financial Statements.

In December 2019, the FASB amended its guidance related to income taxes. The amended guidance simplifies the accounting for income taxes, eliminating certain exceptions to the general income tax principles, in an effort to reduce the cost and complexity of application. The amended guidance is effective for annual periods beginning after December 15, 2020, and interim periods within those reporting periods. Early adoption is permitted in any interim or annual period. The guidance requires application on either a prospective, retrospective or modified retrospective basis, contingent on the income tax exception being applied. The Company is currently evaluating the impact that the guidance may have on the Consolidated Financial Statements.

2. Acquisitions

The Company has acquired a number of businesses during the past three years. The results of operations of these acquired businesses have been included in the consolidated results from the respective acquisition dates. The purchase prices for these acquisitions have been allocated to tangible and intangible assets and liabilities of the businesses based upon estimates of their respective fair values.

In the third quarter of 2018, the Company acquired Industrial Gas Springs Group Holdings Limited (“IGS”), a recognized designer, manufacturer and supplier of customized gas springs. IGS is headquartered in the United Kingdom, with distribution and assembly capabilities in the United States. Its diversified end markets include general industrial, transportation, aerospace, and medical, among others. The Company acquired IGS for an aggregate purchase price of 29,138 British pound sterling (\$38,016) which includes adjustments under the terms of the Share Purchase Agreement, including 2,820 British pound sterling (\$3,679) related to cash acquired. The acquisition was financed using cash on hand and borrowings under the Company's revolving credit facility. In connection with the acquisition, the Company recorded \$14,098 of goodwill and \$15,300 of intangible assets. See Note 7.

In the fourth quarter of 2018, the Company completed its acquisition of Gimatic S.r.l. (“Gimatic”). Gimatic designs and develops robotic grippers, advanced end-of-arm tooling systems, sensors and other automation components. Headquartered in Italy, Gimatic has a sales network extending across Europe, North America and Asia. Its diversified end markets include automotive, packaging, health care, and food and beverage, among others. The Company acquired Gimatic for an aggregate purchase price of 363,352 Euro (\$411,024) which includes adjustments under the terms of the Sale and Purchase Agreement, including approximately 7,790 Euro (\$8,812) related to cash acquired. The Company paid the aggregate purchase price in cash, using cash on hand and additional borrowings under the Company's existing revolving credit facility, including the utilization of funds made available through the accordion feature provided by the facility. In connection with the acquisition, the Company recorded \$277,098 of goodwill and \$158,800 of intangible assets. See Note 7.

The Company incurred \$5,420 of acquisition-related costs during the year ended December 31, 2018 related to the IGS and Gimatic acquisitions. These costs include due diligence costs and transaction costs to complete the acquisition and have been recognized in the Consolidated Statements of Income as selling and administrative expenses.

The operating results of IGS and Gimatic have been included in the Consolidated Statements of Income since the dates of acquisition. For the year ended December 31, 2018, the Company reported \$6,360 in net sales and an operating loss of \$1,726 at IGS, inclusive of \$2,887 of short-term purchase accounting adjustments, and \$8,793 in net sales and an operating loss of \$2,109 at Gimatic, inclusive of \$2,707 of short-term purchase accounting adjustments. IGS and Gimatic results have been included within the Industrial segment's operating profit. The operating results of IGS and Gimatic during 2019 have been included in the Consolidated Statements of Income for the year ended December 31, 2019.

The following table summarizes the fair values of the assets acquired, net of cash acquired, and liabilities assumed at the October 31, 2018 date of acquisition for Gimatic and the July 23, 2018 acquisition date for IGS.

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	IGS	Gimatic
Accounts receivable	\$ 3,300	\$ 11,264
Inventories	5,706	15,386
Prepaid expenses and other current assets	198	7,743
Deferred income taxes	—	554
Property, plant and equipment, net	1,557	6,717
Goodwill (Note 7)	14,098	277,098
Other intangible assets, net (Note 7)	15,300	158,800
Other assets	—	144
Total assets acquired	40,159	477,706
Accounts payable	(927)	(3,825)
Accrued liabilities	(603)	(13,640)
Debt assumed	—	(5,540)
Other liabilities	(678)	(7,092)
Deferred income taxes	(3,614)	(45,397)
Total liabilities assumed	(5,822)	(75,494)
Net assets acquired	\$ 34,337	\$ 402,212

The final purchase price allocations related to IGS and Gimatic reflect post-closing adjustments pursuant to the terms of the Share Purchase Agreement and the Sale and Purchase Agreement, respectively, and final valuation adjustments.

The following table reflects the unaudited pro forma operating results (the "Pro Forma Results") of the Company for the years ended December 31, 2018 and 2017, which give effect to the acquisitions of Gimatic and IGS as if they had occurred on January 1, 2017. The Pro Forma Results are based on assumptions that the Company believes are reasonable under the circumstances. The Pro Forma results are not necessarily indicative of the operating results that would have occurred had the acquisitions been effective January 1, 2017, nor are they intended to be indicative of results that may occur in the future. The underlying Pro Forma Results include the historical financial results of the Company, Gimatic and IGS adjusted for certain items including amortization expense associated with the assets acquired and the Company's expense related to financing arrangements, with the related tax effects. The Pro Forma Results do not include the effects of any synergies or cost reduction initiatives related to the acquisitions.

	(Unaudited Pro Forma)	
	2018	2017
Net Sales	\$ 1,555,481	\$ 1,501,515
Net Income	171,422	44,029

Pro forma earnings during the year ended December 31, 2018 were adjusted to exclude non-recurring items including acquisition-related costs and amortization related to the fair value adjustment to inventory. Pro forma earnings in 2017 were adjusted to include acquisition-related costs of \$5,420 and amortization of \$10,905 related to the fair value adjustments to inventory.

In the second quarter of 2017, the Company completed its acquisition of the assets of the privately held Gammaflux L.P. business ("Gammaflux"), a leading supplier of hot runner temperature and sequential valve gate control systems to the plastics industry. Gammaflux, which is headquartered in Virginia and has offices in Illinois and Germany, provides temperature control solutions for injection molding, extrusion, blow molding, thermoforming, and other applications. Its end markets include packaging, electronics, automotive, household products, medical, and tool building. The Company acquired the assets of Gammaflux for an aggregate purchase price of \$8,866, which was financed using cash on hand and borrowings under the Company's revolving credit facility. The purchase price includes adjustments under the terms of the Asset Purchase Agreement,

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including \$2 related to cash acquired. In connection with the acquisition, the Company recorded \$1,535 of goodwill and \$3,700 of intangible assets. See Note 7.

The Company incurred \$210 of acquisition-related costs during the year ended December 31, 2017 related to the Gammaflux acquisition. These costs include due diligence costs and transaction costs to complete the acquisition and have been recognized in the Consolidated Statements of Income as selling and administrative expenses.

The operating results of Gammaflux since the date of acquisition have been included in the Consolidated Statements of Income for the period ended December 31, 2017. The Company reported \$9,081 in net sales for Gammaflux for the year ended December 31, 2017. Gammaflux results have been included within the Industrial segment's operating profit. The operating results of Gammaflux during 2018 and 2019 have been included in the Consolidated Statements of Income for the years ended December 31, 2018 and 2019.

3. Divestiture

On December 20, 2019, the Company entered into a Share Purchase and Transfer Agreement ("SPA") with the Kajo Neukirchen Group ("KNG") to sell the Seeger business, consisting of partnership interests and shares, respectively, of Seeger-Orbis GmbH & Co. OHG and Seeger-Orbis Mechanical Components (Tianjin) Co., Ltd. ("Seeger") for 42,500 Euros, subject to certain adjustments. The Company classified the assets and liabilities of Seeger, which operates within the Industrial segment, as "held for sale" on the Consolidated Balance Sheet as of December 31, 2019. Pursuant to the required accounting guidance, the Company allocated \$15,000 of goodwill from the Engineered Components reporting unit to Seeger based on the estimated relative fair values of the business to be disposed of and the portion of the reporting unit that will be retained. The Company subsequently recorded an impairment charge of \$5,600 related to the goodwill that was allocated to Seeger. The impairment charge was recorded within Selling and Administrative expenses on the Consolidated Statements of Income in the period ended December 31, 2019.

The Seeger assets and liabilities held for sale are comprised of the following as of December 31, 2019:

Assets

Accounts receivable, less allowance of \$152	\$ 6,844
Inventories	13,727
Prepaid expenses and other current assets	802
Current assets held for sale	<u>21,373</u>
Property, plant and equipment, net	17,701
Other intangible assets, net	590
Goodwill	9,400
Other assets	354
Non-current assets held for sale	<u>28,045</u>

Liabilities

Accounts payable	\$ 2,961
Accrued liabilities	1,655
Current liabilities held for sale	<u>4,616</u>
Accrued retirement benefits	5,788
Other liabilities	1,201
Non-current liabilities held for sale	<u>6,989</u>

The Company completed the sale of the Seeger business to KNG effective February 1, 2020. Pursuant to the terms of the SPA, total cash consideration was 39,634 Euros (\$43,970), inclusive of 3,794 Euros (\$4,209) of cash sold, subject to post-closing adjustments. The resulting tax charges are estimated to approximate 4,100 Euros (\$4,600) and will be recognized in the first quarter of 2020, following the completion of the sale. Taxes will be payable during 2020. The Company plans to utilize the proceeds from the sale to reduce debt under the Amended Credit Facility.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

Pursuant to the SPA, 6,000 Euros of the proceeds were placed in escrow and will be released pro-ratably through 2024, pending any potential settlement of claims.

4. Revenue

The Company is a global provider of highly engineered products, differentiated industrial technologies, and innovative solutions, serving a wide range of end markets and customers. Its specialized products and services are used in far-reaching applications including aerospace, transportation, manufacturing, automation, healthcare, and packaging. The Company accounts for revenue in accordance with ASC 606, which it adopted on January 1, 2018, using the modified retrospective approach. Note 1 further discusses this adoption.

Revenue is recognized by the Company when control of the product or solution is transferred to the customer. Control is generally transferred when products are shipped or delivered to customers, title is transferred, the significant risks and rewards of ownership have transferred, the Company has rights to payment and rewards of ownership pass to the customer. Customer acceptance may also be a factor in determining whether control of the product has transferred. Although revenue is generally transferred at a point in time, a certain portion of businesses with customized products or contracts in which the Company performs work on customer-owned assets requires the use of an over time recognition model as certain contracts meet one or more of the established criteria pursuant to ASC 606. Also, service revenue is recognized as control transfers, which is concurrent with the services being performed.

The following tables present the Company's revenue disaggregated by products and services, and geographic regions, by segment:

	2019		
	Industrial	Aerospace	Total Company
Product and Services			
Engineered Components Products	\$ 254,569	\$ —	\$ 254,569
Molding Solutions Products	442,564	—	442,564
Force & Motion Control Products	186,737	—	186,737
Automation Products	54,637	—	54,637
Aerospace Original Equipment Manufacturer Products	—	367,538	367,538
Aerospace Aftermarket Product and Services	—	185,073	185,073
	<u>\$ 938,507</u>	<u>\$ 552,611</u>	<u>\$ 1,491,118</u>
Geographic Regions ^(A)			
Americas	\$ 365,903	\$ 397,580	\$ 763,483
Europe	349,001	99,204	448,205
Asia	219,872	51,754	271,626
Rest of World	3,731	4,073	7,804
	<u>\$ 938,507</u>	<u>\$ 552,611</u>	<u>\$ 1,491,118</u>

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

	2019		
	Industrial	Aerospace	Total Company
End Markets			
Aerospace OEM	\$ 14,128	\$ 367,538	\$ 381,666
Aerospace Aftermarket	—	185,073	185,073
Medical, Personal Care & Packaging	222,963	—	222,963
Tool and Die	102,476	—	102,476
General Industrial	240,983	—	240,983
Auto Molding Solutions	144,122	—	144,122
Auto Production	159,197	—	159,197
Automation	54,638	—	54,638
	<u>\$ 938,507</u>	<u>\$ 552,611</u>	<u>\$ 1,491,118</u>

	2018		
	Industrial	Aerospace	Total Company
Product and Services			
Engineered Components Products	\$ 285,929	\$ —	\$ 285,929
Molding Solutions Products	503,793	—	503,793
Force & Motion Control Products	196,212	—	196,212
Automation Products	8,793	—	8,793
Aerospace Original Equipment Manufacturer Products	—	336,987	336,987
Aerospace Aftermarket Product and Services	—	164,175	164,175
	<u>\$ 994,727</u>	<u>\$ 501,162</u>	<u>\$ 1,495,889</u>

Geographic Regions ^(A)			
Americas	\$ 394,361	\$ 358,183	\$ 752,544
Europe	368,159	94,561	462,720
Asia	228,663	44,298	272,961
Rest of World	3,544	4,120	7,664
	<u>\$ 994,727</u>	<u>\$ 501,162</u>	<u>\$ 1,495,889</u>

End Markets			
Aerospace OEM	\$ 10,191	\$ 336,987	\$ 347,178
Aerospace Aftermarket	—	164,175	164,175
Medical, Personal Care & Packaging	220,269	—	220,269
Tool and Die	115,635	—	115,635
General Industrial	244,007	—	244,007
Auto Molding Solutions	208,767	—	208,767
Auto Production	187,065	—	187,065
Automation	8,793	—	8,793
	<u>\$ 994,727</u>	<u>\$ 501,162</u>	<u>\$ 1,495,889</u>

(A) Sales by geographic market are based on the location to which the product is shipped.

Revenue from goods and services transferred to customers at a point in time accounted for approximately 90 percent of revenue for the years ended December 31, 2019 and 2018. A majority of revenue within the Industrial segment and Aerospace

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

OEM business, along with a portion of revenue within the Aerospace Aftermarket business, is recognized at a point in time, primarily when the product or solution is shipped to the customer.

Revenue from products and services transferred to customers over time accounted for approximately 10 percent of revenue for years ended December 31, 2019 and 2018. The Company recognizes revenue over time in instances where a contract supports a continual transfer of control to the customer. Substantially all of our revenue in the Aerospace maintenance repair and overhaul business and a portion of the Engineered Components Products, Molding Solutions Products and Aerospace Original Equipment Manufacturer Products is recognized over time. Within the Molding Solutions and Aerospace Aftermarket businesses, this continual transfer of control to the customer results from repair and refurbishment work performed on customer controlled assets. With other contracts, this continual transfer of control to the customer is supported by clauses in the contract where we deliver products that do not have an alternative use and requires an enforceable right to payment of costs incurred (plus a reasonable profit) or the Company has a contractual right to complete any work in process and receive full contract price.

Performance Obligations. A performance obligation represents a promise within a contract to provide a distinct good or service to the customer. The Company accounts for a contract when it has approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance and collectibility of consideration is probable. Transaction price reflects the amount of consideration which the Company expects to be entitled in exchange for transferred goods or services. A contract's transaction price is allocated to each distinct performance obligation and revenue is recognized as the performance obligation is satisfied.

The majority of our revenues are from contracts that are less than one year, however certain Aerospace OEM and Industrial Molding Solutions business contracts extend beyond one year. In the Industrial segment, customers are typically with OEMs or suppliers to OEMs and in some businesses, with distributors. In the Aerospace segment, customers include commercial airlines, OEMs and other aircraft and military parts and service providers.

To determine the proper revenue recognition method for contracts, the Company uses judgment to evaluate whether two or more contracts should be combined and accounted for as one single contract and whether the combined or single contract should be accounted for as more than one performance obligation. Contracts within the Aerospace OEM and Engineered Components businesses typically have contracts that are combined as the customer may issue multiple purchase orders at or near the same point in time under the terms of a long term agreement.

Revenue is recognized in an over time model based on the extent of progress towards completion of the performance obligation. The selection of the method to measure progress towards completion requires judgment and is based on the nature of the products or services to be provided. The Company utilizes the cost-to-cost measure of progress for over time contracts as we believe this measure best depicts the transfer of control to the customer, which occurs as we incur costs on contracts.

Contract Estimates. Due to the nature of the work performed in completing certain performance obligations, the estimation of both total revenue and cost at completion (the process described above) includes a number of variables and requires significant judgment.

Estimating total contract revenue may require judgment as certain contracts contain pricing discount structures, rebates, early payment discounts, or other provisions that can impact transaction price. The Company generally estimates variable consideration utilizing the expected value methodology as multiple inputs are considered and weighed, such as customer history, customer forecast communications, economic outlooks, and industry data. In certain circumstances where a particular outcome is probable, we utilize the most likely amount to which we expect to be entitled. The Company includes estimated amounts in the transaction price to the extent it is probable that a significant reversal of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is resolved.

Estimating the total expected costs related to contracts also requires significant judgment. The Aerospace OEM business has an Estimate at Completion (EAC) process in which management reviews the progress and execution of our performance obligations for significant contracts with revenue recognized under an over time model. As part of this process, management reviews information including, but not limited to, performance under the contract, progress towards completion, identified risks and opportunities, sourcing determinations and related changes in estimates of costs to be incurred. These considerations include management's judgment about the ability and cost to achieve technical requirements and other contract requirements. Management makes assumptions and estimates regarding labor efficiency, the complexity of the work to be performed, the

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

availability of materials, the length of time to complete the performance obligation (e.g., to estimate increases in wages and prices for materials and related support cost allocations), execution by our subcontractors and overhead cost rates, among other variables.

The Company generally utilizes the portfolio approach to estimate the amount of revenue to recognize for certain other contracts which require over time revenue recognition. Such contracts are grouped together either by revenue stream, customer or product. Each portfolio of contracts is grouped together based on having similar characteristics. The portfolio approach is utilized only when the result of the accounting is not expected to be materially different than if applied to individual contracts.

Adjustments to net sales, cost of sales and the related impact to operating income are recognized as necessary in the period they become known. Revenue recognized from performance obligations satisfied in previous periods was not material in 2019 and 2018.

Contract Balances. The timing of revenue recognition, invoicing and cash collections affect accounts receivable, unbilled receivables (contract assets) and customer advances and deposits (contract liabilities) on the Consolidated Balance Sheets.

Unbilled Receivables (Contract Assets) - Pursuant to the over time revenue recognition model, revenue may be recognized prior to the customer being invoiced. An unbilled receivable is recorded to reflect revenue that is recognized when 1) the cost-to-cost method is applied and 2) such revenue exceeds the amount invoiced to the customer. Unbilled receivables are included within prepaid expenses and other current assets on the Consolidated Balance Sheets as of December 31, 2019 and 2018.

Customer Advances and Deposits (Contract Liabilities) - The Company may receive a customer advance or deposit, or have an unconditional right to receive a customer advance, prior to revenue being recognized. Certain contracts within the Molding Solutions business, for example, may require such advances. Since the performance obligations related to such advances may not have been satisfied, a contract liability is established. An offsetting asset of equal amount is recorded as an account receivable until the advance is collected. Advances and deposits are included within accrued liabilities on the Consolidated Balance Sheets until the respective revenue is recognized. Advance payments are not considered a significant financing component as they are generally received less than one year before the customer solution is completed. These assets and liabilities are reported on the Consolidated Balance Sheets on an individual contract basis at the end of each reporting period.

Net contract liabilities consisted of the following:

	December 31, 2019	December 31, 2018	\$ Change	% Change
Unbilled receivables (contract assets)	\$ 22,444	\$ 11,844	\$ 10,600	89 %
Contract liabilities	(55,076)	(57,522)	2,446	(4)%
Net contract liabilities	\$ (32,632)	\$ (45,678)	\$ 13,046	(29)%

Contract liabilities balances at December 31, 2019 and December 31, 2018 include \$16,971 and \$15,438, respectively, of customer advances for which the Company has an unconditional right to collect payment. Accounts receivable, as presented on the Consolidated Balance Sheet, includes corresponding balances at December 31, 2019 and December 31, 2018, respectively.

Changes in the net contract liabilities balance during the year ended December 31, 2019 were impacted by a \$2,446 decrease in contract liabilities, driven primarily by revenue recognized in the current period, partially offset by new customer advances and deposits. Adding to this net contract liabilities decrease was a \$10,600 increase in contract assets, driven primarily by contract progress (i.e. unbilled receivable), partially offset by earlier contract progress being invoiced to the customer.

The Company recognized approximately 85% of the revenue related to the contract liability balance as of December 31, 2018 during the year ended December 31, 2019, primarily representing revenue from the sale of molds and hot runners within the Molding Solutions business.

Contract Costs. The Company may incur costs to fulfill a contract. Costs are incurred to develop, design and manufacture tooling to produce a customer's customized product in conjunction with certain of its contracts, primarily in the Aerospace OEM business. For certain contracts, control related to this tooling remains with the Company. The tooling may be

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

deemed recoverable over the life of the related customer contract (oftentimes a long-term agreement). The Company therefore capitalizes these tooling costs and amortizes them over the shorter of the tooling life or the duration of the long-term agreement. The Company may also incur costs related to the development of product designs (molds or hot runner systems) within its Molding Solutions business. Control of the design may be retained by the Company and deemed recoverable over the contract to build the systems or mold, therefore this design work cost is capitalized and amortized to cost of sales when the related revenue is recognized. Amortization related to these capitalized costs to fulfill a contract were \$14,078 and \$14,988 in the years ended December 31, 2019 and 2018, respectively.

Capitalized costs, net of amortization, to fulfill a contract balances were as follows:

	December 31, 2019	December 31, 2018
Tooling	\$ 5,908	\$ 6,155
Design costs	3,209	2,285
Other	—	5
	<u>\$ 9,117</u>	<u>\$ 8,445</u>

Remaining Performance Obligations. The Company has elected to disclose remaining performance obligations only for contracts with an original duration of greater than one year. Such remaining performance obligations represent the transaction price of firm orders for which work has not been performed and, for Aerospace, excludes projections of components and assemblies that Aerospace OEM customers anticipate purchasing in the future under existing programs, which represent orders that are beyond lead time and do not represent performance obligations pursuant to ASC 606. As of December 31, 2019, the aggregate amount of the transaction price allocated to remaining performance obligations was \$234,859. The Company expects to recognize revenue on approximately 70% of the remaining performance obligations over the next 12 months, with the remainder being recognized within 24 months.

5. Inventories

Inventories at December 31 consisted of:

	2019	2018
Finished goods	\$ 69,594	\$ 87,779
Work-in-process	88,196	98,426
Raw materials and supplies	74,916	79,785
	<u>\$ 232,706</u>	<u>\$ 265,990</u>

6. Property, Plant and Equipment

Property, plant and equipment at December 31 consisted of:

	2019	2018
Land	\$ 17,644	\$ 23,239
Buildings	178,657	183,544
Machinery and equipment	644,339	646,714
	<u>840,640</u>	<u>853,497</u>
Less accumulated depreciation	(484,037)	(482,966)
	<u>\$ 356,603</u>	<u>\$ 370,531</u>

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

Depreciation expense was \$47,552, \$48,914 and \$48,693 during 2019, 2018 and 2017, respectively.

7. Goodwill and Other Intangible Assets

Goodwill: The following table sets forth the change in the carrying amount of goodwill for each reportable segment and the Company:

	Industrial	Aerospace	Total Company
January 1, 2018	\$ 659,437	\$ 30,786	\$ 690,223
Acquisition-related	285,355	—	285,355
Foreign currency translation	(20,054)	—	(20,054)
December 31, 2018	924,738	30,786	955,524
Acquisition-related	5,841	—	5,841
Reclassified to assets held for sale (see Note 3)	(15,000)	—	(15,000)
Foreign currency translation	(13,343)	—	(13,343)
December 31, 2019	<u>\$ 902,236</u>	<u>\$ 30,786</u>	<u>\$ 933,022</u>

Of the \$933,022 of goodwill at December 31, 2019, \$43,860 represents the original tax deductible basis.

The acquisition-related changes recorded at Industrial in 2018 include \$285,355 of goodwill resulting from the acquisitions of Gimatic and IGS in October and July 2018, respectively, both of which are included in the Industrial segment. See Note 2. The amounts allocated to goodwill reflect the benefits that the Company expects to realize from future enhancements to technology, an increase in global market access and Gimatic's and IGS's assembled workforce. None of the recognized goodwill recognized at IGS is expected to be deductible for income tax purposes. The Company is permitted to make an election with Italian tax authorities that allows for an income tax deduction on a portion of Gimatic goodwill. The Company plans to complete its analysis that determines this deduction by the second quarter of 2020. The acquisition-related changes recorded at Industrial during 2019 include final purchase accounting adjustments of \$5,841 related to the acquisition of Gimatic.

The Company entered into the SPA to sell Seeger in December 2019. Pursuant to the required accounting guidance, the Company allocated \$15,000 of goodwill within the Engineered Components reporting unit to Seeger based on the estimated relative fair values of the business to be disposed of and the portion of the reporting unit that will be retained ("Seeger goodwill"). Seeger goodwill was reclassified to assets held for sale on the Consolidated Balance Sheet as of December 31, 2019 and subsequently evaluated for impairment. See Note 3.

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

Other Intangible Assets: Other intangible assets at December 31 consisted of:

		2019		2018	
	Range of Life-Years	Gross Amount	Accumulated Amortization	Gross Amount	Accumulated Amortization
Amortized intangible assets:					
Revenue Sharing Programs	Up to 30	\$ 299,500	\$ (135,466)	\$ 299,500	\$ (121,957)
Component Repair Programs	Up to 30	111,839	(27,270)	111,839	(21,895)
Customer relationships	10-16	338,366	(98,953)	338,366	(79,439)
Patents and technology	4-11	123,433	(68,188)	125,852	(59,205)
Trademarks/trade names	10-30	10,949	(10,145)	11,950	(10,731)
Other	Up to 15	10,746	(4,014)	7,296	(3,551)
		894,833	(344,036)	894,803	(296,778)
Unamortized intangible asset:					
Trade names		55,670	—	55,670	—
Foreign currency translation		(25,351)	—	(17,157)	—
Other intangible assets		\$ 925,152	\$ (344,036)	\$ 933,316	\$ (296,778)

The Company has entered into a number of aftermarket RSP and CRP agreements each of which is with our customer, General Electric ("GE"). See Note 1 for a further discussion of these Revenue Sharing and Component Repair Programs. As of December 31, 2019, the Company has made all required payments under the aftermarket RSP and CRP agreements. In the second quarter of 2018, management executed an aftermarket agreement with GE. This agreement involved a participation fee related to extending the scope of the existing Revenue Sharing Programs ("RSPs") between the Company and GE and entitling the Company to manufacture and supply existing RSP parts on a sole source basis that have a dual end-use, meaning usage in engines that have both a civil and military end use. The Company paid \$5,800 as consideration for such rights and recorded a long-lived intangible asset, which will be amortized as a reduction to sales over the life of the programs, consistent with the treatment of similar arrangements that were executed in the past.

In connection with the acquisition of Gimatic in October 2018, the Company recorded intangible assets of \$158,800, which includes \$107,900 of customer relationships, \$38,800 of patents and technology and \$12,100 of an indefinite-life trade name. The weighted-average useful lives of the customer relationships and the patents and technology were 16 and 11 years, respectively.

In connection with the acquisition of IGS in July 2018, the Company recorded intangible assets of \$15,300, which includes \$14,500 of customer relationships and \$800 of an indefinite-life trade name. The weighted-average useful life of the customer relationship is 16 years.

Amortization of intangible assets for the years ended December 31, 2019, 2018 and 2017 was \$51,502, \$45,220 and \$41,216, respectively. Estimated amortization of intangible assets for future periods is as follows: 2020 - \$50,000; 2021 - \$50,000; 2022 - \$49,000; 2023 - \$48,000 and 2024 - \$46,000.

8. Accrued Liabilities

Accrued liabilities at December 31 consisted of:

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

	2019	2018
Payroll and other compensation	\$ 39,293	\$ 46,850
Contract liabilities	55,076	57,522
Pension and other postretirement benefits	8,044	8,618
Accrued income taxes	41,706	30,391
Lease liability ^(A)	10,751	—
Other	55,122	63,401
	<u>\$ 209,992</u>	<u>\$ 206,782</u>

(A) The Company adopted the amended guidance related to lease accounting on January 1, 2019. See Note 1 for discussion related to this adoption.

9. Debt and Commitments

Long-term debt and notes and overdrafts payable at December 31 consisted of:

	2019		2018	
	Carrying Amount	Fair Value	Carrying Amount	Fair Value
Revolving credit agreement	\$ 720,379	\$ 737,816	\$ 831,016	\$ 828,800
3.97% Senior Notes	100,000	104,151	100,000	100,185
Borrowings under lines of credit and overdrafts	7,724	7,724	2,137	2,137
Finance leases	6,266	6,515	10,216	10,503
Other foreign bank borrowings	406	410	647	651
	<u>834,775</u>	<u>856,616</u>	<u>944,016</u>	<u>942,276</u>
Less current maturities	(9,758)		(7,659)	
Long-term debt	<u>\$ 825,017</u>		<u>\$ 936,357</u>	

The Company's long-term debt portfolio consists of fixed-rate and variable-rate instruments and is managed to reduce the overall cost of borrowing and to mitigate fluctuations in interest rates. Among other things, interest rate fluctuations impact the market value of the Company's fixed-rate debt.

In February 2017, the Company and certain of its subsidiaries entered into the fourth amendment of its fifth amended and restated revolving credit agreement (the "Amended Credit Agreement") and retained Bank of America, N.A as the Administrative Agent for the lenders. The Amended Credit Agreement increased the facility from \$750,000 to \$850,000 and extended the maturity date from September 2018 to February 2022. The Amended Credit Agreement also increased the previous accordion feature from \$250,000, allowing the Company to request additional borrowings of up to \$350,000. The Company may exercise the accordion feature upon request to the Administrative Agent as long as an event of default has not occurred or is not continuing. The borrowing availability of \$850,000, pursuant to the terms of the Amended Credit Agreement, allows for multi-currency borrowing which includes Euro, British pound sterling or Swiss franc borrowing, up to \$600,000. In September 2018, the Company and one of its wholly owned subsidiaries entered into a Sale and Purchase Agreement to acquire Gimatic S.r.l. See Note 2. In conjunction with the Acquisition, the Company requested additional borrowings of \$150,000 that was provided for under the accordion feature. The Administrative Agent for the lenders approved the Company's access to the accordion feature and on October 19, 2018 the lenders formally committed the capital to fund such feature, resulting in the execution of the fifth amendment to the Amended Credit Agreement (the "Fifth Amendment"). The Fifth Amendment, effective October 19, 2018, thereby increased the borrowing availability of the existing facility to \$1,000,000. The Company may also request access to the residual \$200,000 of the accordion feature. Depending on the Company's consolidated leverage ratio, and at the election of the Company, borrowings under the Amended Credit Agreement will bear interest at either LIBOR plus a margin of between 1.10% and 1.70% or the base rate, as defined in the Amended Credit Agreement, plus a margin of 0.10% to 0.70%. Multi-currency borrowings, pursuant to the Amended Credit Agreement, bear interest at their respective interbank offered rate (i.e. Euribor) or 0.00% (higher of the two rates) plus a margin of between 1.10% and 1.70%. The Company paid fees and expenses of \$529 and \$2,542 in 2018 and 2017, respectively, in conjunction with executing amendments to the Amended Credit Agreement; such fees have been deferred within Other Assets on the accompanying Consolidated Balance Sheets and are being amortized into interest expense on the accompanying Consolidated Statements of Income through its

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

maturity. Cash used to pay these fees has been recorded through other financing activities on the Consolidated Statements of Cash Flows.

Borrowings and availability under the Amended Credit Agreement were \$720,379 and \$279,621, respectively, at December 31, 2019 and \$831,016 and \$168,984, respectively, at December 31, 2018. The average interest rate on these borrowings was 1.76% and 1.99% on December 31, 2019 and 2018, respectively. Borrowings included Euro-denominated borrowings of 504,690 Euros (\$565,379) at December 31, 2019 and 470,350 Euros (\$538,316) at December 31, 2018. The fair value of the borrowings is based on observable Level 2 inputs. The borrowings were valued using discounted cash flows based upon the Company's estimated interest costs for similar types of borrowings. In 2019 and 2018, the Company borrowed 44,100 Euros (\$49,506) and 179,000 Euros (\$208,589), respectively, under the Amended Credit Facility through an international subsidiary. The proceeds were distributed to the Parent Company and subsequently used to pay down U.S. borrowings under the Amended Credit Agreement.

In October 2014, the Company entered into a Note Purchase Agreement ("Note Purchase Agreement"), among the Company and New York Life Insurance Company, New York Life Insurance and Annuity Corporation and New York Life Insurance and Annuity Corporation Institutionally Owned Life Insurance Separate Account, as purchasers, for the issuance of \$100,000 aggregate principal amount of 3.97% Senior Notes due October 17, 2024 (the "3.97% Senior Notes").

The 3.97% Senior Notes are senior unsecured obligations of the Company and pay interest semi-annually on April 17 and October 17 of each year at an annual rate of 3.97%. The 3.97% Senior Notes will mature on October 17, 2024 unless earlier prepaid in accordance with their terms. Subject to certain conditions, the Company may, at its option, prepay all or any part of the 3.97% Senior Notes in an amount equal to 100% of the principal amount of the 3.97% Senior Notes so prepaid, plus any accrued and unpaid interest to the date of prepayment, plus the Make-Whole Amount, as defined in the Note Purchase Agreement, with respect to such principal amount being prepaid. The fair value of the 3.97% Senior Notes was determined using the US Treasury yield and a long-term credit spread for similar types of borrowings, which represent Level 2 observable inputs.

The Company's borrowing capacity remains limited by various debt covenants in the Amended Credit Agreement and the Note Purchase Agreement (the "Agreements"). The Agreements require the Company to maintain a ratio of Consolidated Senior Debt, as defined, to Consolidated EBITDA, as defined, of not more than 3.25 times ("Senior Debt Ratio"), a ratio of Consolidated Total Debt, as defined, to Consolidated EBITDA of not more than 3.75 times ("Total Debt Ratio") and a ratio of Consolidated EBITDA to Consolidated Cash Interest Expense, as defined, of not less than 4.25, in each case at the end of each fiscal quarter; provided that the debt to EBITDA ratios are permitted to increase for a period of four fiscal quarters after the closing of certain permitted acquisitions. A permitted acquisition is defined as an acquisition exceeding \$150,000, for which the acquisition of Gimatic on October 31, 2018 qualified. With the completion of a permitted acquisition, the Senior Debt Ratio cannot exceed 3.50 times and the Total Debt Ratio cannot exceed 4.25 times. The increased ratios were allowed for a period of four fiscal quarters subsequent to the close of the permitted acquisition and therefore expired in the fourth quarter of 2019. At December 31, 2019, the Company was in compliance with all covenants under the Agreements and continues to monitor its future compliance based on current and future economic conditions.

In addition, the Company has approximately \$86,000 in uncommitted short-term bank credit lines ("Credit Lines") and overdraft facilities. The Credit Lines are accessed locally and are available primarily within the U.S., Europe and Asia. The Credit Lines are subject to the applicable borrowing rates within each respective country and vary between jurisdictions (i.e. LIBOR, Euribor, etc.). Under the Credit Lines, \$7,700 was borrowed at December 31, 2019 at an average interest rate of 2.38% and \$2,041 was borrowed at December 31, 2018 at an average interest rate of 0.17%. The Company had also borrowed \$24 and \$96 under the overdraft facilities at December 31, 2019 and 2018, respectively. Repayments under the Credit Lines are due within one month after being borrowed. Repayments of the overdrafts are generally due within two days after being borrowed. The carrying amounts of the Credit Lines and overdrafts approximate fair value due to the short maturities of these financial instruments.

The Company also has several finance leases under which \$6,266 and \$10,216 was outstanding at December 31, 2019 and December 31, 2018, respectively. The fair value of the finance leases are based on observable Level 2 inputs. These instruments were valued using discounted cash flows based upon the Company's estimated interest costs for similar types of borrowings.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

At December 31, 2019 and 2018, the Company also had other foreign bank borrowings of \$406 and \$647, respectively. The fair value of the foreign bank borrowings was based on observable Level 2 inputs. These instruments were valued using discounted cash flows based upon the Company's estimated interest costs for similar types of borrowings.

Long-term debt and notes payable as of December 31, 2019 are payable as follows: \$9,758 in 2020, \$1,571 in 2021, \$721,566 in 2022, \$761 in 2023, \$101,119 in 2024 and \$0 thereafter.

In addition, the Company had unused letters of credit totaling \$8,759 at December 31, 2019.

Interest paid was \$20,248, \$16,678 and \$13,962 in 2019, 2018 and 2017, respectively. Interest capitalized was \$498, \$544 and \$415 in 2019, 2018 and 2017, respectively, and is being depreciated over the lives of the related fixed assets.

10. Business Reorganizations

In 2017, the Company authorized the closure and consolidation of two production facilities (the "Closures") including a FOBOHA facility located in Muri, Switzerland and an Associated Spring facility into other facilities included within the Industrial segment to leverage capacity, infrastructure and critical resources. During 2017, the Closures resulted in employee severance charges of \$3,796, other Closure costs of \$3,664, primarily related to asset write-downs, and pension curtailment and settlement gains of \$7,217 and \$230, respectively. The employee severance charges and other Closure costs were recorded primarily within Cost of Sales and the pension curtailment and settlement gains were recorded within Other Expense (Income) in the accompanying Consolidated Statements of Income. All charges are reflected in the results of the Industrial segment. The Muri Closure was completed as of December 31, 2017, whereas the Closure at the Associated Spring facility was completed as of June 30, 2018.

11. Derivatives

The Company has manufacturing and sales facilities around the world and thus makes investments and conducts business transactions denominated in various currencies. The Company is also exposed to fluctuations in interest rates and commodity price changes. These financial exposures are monitored and managed by the Company as an integral part of its risk management program.

Financial instruments have been used by the Company to hedge its exposure to fluctuations in interest rates. In 2012, the Company entered into five-year interest rate swap agreements (the "Swaps") transacted with three banks which together converted the interest on the first \$100,000 of the Company's one-month LIBOR-based borrowings from a variable rate plus the borrowing spread to a fixed rate of 1.03% plus the borrowing spread, for the purpose of mitigating its exposure to variable interest rates. The Swaps expired on April 28, 2017. The Company entered into a new interest rate swap agreement (the "Swap") that commenced on April 28, 2017, with one bank, and converts the interest on the first \$100,000 of the Company's one-month LIBOR-based borrowings from a variable rate plus the borrowing spread to a fixed rate of 1.92% plus the borrowing spread. The Swap expires on January 31, 2022. These interest rate swap agreements were accounted for as cash flow hedges. The Swap remained in place at December 31, 2019.

The Company also uses financial instruments to hedge its exposures to fluctuations in foreign currency exchange rates. The Company has various contracts outstanding which primarily hedge recognized assets or liabilities and anticipated transactions in various currencies including the Euro, British pound sterling, U.S. dollar, Canadian dollar, Japanese yen, Singapore dollar, Korean won, Swedish kroner, Chinese renminbi, Mexican peso, Hong Kong dollar and Swiss franc. Certain foreign currency derivative instruments are treated as cash flow hedges of forecasted transactions. All foreign exchange contracts are due within two years.

The Company does not use derivatives for speculative or trading purposes or to manage commodity exposures. Changes in the fair market value of derivatives that qualify as cash flow hedges are recorded to accumulated other non-owner changes to equity. Amounts recorded to accumulated other non-owner changes to equity are reclassified to earnings in a manner that matches the earnings impact of the hedged transaction. Amounts related to contracts that are not designated as hedges are recorded directly to earnings.

The Company's policy for classifying cash flows from derivatives is to report the cash flows consistent with the underlying hedged item. Other financing cash flows during the years ended December 31, 2019 and 2018, as presented on the

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

Consolidated Statements of Cash Flows, include \$7,538 and \$10,813, respectively, of net cash payments related to the settlement of foreign currency hedges related to intercompany financing.

The following table sets forth the fair value amounts of derivative instruments held by the Company:

	Derivative Assets			Derivative Liabilities		
	Fair Value			Fair Value		
	Balance Sheet Location	December 31, 2019	December 31, 2018	Balance Sheet Location	December 31, 2019	December 31, 2018
Derivatives designated as hedging instruments:						
Interest rate contracts	Other assets	\$ —	\$ 1,412	Other liabilities	\$ (820)	\$ —
Foreign exchange contracts	Prepaid expenses and other current assets	700	—	Accrued liabilities	—	(258)
Total derivatives designated as hedging instruments		700	1,412		(820)	(258)
Derivatives not designated as hedging instruments:						
Foreign exchange contracts	Prepaid expenses and other current assets	1,375	1,105	Accrued liabilities	(1)	(90)
Total derivatives not designated as hedging instruments		1,375	1,105		(1)	(90)
Total derivatives		\$ 2,075	\$ 2,517		\$ (821)	\$ (348)

The following table sets forth the effect of hedge accounting on accumulated other comprehensive (loss) income for the twelve month periods ended December 31, 2019, 2018 and 2017:

Derivatives in Hedging Relationships	Amount of Gain (Loss) Recognized in Accumulated Other Comprehensive Income (Loss) on Derivative			Location of Gain (Loss) Reclassified from Accumulated Other Comprehensive Income (Loss) into Income	Amount of Gain (Loss) Reclassified from Accumulated Other Comprehensive Income (Loss) into Income		
	Twelve Months Ended December 31,				Twelve Months Ended December 31,		
	2019	2018	2017	Comprehensive Income (Loss) into Income	2019	2018	2017

Derivatives in Cash Flow Hedging Relationships:

Interest rate contracts	\$ (1,702)	\$ 578	\$ 460	Interest expense	\$ 347	\$ (277)	\$ (545)
Foreign exchange contracts	753	95	(161)	Net sales	(956)	(1,116)	(242)
Total	<u>\$ (949)</u>	<u>\$ 673</u>	<u>\$ 299</u>		<u>\$ (609)</u>	<u>\$ (1,393)</u>	<u>\$ (787)</u>

The following table sets forth the effect of hedge accounting on the consolidated statements of income for the twelve month periods ended December 31, 2019, 2018 and 2017:

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

	Location and Amount of Gain (Loss) Recognized in Income on Hedging Relationships					
	Twelve Months Ended December 31,					
	2019		2018		2017	
	Net sales	Interest expense	Net sales	Interest expense	Net sales	Interest expense
Total amounts of income and expense line items presented in the consolidated statements of income in which the effects of hedges are recorded	\$1,491,118	\$ 20,629	\$1,495,889	\$ 16,841	\$1,436,499	\$ 14,571
The effects of hedging:						
Gain (Loss) on cash flow hedging relationships						
Interest rate contracts						
Amount of gain (loss) reclassified from accumulated other comprehensive income (loss) into income		347		(277)		(545)
Foreign exchange contracts						
Amount of loss reclassified from accumulated other comprehensive income (loss) into income	(956)		(1,116)		(242)	

The following table sets forth the effect of derivatives not designated as hedging instruments on the consolidated statements of income for the twelve month periods ended December 31, 2019, 2018 and 2017:

Derivatives Not Designated as Hedging Instruments	Location of Gain (Loss) Recognized in Income on Derivative	Amount of Gain (Loss) Recognized in Income on Derivative ^(A)		
		Twelve Months Ended December 31,		
		2019	2018	2017
Foreign exchange contracts	Other expense (income), net	\$ (8,250)	\$ (12,162)	\$ (16,813)

(A) During 2019, approximately half of the loss recognized was offset by a net gain recorded on the underlying hedged asset or liability (the "underlying"). During 2018 and 2017, such losses were substantially offset by net gains recorded on the underlying. Offsetting net gains on the underlying are also recorded in other expense (income), net.

12. Fair Value Measurements

The provisions of the accounting standard for fair value define fair value as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. This standard classifies the inputs used to measure fair value into the following hierarchy:

- Level 1 Unadjusted quoted prices in active markets for identical assets or liabilities.
- Level 2 Unadjusted quoted prices in active markets for similar assets or liabilities, or unadjusted quoted prices for identical or similar assets or liabilities in markets that are not active, or inputs other than quoted prices that are observable for the asset or liability.
- Level 3 Unobservable inputs for the asset or liability.

The following table provides the assets and liabilities reported at fair value and measured on a recurring basis as of December 31, 2019 and 2018:

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

	Total	Fair Value Measurements Using		
		Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
December 31, 2019				
Asset derivatives	\$ 2,075	\$ —	\$ 2,075	\$ —
Liability derivatives	(821)	—	(821)	—
Bank acceptances	14,460	—	14,460	—
Rabbi trust assets	2,947	2,947	—	—
	<u>\$ 18,661</u>	<u>\$ 2,947</u>	<u>\$ 15,714</u>	<u>\$ —</u>
December 31, 2018				
Asset derivatives	\$ 2,517	\$ —	\$ 2,517	\$ —
Liability derivatives	(348)	—	(348)	—
Bank acceptances	17,698	—	17,698	—
Rabbi trust assets	2,457	2,457	—	—
	<u>\$ 22,324</u>	<u>\$ 2,457</u>	<u>\$ 19,867</u>	<u>\$ —</u>

The derivative contracts are valued using observable current market information as of the reporting date such as the prevailing LIBOR-based interest rates and foreign currency spot and forward rates. Bank acceptances represent financial instruments accepted from certain Chinese customers in lieu of cash paid on receivables, generally range from 3 to 6 months in maturity and are guaranteed by banks. The carrying amounts of the bank acceptances, which are included within prepaid expenses and other current assets, approximate fair value due to their short maturities. The fair values of rabbi trust assets are based on quoted market prices from various financial exchanges. For disclosures of the fair values of the Company's pension plan assets, see Note 13.

13. Pension and Other Postretirement Benefits

The accounting standards related to employers' accounting for defined benefit pension and other postretirement plans requires the Company to recognize the funded status of its defined benefit postretirement plans as assets or liabilities in the accompanying consolidated balance sheets and to recognize changes in the funded status of the plans in comprehensive income.

The Company has various defined contribution plans, the largest of which is its Retirement Savings Plan. Most U.S. salaried and non-union hourly employees are eligible to participate in this plan. See Note 18 for further discussion of the Retirement Savings Plan. The Company also maintains various other defined contribution plans which cover certain other employees. Company contributions under certain of these plans are based on the performance of the business units and employee compensation. Contribution expense under these other defined contribution plans was \$6,874, \$6,921 and \$6,644 in 2019, 2018 and 2017, respectively.

Defined benefit pension plans in the U.S. cover a majority of the Company's U.S. employees at the Associated Spring and Force & Motion Control (formerly "Nitrogen Gas Products") businesses of Industrial, the Company's Corporate Office and certain former U.S. employees, including retirees. Employees at certain international businesses within Industrial are also covered by defined benefit pension plans. Plan benefits for salaried and non-union hourly employees are based on years of service and average salary. Plans covering union hourly employees provide benefits based on years of service. In 2012, the Company closed the U.S. Salaried defined benefit pension plan ("U.S. Salaried Plan") to employees hired on or after January 1, 2013, with no impact to the benefits of existing participants. Effective January 1, 2013, the Retirement Savings Plan was amended to provide certain salaried employees hired on or after January 1, 2013 with an additional annual retirement contribution of 4% of eligible earnings, in place of pensionable benefits under the closed U.S. Salaried Plan. The Company funds U.S. pension costs in accordance with the Employee Retirement Income Security Act of 1974, as amended ("ERISA"). Non-U.S. defined benefit pension plans cover certain employees of certain international locations in Europe and Canada.

The Company provides other medical, dental and life insurance postretirement benefits for certain of its retired employees in the U.S. and Canada. It is the Company's practice to fund these benefits as incurred.

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

The accompanying balance sheets reflect the funded status of the Company's defined benefit pension plans at December 31, 2019 and 2018, respectively. Reconciliations of the obligations and funded status of the plans follow:

	2019			2018		
	U.S.	Non-U.S.	Total	U.S.	Non-U.S.	Total
Benefit obligation, January 1	\$ 388,334	\$ 79,307	\$ 467,641	\$ 415,369	\$ 82,741	\$ 498,110
Service cost	3,715	1,710	5,425	4,290	1,671	5,961
Interest cost	16,628	1,611	18,239	15,875	1,508	17,383
Amendments	240	(934)	(694)	—	826	826
Actuarial loss (gain)	46,662	11,843	58,505	(22,193)	(2,256)	(24,449)
Benefits paid	(24,954)	(4,026)	(28,980)	(25,007)	(6,607)	(31,614)
Transfers in	—	2,165	2,165	—	3,462	3,462
Plan settlements	—	(1,582)	(1,582)	—	—	—
Participant contributions	—	1,131	1,131	—	1,120	1,120
Foreign exchange rate changes	—	1,975	1,975	—	(3,158)	(3,158)
Reclassified to liabilities held for sale (see Note 3)	—	(6,169)	(6,169)	—	—	—
Benefit obligation, December 31	430,625	87,031	517,656	388,334	79,307	467,641
Fair value of plan assets, January 1	322,615	73,607	396,222	375,378	79,060	454,438
Actual return on plan assets	64,681	6,992	71,673	(30,681)	(1,928)	(32,609)
Company contributions	17,900	1,808	19,708	2,925	1,807	4,732
Participant contributions	—	1,131	1,131	—	1,120	1,120
Benefits paid	(24,954)	(4,026)	(28,980)	(25,007)	(6,607)	(31,614)
Plan settlements	—	(1,582)	(1,582)	—	—	—
Transfers in	—	2,165	2,165	—	3,462	3,462
Foreign exchange rate changes	—	2,170	2,170	—	(3,307)	(3,307)
Fair value of plan assets, December 31	380,242	82,265	462,507	322,615	73,607	396,222
Underfunded status, December 31	\$ (50,383)	\$ (4,766)	\$ (55,149)	\$ (65,719)	\$ (5,700)	\$ (71,419)

Projected benefit obligations related to pension plans with benefit obligations in excess of plan assets follow:

	2019			2018		
	U.S.	Non-U.S.	Total	U.S.	Non-U.S.	Total
Projected benefit obligation	\$ 334,808	\$ 46,256	\$ 381,064	\$ 388,334	\$ 42,000	\$ 430,334
Fair value of plan assets	282,213	31,248	313,461	322,615	28,595	351,210

Information related to pension plans with accumulated benefit obligations in excess of plan assets follows:

	2019			2018		
	U.S.	Non-U.S.	Total	U.S.	Non-U.S.	Total
Projected benefit obligation	\$ 334,808	\$ 46,256	\$ 381,064	\$ 388,334	\$ 42,000	\$ 430,334
Accumulated benefit obligation	322,999	52,202	375,201	378,285	41,946	420,231
Fair value of plan assets	282,213	31,248	313,461	322,615	28,595	351,210

The accumulated benefit obligation for all defined benefit pension plans was \$511,977 and \$457,539 at December 31, 2019 and 2018, respectively.

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

Amounts related to pensions recognized in the accompanying balance sheets consist of:

	2019			2018		
	U.S.	Non-U.S.	Total	U.S.	Non-U.S.	Total
Other assets	\$ 2,212	\$ 10,242	\$ 12,454	\$ —	\$ 7,705	\$ 7,705
Accrued liabilities	2,977	—	2,977	2,826	378	3,204
Accrued retirement benefits	49,618	15,008	64,626	62,893	13,027	75,920
Accumulated other non-owner changes to equity, net	(122,109)	(18,859)	(140,968)	(121,927)	(14,047)	(135,974)

Amounts related to pensions recognized in accumulated other non-owner changes to equity, net of tax, at December 31, 2019 and 2018, respectively, consist of:

	2019			2018		
	U.S.	Non-U.S.	Total	U.S.	Non-U.S.	Total
Net actuarial loss	\$ (119,908)	\$ (19,190)	\$ (139,098)	\$ (119,601)	\$ (13,637)	\$ (133,238)
Prior service costs	(2,201)	331	(1,870)	(2,326)	(410)	(2,736)
	<u>\$ (122,109)</u>	<u>\$ (18,859)</u>	<u>\$ (140,968)</u>	<u>\$ (121,927)</u>	<u>\$ (14,047)</u>	<u>\$ (135,974)</u>

The accompanying balance sheets reflect the underfunded status of the Company's other postretirement benefit plans at December 31, 2019 and 2018. Reconciliations of the obligations and underfunded status of the plans follow:

	2019	2018
Benefit obligation, January 1	\$ 33,076	\$ 37,570
Service cost	70	85
Interest cost	1,345	1,358
Actuarial loss (gain)	380	(3,791)
Benefits paid	(2,917)	(3,435)
Participant contributions	1,246	1,280
Foreign exchange rate changes	39	9
Benefit obligation, December 31	<u>33,239</u>	<u>33,076</u>
Fair value of plan assets, January 1	—	—
Company contributions	1,671	2,155
Participant contributions	1,246	1,280
Benefits paid	(2,917)	(3,435)
Fair value of plan assets, December 31	<u>—</u>	<u>—</u>
Underfunded status, December 31	<u>\$ 33,239</u>	<u>\$ 33,076</u>

Amounts related to other postretirement benefits recognized in the accompanying balance sheets consist of:

	2019	2018
Accrued liabilities	\$ 5,067	\$ 5,414
Accrued retirement benefits	28,172	27,662
Accumulated other non-owner changes to equity, net	(3,079)	(2,716)

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

Amounts related to other postretirement benefits recognized in accumulated other non-owner changes to equity, net of tax, at December 31, 2019 and 2018 consist of:

	2019	2018
Net actuarial loss	\$ (2,981)	\$ (2,618)
Prior service loss	(98)	(98)
	<u>\$ (3,079)</u>	<u>\$ (2,716)</u>

The sources of changes in accumulated other non-owner changes to equity, net, during 2019 were:

	Pension	Other Postretirement Benefits
Prior service cost	\$ 560	\$ —
Net loss	(12,607)	(289)
Amortization of prior service costs	308	19
Amortization of actuarial loss	7,050	9
Foreign exchange rate changes	(305)	(102)
	<u>\$ (4,994)</u>	<u>\$ (363)</u>

Weighted-average assumptions used to determine benefit obligations as of December 31, are:

	2019	2018
U.S. plans:		
Discount rate	3.40%	4.40%
Increase in compensation	2.56%	2.56%
Non-U.S. plans:		
Discount rate	1.26%	2.07%
Increase in compensation	2.72%	2.72%

The investment strategy of the plans is to generate a consistent total investment return sufficient to pay present and future plan benefits to retirees, while minimizing the long-term cost to the Company. Target allocations for asset categories are used to earn a reasonable rate of return, provide required liquidity and minimize the risk of large losses. Targets may be adjusted, as necessary, to reflect trends and developments within the overall investment environment. The weighted-average target investment allocations by asset category were as follows during 2019: 65% in equity securities and 35% in fixed income securities, including cash.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

The fair values of the Company's pension plan assets at December 31, 2019 and 2018, by asset category are as follows:

<u>Asset Category</u>	<u>Total</u>	<u>Fair Value Measurements Using</u>		
		<u>Quoted Prices in Active Markets for Identical Assets (Level 1)</u>	<u>Significant Other Observable Inputs (Level 2)</u>	<u>Significant Unobservable Inputs (Level 3)</u>
December 31, 2019				
Cash and short-term investments	\$ 3,737	\$ 3,737	\$ —	\$ —
Equity securities:				
U.S. large-cap	40,538	—	40,538	—
U.S. mid-cap	17,744	17,744	—	—
U.S. small-cap	16,116	16,116	—	—
International equities	146,013	—	146,013	—
Global equity	51,037	51,037	—	—
Fixed income securities:				
U.S. bond funds	124,429	—	124,429	—
International bonds	60,050	—	60,050	—
Other	2,843	—	—	2,843
	<u>\$ 462,507</u>	<u>\$ 88,634</u>	<u>\$ 371,030</u>	<u>\$ 2,843</u>
December 31, 2018				
Cash and short-term investments	3,750	3,750	—	—
Equity securities:				
U.S. large-cap	36,821	—	36,821	—
U.S. mid-cap	13,337	13,337	—	—
U.S. small-cap	13,244	13,244	—	—
International equities	123,084	—	123,084	—
Global equity	43,337	43,337	—	—
Fixed income securities:				
U.S. bond funds	117,249	—	117,249	—
International bonds	42,920	—	42,920	—
Other	2,480	—	—	2,480
	<u>\$ 396,222</u>	<u>\$ 73,668</u>	<u>\$ 320,074</u>	<u>\$ 2,480</u>

The fair values of the Level 1 assets are based on quoted market prices from various financial exchanges. The fair values of the Level 2 assets are based primarily on quoted prices in active markets for similar assets or liabilities. The Level 2 assets are comprised primarily of commingled funds and fixed income securities. Commingled equity funds are valued at their net asset values based on quoted market prices of the underlying assets. Fixed income securities are valued using a market approach which considers observable market data for the underlying asset or securities. The Level 3 assets relate to the defined benefit pension plan at the Synventive business. These pension assets are fully insured and have been estimated based on accrued pension rights and actuarial rates. These pension assets are limited to fulfilling the Company's pension obligations.

The Company expects to contribute approximately \$4,399 to the pension plans in 2020. No contributions to the U.S. Qualified pension plans, specifically, are required, and the Company does not currently plan to make any discretionary contributions to such plans in 2020.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

The following are the estimated future net benefit payments, which include future service, over the next 10 years:

	Pensions	Other Postretirement Benefits
2020	\$ 29,543	\$ 3,336
2021	29,523	3,154
2022	29,558	2,918
2023	29,123	2,704
2024	29,382	2,520
Years 2025-2029	145,516	10,336
Total	\$ 292,645	\$ 24,968

Pension and other postretirement benefit costs consist of the following:

	Pensions			Other Postretirement Benefits		
	2019	2018	2017	2019	2018	2017
Service cost	\$ 5,425	\$ 5,961	\$ 6,055	\$ 70	\$ 85	\$ 83
Interest cost	18,239	17,383	18,819	1,345	1,358	1,561
Expected return on plan assets	(29,425)	(29,900)	(28,082)	—	—	—
Amortization of prior service cost (credit)	404	560	446	25	20	(68)
Recognized losses	8,889	11,628	10,557	13	561	276
Curtailment gain	—	—	(7,217)	—	—	—
Settlement loss (gain)	340	—	(119)	—	—	—
Net periodic benefit cost	<u>\$ 3,872</u>	<u>\$ 5,632</u>	<u>\$ 459</u>	<u>\$ 1,453</u>	<u>\$ 2,024</u>	<u>\$ 1,852</u>

The Closure of the Company's FOBOHA facility located in Muri, Switzerland resulted in a pre-tax curtailment gain of \$7,217 during the 2017 period. See Note 10.

The components of net periodic benefit cost other than the service cost component are included in Other Expense (Income) on the Consolidated Statements of Income. See Note 1 for the accounting guidance related to the presentation of net periodic pension and other postretirement benefit cost.

The estimated net actuarial loss and prior service cost for the defined benefit pension plans that will be amortized from accumulated other non-owner changes to equity into net periodic benefit cost in 2020 are \$13,712 and \$307, respectively. The estimated net actuarial loss and prior service cost for other defined benefit postretirement plans that will be amortized from accumulated other non-owner changes to equity into net periodic benefit cost in 2020 are \$27 and \$88, respectively.

Weighted-average assumptions used to determine net periodic benefit cost for years ended December 31, are:

	2019	2018	2017
U.S. plans:			
Discount rate	4.40%	3.90%	4.50%
Long-term rate of return	7.75%	7.75%	7.75%
Increase in compensation	2.56%	2.56%	2.56%
Non-U.S. plans:			
Discount rate	2.07%	1.90%	1.60%
Long-term rate of return	3.90%	4.09%	3.59%
Increase in compensation	2.72%	2.17%	2.29%

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

The expected long-term rate of return is based on consideration of projected rates of return and the historical rates of return of published indices that reflect the plans' target asset allocation.

The Company's accumulated postretirement benefit obligations, exclusive of pensions, take into account certain cost-sharing provisions. The annual rate of increase in the cost of covered benefits (i.e., health care cost trend rate) is assumed to be 6.78% and 7.30% at December 31, 2019 and 2018, respectively, decreasing gradually to a rate of 4.50% by December 31, 2038. A one percentage point change in the assumed health care cost trend rate would have the following effects:

	One Percentage Point Increase	One Percentage Point Decrease
Effect on postretirement benefit obligation	\$ 171	\$ (160)
Effect on postretirement benefit cost	7	(7)

The Company actively contributes to a Swedish pension plan that supplements the Swedish social insurance system. The pension plan guarantees employees a pension based on a percentage of their salary and represents a multi-employer pension plan, however the pension plan was not significant in any year presented. This pension plan is not underfunded.

Contributions related to the individually insignificant multi-employer plans, as disclosure is required pursuant to the applicable accounting standards, are as follows:

	Contributions by the Company		
<u>Pension Fund:</u>	2019	2018	2017
Swedish Pension Plan	754	\$ 792	\$ 739
Total Contributions	<u>\$ 754</u>	<u>\$ 792</u>	<u>\$ 739</u>

14. Stock-Based Compensation

The Company accounts for the cost of all share-based payments, including stock options, by measuring the payments at fair value on the grant date and recognizing the cost in the results of operations. The fair values of stock options are estimated using the Black-Scholes option-pricing model based on certain assumptions. The fair values of service and performance based stock awards are estimated based on the fair market value of the Company's stock price on the grant date. The fair value of market based performance share awards are estimated using the Monte Carlo valuation method. Estimated forfeiture rates are applied to outstanding awards.

Refer to Note 18 for a description of the Company's stock-based compensation plans and their general terms. As of December 31, 2019, incentives have been awarded in the form of performance share awards and restricted stock unit awards (collectively, "Rights") and stock options. The Company has elected to use the straight-line method to recognize compensation costs. Stock options and awards typically vest over a period ranging from six months to five years. The maximum term of stock option awards is 10 years. Upon exercise of a stock option or upon vesting of Rights, shares may be issued from treasury shares held by the Company or from authorized shares.

During 2019, 2018 and 2017, the Company recognized \$13,306, \$12,158, and \$12,279 respectively, of stock-based compensation cost and \$2,805, \$2,613, and \$4,579 respectively, of related tax benefits in the accompanying consolidated statements of income. Additionally, the Company recognized excess tax benefits in the tax provision of \$1,952, \$1,687 and \$2,463 in 2019, 2018 and 2017, respectively. The Company has realized all available tax benefits related to deductions from excess stock awards exercised or restricted stock unit awards and performance share awards vested. At December 31, 2019, the Company had \$16,989 of unrecognized compensation costs related to unvested awards which are expected to be recognized over a weighted average period of 2.14 years.

The following table summarizes information about the Company's stock option awards during 2019:

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

	Number of Shares	Weighted-Average Exercise Price
Outstanding, January 1, 2019	684,149	\$ 37.87
Granted	135,270	60.37
Exercised	(180,169)	27.91
Forfeited	(18,965)	48.35
Outstanding, December 31, 2019	620,285	45.35

The following table summarizes information about stock options outstanding at December 31, 2019:

Range of Exercise Prices	Options Outstanding			Options Exercisable	
	Number of Shares	Average Remaining Life (Years)	Average Exercise Price	Number of Shares	Average Exercise Price
\$15.27 to \$20.69	21,195	0.97	\$ 19.95	21,195	\$ 19.95
\$24.24 to \$30.71	124,000	5.82	30.32	124,000	30.32
\$34.92 to \$37.13	133,905	5.21	36.13	133,905	36.13
\$47.04 to \$59.28	215,584	7.69	53.28	101,048	50.86
\$59.46 to \$63.38	125,601	9.16	60.70	2,039	63.38

The Company received cash proceeds from the exercise of stock options of \$5,029, \$673 and \$1,964 in 2019, 2018 and 2017, respectively. The total intrinsic value (the amount by which the stock price exceeds the exercise price of the option on the date of exercise) of the stock options exercised during 2019, 2018 and 2017 was \$5,324, \$1,589 and \$2,887, respectively.

The weighted-average grant date fair value of stock options granted in 2019, 2018 and 2017 was \$14.04, \$12.80 and \$10.31, respectively. The fair value of each stock option grant on the date of grant was estimated using the Black-Scholes option-pricing model based on the following weighted average assumptions:

	2019	2018	2017
Risk-free interest rate	2.43%	2.60%	1.90%
Expected life (years)	5.5	5.3	5.3
Expected volatility	25.0%	24.1%	26.1%
Expected dividend yield	1.43%	1.74%	1.82%

The risk-free interest rate is based on the term structure of interest rates at the time of the option grant. The expected life represents an estimate of the period of time that options are expected to remain outstanding. Assumptions of expected volatility of the Company's common stock and expected dividend yield are estimates of future volatility and dividend yields based on historical trends.

The following table summarizes information about stock options outstanding that are expected to vest and stock options outstanding that are exercisable at December 31, 2019:

Options Outstanding, Expected to Vest				Options Outstanding, Exercisable			
Shares	Weighted-Average Exercise Price	Aggregate Intrinsic Value	Weighted-Average Remaining Term (Years)	Shares	Weighted-Average Exercise Price	Aggregate Intrinsic Value	Weighted-Average Remaining Term (Years)
610,325	\$ 45.35	\$ 10,145	6.85	382,187	\$ 37.39	\$ 9,394	5.77

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

The following table summarizes information about the Company's Rights during 2019:

	Service Based Rights		Service and Performance Based Rights		Service and Market Based Rights	
	Number of Units	Weighted-Average Grant Date Fair Value	Number of Units	Weighted-Average Grant Date Fair Value	Number of Units	Weighted-Average Grant Date Fair Value
Outstanding, January 1, 2019	263,981	\$ 45.07	147,051	\$ 44.71	123,938	\$ 64.78
Granted	124,900	48.91	58,935	59.87	29,467	96.10
Forfeited	(24,088)	54.85	(5,081)	59.23	(3,417)	82.02
Additional Earned	—	—	36,990	31.34	51,726	48.87
Issued	(108,606)	48.54	(96,651)	31.34	(111,387)	48.87
Outstanding, December 31, 2019	<u>256,187</u>		<u>141,244</u>		<u>90,327</u>	

The Company granted 124,900 restricted stock unit awards and 88,402 performance share awards in 2019. All of the restricted stock unit awards vest upon meeting certain service conditions. "Additional Earned" reflects performance share awards earned above target that have been issued. The performance share awards are part of the long-term Performance Share Award Program (the "Awards Program"), which is designed to assess the long-term Company performance relative to the performance of companies included in the Russell 2000 Index or to pre-established goals. The performance goals are independent of each other and based on equally weighted metrics. For awards granted in 2019 and 2018, the metrics included the Company's total shareholder return ("TSR"), operating income before depreciation and amortization growth ("EBITDA growth") and return on invested capital ("ROIC"). For awards granted in 2017, the metrics included TSR and ROIC. The TSR and EBITDA growth metrics are designed to assess the long-term Company performance relative to the performance of companies included in the Russell 2000 Index over a three year period. ROIC is designed to assess the Company's performance compared to pre-established goals over a three year performance period. The participants can earn from zero to 250% of the target award and the award includes a forfeitable right to dividend equivalents, which are not included in the aggregate target award numbers. Compensation expense for the awards is recognized over the three year service period based upon the value determined under the intrinsic value method for EBITDA growth and ROIC portions of the award and the Monte Carlo simulation valuation model for the TSR portion of the award since it contains a market condition. The assumptions used to determine the weighted-average fair values of the market based portion of the 2019 awards include a 2.51% risk-free interest rate and a 25.49% expected volatility rate.

Compensation expense for the TSR portion of the awards is fixed at the date of grant and will not be adjusted in future periods based upon the achievement of the TSR performance goal. Compensation expense for the EBITDA growth and the ROIC portions of the awards is recorded each period based upon a probability assessment of achieving the goals with a final adjustment at the end of the service period based upon the actual achievement of those performance goals.

15. Income Taxes

The components of Income from continuing operations before income taxes and Income taxes follow:

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

	2019	2018	2017
Income from continuing operations before income taxes:			
U.S.	\$ 2,424	\$ (10,719)	\$ 3,082
International	204,420	218,214	192,617
Income from continuing operations before income taxes	<u>\$ 206,844</u>	<u>\$ 207,495</u>	<u>\$ 195,699</u>
Income tax provision:			
Current:			
U.S. – federal	\$ 2,068	\$ 3,110	\$ 77,799
U.S. – state	(1,873)	(623)	1,762
International	60,866	57,871	48,032
	<u>61,061</u>	<u>60,358</u>	<u>127,593</u>
Deferred:			
U.S. – federal	\$ (1,356)	\$ (2,206)	\$ 9,596
U.S. – state	344	(826)	819
International	(11,555)	(16,017)	(1,724)
	<u>(12,567)</u>	<u>(19,049)</u>	<u>8,691</u>
Income taxes	<u>\$ 48,494</u>	<u>\$ 41,309</u>	<u>\$ 136,284</u>

On December 22, 2017 the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act (the “Act”). The Act reduced the U.S. Corporate income tax rate from 35% to 21%, effective January 1, 2018. As required, the Company re-measured its U.S. deferred tax assets and liabilities as of December 31, 2017, applying the reduced U.S. Corporate income tax rate. As a result, the Company recorded a provisional adjustment of \$4,152 to net expense, with a corresponding reduction to the U.S. net deferred asset. The Company filed the 2017 Federal Corporate Tax Return in October 2018 and claimed additional tax deductions subject to the 35% tax rate, which reduced the related tax expense to \$3,399.

The Act taxed certain unrepatriated earnings and profits (“E&P”) of our foreign subsidiaries. In order to determine the Transition Tax we were required to determine, along with other information, the amount of our accumulated post 1986 E&P for our foreign subsidiaries, as well as the non U.S. income tax paid by those subsidiaries on such E&P. We were capable of reasonably estimating the Transition Tax and recorded a provisional Transition Tax expense of \$86,707 in 2017. The U.S. Treasury issued certain Notices and proposed regulations (“interpretative guidance”) in 2018. The interpretative guidance provided additional guidance to assist companies in calculating the one-time Transition Tax. The Company completed the accounting and recorded a final Transition Tax of \$86,858. The U.S. Treasury issued Final Regulations addressing the Transition Tax in January 2019. The Final Regulations did not impact the computation of final income tax expense. The Company made a reasonable estimate of the state taxation of these earnings and recorded a provisional expense of \$1,423 in 2017. In 2018, various states issued guidance related to calculating the tax impacts of the Act, as well as clarifications describing how States would tax income arising from the application of provisions within the Act. As a result, the Company reduced the tax expense related to the impact of the Act to \$597 in 2018.

U.S. Tax Reform required the mandatory deemed repatriation of the undistributed earnings of the Company’s international subsidiaries as of December 31, 2017. If the earnings were distributed in the form of cash dividends, the Company would not be subject to additional U.S. income taxes but could be subject to foreign income and withholding taxes. Under accounting standards (ASC 740) a deferred tax liability is not recorded for the excess of the tax basis over the financial reporting (book) basis of an investment in a foreign subsidiary if the indefinite reinvestment criteria is met. For amounts currently expected to be repatriated, the Company recorded a provisional expense of \$6,932 during 2017. In 2018 the Company repatriated \$62,383 between certain foreign entities, thereby reducing the previously recorded deferred tax liability by \$5,245 and repatriated \$228,750 to the U.S. In 2018, the Company revised its estimates and no longer expects to repatriate foreign earnings relating to \$1,185 of taxes for which a deferred tax liability was previously recorded and as such, a benefit resulted. On December 31, 2019, the Company's unremitted foreign earnings were approximately \$1,571,033.

The Company has recognized a deferred tax liability for U.S. taxes of \$495 on \$10,166 of undistributed earnings of its international subsidiaries, earned before 2017 and the application of the Transition Tax implemented by the Act. All remaining earnings are considered indefinitely reinvested as defined per the indefinite reversal criterion within the accounting guidance

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

for income taxes. If the earnings were distributed in the form of dividends, the Company would not be subject to U.S. Tax but could be subject to foreign income and withholding taxes. Determination of the amount of this unrecognized deferred income tax liability is not practicable. The Company repatriated dividends of \$152,992 and \$228,750, as noted above, to the U.S. from accumulated foreign earnings in 2019 and 2018, respectively. Pursuant to the Act, neither dividend was subject to tax.

Deferred income tax assets and liabilities at December 31 consist of the tax effects of temporary differences related to the following:

	2019	2018
Deferred tax assets:		
Pension	\$ 16,256	\$ 19,025
Tax loss carryforwards	9,167	11,516
Inventory valuation	12,251	11,576
Other postretirement/postemployment costs	8,066	8,372
Accrued Compensation	7,753	9,384
Lease obligation	9,188	—
Other	14,769	3,349
Valuation allowance	(3,592)	(4,366)
Total deferred tax assets	73,858	58,856
Deferred tax liabilities:		
Depreciation and amortization	(110,230)	(122,636)
Goodwill	(9,757)	(9,597)
Swedish tax incentive	(7,436)	(7,241)
Right of use liability	(9,050)	—
Other	(4,558)	(5,467)
Total deferred tax liabilities	(141,031)	(144,941)
Net deferred tax liabilities	\$ (67,173)	\$ (86,085)

Amounts related to deferred taxes in the balance sheets as of December 31, 2019 and 2018 are presented as follows:

	2019	2018
Non-current deferred tax assets	\$ 21,235	\$ 20,474
Non-current deferred tax liabilities	(88,408)	(106,559)
Net deferred tax liabilities	\$ (67,173)	\$ (86,085)

The standards related to accounting for income taxes require that deferred tax assets be reduced by a valuation allowance if, based on all available evidence, it is more likely than not that the deferred tax asset will not be realized. Available evidence includes the reversal of existing taxable temporary differences, future taxable income exclusive of temporary differences, taxable income in carryback years and tax planning strategies.

Management believes that sufficient taxable income should be earned in the future to realize the net deferred tax assets principally in the United States. The realization of these assets is dependent in part on the amount and timing of future taxable income in the jurisdictions where deferred tax assets reside. The Company has tax loss carryforwards of \$31,112; \$3,658 which relates to U.S tax loss carryforwards which have carryforward periods up to 20 years for federal purposes and ranging from one to 20 years for state purposes; \$14,703 of which relates to international tax loss carryforwards with carryforward periods ranging from one to 20 years; and \$12,751 of which relates to international tax loss carryforwards with unlimited carryforward periods. In addition, the Company has tax credit carryforwards of \$383 with remaining carryforward periods ranging from one year to 5 years. As the ultimate realization of the remaining net deferred tax assets is dependent upon future taxable income, if such future taxable income is not earned and it becomes necessary to recognize a valuation allowance, it could result in a material increase in the Company's tax expense which could have a material adverse effect on the Company's financial condition and results of operations.

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

Management is required to assess whether its valuation allowance analysis is affected by various components of the Act including the deemed mandatory repatriation of foreign income for the Transition Tax, future GILTI inclusions, changes to the deductibility of executive compensation and interest expense and changes to the NOL and FTC rules. The Company has determined that a valuation allowance of \$177 is appropriate relating to deferred taxes recognized for stock compensation granted to executives which the Company believes will not be deductible in future years.

A reconciliation of the U.S. federal statutory income tax rate to the consolidated effective income tax rate from continuing operations follows:

	2019	2018	2017
U.S. federal statutory income tax rate	21.0%	21.0%	35.0%
State taxes (net of federal benefit)	0.1	—	0.1
Transition Tax	—	(0.3)	45.0
U.S. Corporate Tax Rate change	—	(0.4)	2.1
Indefinite Reinvestment Assertion	—	(0.6)	3.5
Foreign operations taxed at different rates	2.0	1.3	(11.5)
Foreign losses without tax benefit	2.0	1.5	1.5
GILTI	0.6	1.2	—
Tax Holidays	(1.3)	(1.7)	(0.8)
Stock awards excess tax benefit	(0.9)	(0.8)	(1.2)
Swiss Legal Entity Reduction	—	—	(3.4)
Reduction of Valuation Allowances	(0.3)	(2.5)	—
Audit Settlements	0.3	—	(2.7)
Other	(0.1)	1.2	2.0
Consolidated effective income tax rate	23.4%	19.9%	69.6%

Payment of the Transition Tax assessed is required over an eight-year period. The short-term portion of the Transition Tax payable, \$6,949, has been included within Accrued Liabilities on the Consolidated Balance Sheet as of December 31, 2019. The long-term portion of the assessment, \$66,012, is included as a Long-term tax liability on the Consolidated Balance Sheet and is payable as follows: \$6,949 annually in 2021 through 2022; \$13,029 in 2023; \$17,371 in 2024 and \$21,714 in 2025.

The Aerospace and Industrial Segments have a number of multi-year tax holidays in Singapore and China. Tax benefits of \$2,718 (\$0.05 per diluted share), \$3,627 (\$0.07 per diluted share) and \$1,540 (\$0.03 per diluted share) were realized in 2019, 2018 and 2017, respectively. These holidays are subject to the Company meeting certain commitments in the respective jurisdictions. Aerospace was granted an income tax holiday for operations recently established in Malaysia. The Company has discretion as to the start date of the holiday in Malaysia and currently anticipates the holiday beginning during the second half of 2020. The China holiday expires at the end of 2020 and the Singapore holiday expires at the end of 2022, whereas the Malaysia holiday expires ten years after becoming effective.

Income taxes paid globally, net of refunds, were \$59,003, \$60,576 and \$51,548 in 2019, 2018 and 2017, respectively.

As of December 31, 2019, 2018 and 2017, the total amount of unrecognized tax benefits recorded in the consolidated balance sheet was \$8,919, \$11,594 and \$9,209, respectively, which, if recognized, would have reduced the effective tax rate in prior years, with the exception of amounts related to acquisitions. A reconciliation of the unrecognized tax benefits for 2019, 2018 and 2017 follows:

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

	2019	2018	2017
Balance at January 1	\$ 11,594	\$ 9,209	\$ 13,320
Increase (decrease) in unrecognized tax benefits due to:			
Tax positions taken during prior periods	11	649	1,141
Tax positions taken during the current period	1,114	367	778
Acquisition	—	2,516	—
Settlements	(1,351)	—	(4,162)
Lapse of the applicable statute of limitations	(2,344)	(1,290)	(1,868)
Foreign Currency Translation	(105)	143	—
Balance at December 31	<u>\$ 8,919</u>	<u>\$ 11,594</u>	<u>\$ 9,209</u>

The Company recognizes interest and penalties, if any, related to unrecognized tax benefits in income tax expense. The Company recognized interest and penalties as a component of income taxes of \$(206), \$370, and \$(257) in the years 2019, 2018 and 2017 respectively. The liability for unrecognized tax benefits includes gross accrued interest and penalties of \$3,906, \$4,169 and \$1,576 at December 31, 2019, 2018 and 2017, respectively.

The Company or its subsidiaries file income tax returns in the U.S. federal jurisdiction, and various state and foreign jurisdictions. In the normal course of business, the Company is subject to examination by various taxing authorities, including the IRS in the U.S. and the taxing authorities in other major jurisdictions including China, Germany, Singapore, Sweden and Switzerland. With a few exceptions, tax years remaining open to examination in significant foreign jurisdictions include tax years 2014 and forward and for the U.S. include tax years 2016 and forward. The Company is undergoing a tax audit by the IRS for the 2016 tax year. The Company has received the final assessment for the Manner business in Germany for tax years 2014 through 2016. Additionally, the Company remains under audit for the Synventive business group in 2015 through 2017 in Germany.

16. Common Stock

There were no shares of common stock issued from treasury in 2019, 2018 or 2017.

In 2019, 2018 and 2017, the Company acquired 900,000 shares, 2,292,100 shares and 677,100 shares, respectively, of the Company's common stock at a cost of \$50,347, \$138,275 and \$40,791, respectively. These amounts exclude shares reacquired to pay for the related income tax upon issuance of shares in accordance with the terms of the Company's stockholder-approved equity compensation plans and the equity rights granted under those plans ("Reacquired Shares"). These Reacquired Shares were placed in treasury.

In 2019, 2018 and 2017, 505,623 shares, 332,893 shares and 341,837 shares of common stock, respectively, were issued from authorized shares for the exercise of stock options, various other incentive awards and purchases by the Company's Employee Stock Purchase Plan.

17. Preferred Stock

At December 31, 2019 and 2018, the Company had 3,000,000 shares of preferred stock authorized, none of which were outstanding.

18. Stock Plans

Most U.S. salaried and non-union hourly employees are eligible to participate in the Company's 401(k) plan (the "Retirement Savings Plan"). The Retirement Savings Plan provides for the investment of employer and employee contributions in various investment alternatives including the Company's common stock, at the employee's direction. The Company contributes an amount equal to 50% of employee contributions up to 6% of eligible compensation. The Company expenses all contributions made to the Retirement Savings Plan. Effective January 1, 2013, the Retirement Savings Plan was amended to provide certain salaried employees hired on or after January 1, 2013 with an additional annual retirement contribution of 4% of eligible earnings. The Company recognized expense of \$4,149, \$4,333 and \$4,088 in 2019, 2018 and 2017, respectively. As of December 31, 2019, the Retirement Savings Plan held 812,362 shares of the Company's common stock.

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

The Company has an Employee Stock Purchase Plan (“ESPP”) under which eligible employees may elect to have up to the lesser of \$25 or 10% of base compensation deducted from their payroll checks for the purchase of the Company’s common stock at 95% of the average market value on the date of purchase. The maximum number of shares which may be purchased under the ESPP is 4,550,000. The number of shares purchased under the ESPP was 8,834, 8,006 and 7,734 in 2019, 2018 and 2017, respectively. The Company received cash proceeds from the purchase of these shares of \$463, \$457 and \$444 in 2019, 2018 and 2017, respectively. As of December 31, 2019, 260,831 additional shares may be purchased.

The 1991 Barnes Group Stock Incentive Plan (the “1991 Plan”) authorized the granting of incentives to executive officers, directors and key employees in the form of stock options, stock appreciation rights, incentive stock rights and performance unit awards. On May 9, 2014, the 1991 Plan was merged into the 2014 Plan (defined below).

The Barnes Group Inc. Employee Stock and Ownership Program (the “2000 Plan”) was approved on April 12, 2000, and subsequently amended on April 10, 2002 by the Company’s stockholders. The 2000 Plan permitted the granting of incentive stock options, nonqualified stock options, restricted stock awards, performance share or cash unit awards and stock appreciation rights, or any combination of the foregoing, to eligible employees to purchase up to 6,900,000 shares of the Company’s common stock. Such shares were authorized and reserved. On May 9, 2014, the 2000 Plan was merged into the 2014 Plan (defined below).

The Barnes Group Stock and Incentive Award Plan (the “2004 Plan”) was approved on April 14, 2004, and subsequently amended on April 20, 2006 and May 7, 2010 by the Company’s stockholders. The 2004 Plan permits the issuance of incentive awards, stock option grants and stock appreciation rights to eligible participants to purchase up to 5,700,000 shares of common stock. On May 9, 2014, the 2004 Plan was merged into the 2014 Plan (defined below), and the remaining shares available for future grants under the 2004 Plan, as of the merger date, were made available under the 2014 Plan.

The 2014 Barnes Group Stock and Incentive Award Plan (the “2014 Plan”) was approved on May 9, 2014 by the Company’s stockholders. The 2014 Plan permits the issuance of incentive awards, stock option grants and stock appreciation rights to eligible participants to purchase up to 6,913,978 shares of common stock. The amount includes shares available for purchase under the 1991, 2000, and 2004 Plans which were merged into the 2014 Plan. The 2014 Plan allows for stock options and stock appreciation rights to be issued at a ratio of 1:1 and other types of incentive awards at a ratio of 2.84:1 from the shares available for future grants. As of December 31, 2019, there were 3,540,739 shares available for future grants under the 2014 Plan, inclusive of Shares Reacquired and shares made available through 2019 forfeitures. As of December 31, 2019, there were 1,147,303 shares of common stock outstanding to be issued upon the exercise of stock options and the vesting of Rights.

Rights under the 2014 Plan entitle the holder to receive, without payment, one share of the Company’s common stock after the expiration of the vesting period. Certain of these Rights are also subject to the satisfaction of established performance goals. Additionally, holders of certain Rights are credited with dividend equivalents, which are converted into additional Rights, and holders of certain restricted stock units are paid dividend equivalents in cash when dividends are paid to other stockholders. All Rights have a vesting period of up to five years.

Under the Non-Employee Director Deferred Stock Plan, as amended, each non-employee director who joined the Board of Directors prior to December 15, 2005 was granted the right to receive 12,000 shares of the Company’s common stock upon retirement. In 2019, 2018 and 2017, \$22, \$22 and \$20, respectively, of dividend equivalents were paid in cash related to these shares. There was no compensation cost related to this plan in 2019 and there was \$8 and \$9 in 2018 and 2017, respectively. There are 33,600 shares reserved for issuance under this plan. Each non-employee director who joined the Board of Directors subsequent to December 15, 2005 received restricted stock units under the respective 2004 or 2014 Plans.

Total maximum shares reserved for issuance under all stock plans aggregated 4,982,473 at December 31, 2019.

19. Weighted Average Shares Outstanding

Net income per common share is computed in accordance with accounting standards related to earnings per share. Basic earnings per share is calculated using the weighted-average number of common shares outstanding during the year. Share-based payment awards that entitle their holders to receive nonforfeitable dividends before vesting should be considered participating securities and, as such, should be included in the calculation of basic earnings per share. The Company’s restricted stock unit awards which contain nonforfeitable rights to dividends are considered participating securities. Diluted earnings per share reflects the assumed exercise and conversion of all dilutive securities. Shares held by the Retirement Savings Plan are considered outstanding for both basic and diluted earnings per share. There are no adjustments to net income for purposes of

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

computing income available to common stockholders for the years ended December 31, 2019, 2018 and 2017. A reconciliation of the weighted-average number of common shares outstanding used in the calculation of basic and diluted earnings per share follows:

	Weighted-Average Common Shares Outstanding		
	2019	2018	2017
Basic	51,213,518	52,304,190	54,073,407
Dilutive effect of:			
Stock options	176,984	260,240	258,052
Performance share awards	242,667	267,176	273,839
Diluted	51,633,169	52,831,606	54,605,298

The calculation of weighted-average diluted shares outstanding excludes all anti-dilutive shares. During 2019, 2018 and 2017, the Company excluded 280,254, 127,562 and 46,450 stock awards, respectively, from the calculation of diluted weighted-average shares outstanding as the stock awards were considered anti-dilutive.

20. Leases

The Company maintains leases of certain manufacturing, distribution and assembly facilities, office space, land, machinery and equipment. Leases generally have remaining terms of one year to ten years. Leases with an initial term of twelve months or less are not recorded on the Consolidated Balance Sheets. The Company recognizes lease expense for minimum lease payments on a straight line basis over the term of the lease. Certain leases include options to renew or terminate. Renewal options are exercisable per the discretion of the Company and vary based on the nature of each lease, with renewal periods generally ranging from one year to five years. The term of the lease includes renewal periods only if the Company is reasonably certain that it will exercise the renewal option. When determining if a renewal option is reasonably certain of being exercised, the Company considers several factors, including but not limited to, the cost of moving to another location, the cost of disruption to operations, whether the purpose or location of the leased asset is unique and the contractual terms associated with extending the lease.

Certain leases provide the option to purchase the leased property and are therefore evaluated for finance lease consideration. Right-of-use ("ROU") assets and lease liabilities related to finance leases were not material as of December 31, 2019. ROU assets arising from finance leases are included in property, plant and equipment, net, and the corresponding liabilities are included in Long Term Debt - Current and Long-Term Debt on the Consolidated Balance Sheet. The depreciable life of leased assets are limited by the expected term of the lease, unless there is a transfer of title or purchase option and the Company believes it is reasonably certain of exercise.

Lease agreements generally do not contain any material residual value guarantees or materially restrictive covenants and the Company does not sublease to any third parties. The Company does not have any material leases that have been signed but not commenced.

Contracts are evaluated at inception to determine whether they contain a lease, where the Company obtains the right to control an identified asset. The following table sets forth the classification of ROU assets and lease liabilities on the Consolidated Balance Sheets:

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

<u>Operating Leases</u>	<u>Classification</u>	<u>December 31, 2019</u>
Leased Assets		
ROU assets	Other assets	\$ 31,411
Lease Liabilities		
Current lease liability	Accrued liabilities	10,751
Long-term lease liability	Other liabilities	21,374
		<u>\$ 32,125</u>

Operating lease ROU assets and operating lease liabilities are recognized based on the present value of the future minimum lease payments over the lease term at commencement date. The operating lease ROU assets represent the lease liability, plus any lease payments made at or before the commencement date, less any lease incentives received. The Company's real estate leases, which are comprised primarily of manufacturing, distribution and assembly facilities, represent a majority of the lease liability. A significant portion of lease payments are fixed, although an immaterial portion of payments are variable in nature. Variable lease payments vary based on changes in facts and circumstances related to the use of the ROU and are recorded as incurred. The Company utilizes its incremental borrowing rate by lease term to calculate the present value of our future lease payments if an implicit rate is not specified. The discount rate is risk adjusted on a secured basis and is the rate at which the Company would be charged to borrow the amount equal to the lease payments over a similar term.

The Company has lease agreements with lease and non-lease components, which are accounted for as a single lease component. The Company applies a portfolio approach to effectively account for the operating lease ROU assets and liabilities.

Operating lease costs for the twelve months ended December 31, 2019 were \$16,211 and were included within cost of sales and selling and administrative expenses. Operating lease costs include short-term and variable leases costs, which were immaterial during the period. Rent expense was \$15,839 and \$15,325 for 2018 and 2017, respectively.

Future minimum lease payments under non-cancellable leases as of December 31, 2019 were as follows:

	<u>Operating Leases</u>
2020	\$ 11,870
2021	9,016
2022	4,616
2023	3,096
2024	1,601
After 2024	6,804
Total lease payments	<u>\$ 37,003</u>
Less: Interest	4,878
Present value of lease payments	<u>\$ 32,125</u>

Minimum rental commitments under non-cancellable leases as of December 31, 2018 for years 2019 through 2023, pursuant to the previous lease accounting guidance, were \$11,931, \$8,322, \$5,888, \$2,898 and \$2,064, respectively, and \$7,659 thereafter.

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

<u>Lease Term and Discount Rate</u>	<u>December 31, 2019</u>
Weighted-average remaining lease term (years)	
Operating leases	6.0
Weighted-average discount rate	
Operating leases	3.90%

<u>Other Information</u>	<u>Year ended December 31, 2019</u>
Cash paid for amounts included in the measurement of lease liabilities	
Operating cash flows from operating leases	\$ 13,546
Leased assets obtained in exchange for new operating lease liabilities	\$ 11,823

21. Changes in Accumulated Other Comprehensive Income by Component

The following tables set forth the changes in accumulated other comprehensive income by component for the years ended December 31, 2019 and December 31, 2018:

	Gains and Losses on Cash Flow Hedges	Pension and Other Postretirement Benefit Items	Foreign Currency Items	Total
January 1, 2019	\$ 834	\$ (138,690)	\$ (52,644)	\$ (190,500)
Other comprehensive (loss) income before reclassifications to consolidated statements of income	(1,436)	(12,743)	(13,689)	(27,868)
Amounts reclassified from accumulated other comprehensive income to the consolidated statements of income	487	7,386	—	7,873
Net current-period other comprehensive loss	(949)	(5,357)	(13,689)	(19,995)
December 31, 2019	\$ (115)	\$ (144,047)	\$ (66,333)	\$ (210,495)

	Gains and Losses on Cash Flow Hedges	Pension and Other Postretirement Benefit Items	Foreign Currency Items	Total
January 1, 2018	\$ 72	\$ (103,844)	\$ (2,627)	\$ (106,399)
Other comprehensive loss before reclassifications to consolidated statements of income	(410)	(25,170)	(50,017)	(75,597)
Amounts reclassified from accumulated other comprehensive income to the consolidated statements of income	1,083	9,744	—	10,827
Net current-period other comprehensive income (loss)	673	(15,426)	(50,017)	(64,770)
Amounts reclassified from accumulated other comprehensive income to retained earnings ^(A)	89	(19,420)	—	(19,331)
December 31, 2018	\$ 834	\$ (138,690)	\$ (52,644)	\$ (190,500)

(A) This amount represents the reclassification of stranded tax effects resulting from the Act, as permitted by amended guidance issued by the FASB in February 2018. See Note 1.

The following table sets forth the reclassifications out of accumulated other comprehensive income by component for the years ended December 31, 2019 and December 31, 2018:

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

Details about Accumulated Other Comprehensive Income Components	Amount Reclassified from Accumulated Other Comprehensive Income		Affected Line Item in the Consolidated Statements of Income
	2019	2018	
Gains and losses on cash flow hedges			
Interest rate contracts	\$ 347	\$ (277)	Interest expense
Foreign exchange contracts	(956)	(1,116)	Net sales
	(609)	(1,393)	Total before tax
	122	310	Tax benefit
	(487)	(1,083)	Net of tax
Pension and other postretirement benefit items			
Amortization of prior-service costs, net	\$ (429)	\$ (580)	(A)
Amortization of actuarial losses	(8,902)	(12,189)	(A)
Settlement loss	(340)	—	(A)
	(9,671)	(12,769)	Total before tax
	2,285	3,025	Tax benefit
	(7,386)	(9,744)	Net of tax
Total reclassifications in the period	\$ (7,873)	\$ (10,827)	

(A) These accumulated other comprehensive income components are included within the computation of net periodic Pension and Other Postretirement Benefits cost. See Note 13.

22. Information on Business Segments

The Company is organized based upon the nature of its products and services and reports under two global business segments: Industrial and Aerospace. Segment information is consistent with how management reviews the businesses, makes investing and resource allocation decisions and assesses operating performance. The Company has not aggregated operating segments for purposes of identifying these two reportable segments.

Industrial 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, automation, personal care, packaging, electronics, and medical devices. 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 business designs and manufactures 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. The Force & Motion Control business provides innovative cost effective force and motion control solutions for a wide range of metal forming and other industrial markets. The Automation business designs and develops robotic grippers, advanced end-of-arm tooling systems, sensors and other automation components for intelligent robotic handling solutions and industrial automation applications. Industrial's Engineered Components business manufactures and supplies precision mechanical products used in transportation and industrial applications, including mechanical springs, and high-precision punched and fine-blanked components.

Industrial competes with a broad base of large and small companies engaged in the manufacture and sale of engineered products, precision molds, hot runner systems, robotic handling solutions and precision components. Industrial competes on the basis of quality, service, reliability of supply, engineering and technical capability, geographic reach, product breadth, innovation, design and price. Industrial has a global presence in multiple countries, with manufacturing, distribution and assembly operations in the United States, China, Germany, Italy, Sweden and Switzerland, among others. Industrial also has sales and service operations in the United States, China/Hong Kong, Germany, Italy and Switzerland, among others.

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

Aerospace is a global manufacturer of complex fabricated and precision machined components and assemblies for turbine engines, nacelles and structures for both commercial and military aircraft. The Aerospace aftermarket business provides aircraft engine component 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.

Aerospace’s OEM business supplements the leading aircraft engine OEM, nacelles, and structure capabilities and competes with a large number of fabrication and machining companies. Competition is based mainly on value derived from intellectual property and trade secrets, quality, concurrent engineering and technical capability, product breadth, solutions providing new product introduction, timeliness, service and price. Aerospace’s fabrication and machining operations, with facilities in Arizona, Connecticut, Mexico, Michigan, Ohio, Utah and Singapore, produce critical engine, nacelle and airframe components through technologically advanced manufacturing processes.

The Aerospace aftermarket business supplements jet engine OEMs’ maintenance, repair and overhaul capabilities, and competes with the service centers of major commercial airlines and other independent service companies for the repair and overhaul of turbine engine components. The manufacture and supply of aerospace aftermarket spare parts, including those related to the RSPs, are dependent upon the reliable and timely delivery of high-quality components. Aerospace’s aftermarket facilities, located in Connecticut, Ohio, Singapore and Malaysia, specialize in the repair and refurbishment of highly engineered components and assemblies such as cases, rotating life limited parts, rotating air seals, turbine shrouds, vanes and honeycomb air seals.

The Company evaluates the performance of its reportable segments based on the operating profit of the respective businesses, which includes net sales, cost of sales, selling and administrative expenses and certain components of other expense (income), net, as well as the allocation of corporate overhead expenses.

Sales between the business segments and between the geographic areas in which the businesses operate are accounted for on the same basis as sales to unaffiliated customers. Additionally, revenues are attributed to countries based on the location of facilities.

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

The following table (in millions) sets forth summarized financial information by reportable business segment:

		Industrial	Aerospace	Other	Total Company
Sales					
	2019	\$ 938.5	\$ 552.6	\$ —	\$ 1,491.1
	2018	994.7	501.2	—	1,495.9
	2017	973.9	462.6	—	1,436.5
Operating profit					
	2019	\$ 114.0	\$ 122.5	\$ —	\$ 236.4
	2018	130.4	101.4	—	231.8
	2017	122.8	83.6	—	206.5
Assets					
	2019	\$ 1,879.3	\$ 704.3	\$ 154.8	\$ 2,738.3
	2018	1,962.4	692.6	154.0	2,809.0
	2017	1,505.4	667.1	193.3	2,365.7
Depreciation and amortization					
	2019	\$ 62.4	\$ 35.9	\$ 0.8	\$ 99.1
	2018	57.6	35.9	0.8	94.2
	2017	54.8	33.6	1.7	90.2
Capital expenditures					
	2019	\$ 25.3	\$ 26.0	\$ 2.0	\$ 53.3
	2018	33.4	23.6	0.3	57.3
	2017	31.0	27.5	0.2	58.7

Notes:

One customer, General Electric, accounted for 21%, 18% and 18% of the Company's total revenues in 2019, 2018 and 2017, respectively.

"Other" assets include corporate-controlled assets, the majority of which are cash and cash equivalents.

A reconciliation of the total reportable segments' operating profit to income before income taxes follows (in millions):

	2019	2018	2017
Operating profit	\$ 236.4	\$ 231.8	\$ 206.5
Interest expense	20.6	16.8	14.6
Other expense (income), net	9.0	7.4	(3.8)
Income before income taxes	<u>\$ 206.8</u>	<u>\$ 207.5</u>	<u>\$ 195.7</u>

The following table (in millions) summarizes total net sales of the Company by products and services:

	2019	2018	2017
Engineered Components Products	\$ 254.6	\$ 285.9	\$ 292.2
Molding Solutions Products	442.6	503.8	487.3
Force & Motion Control Products	186.7	196.2	194.4
Automation Products	54.6	8.8	—
Aerospace Original Equipment Manufacturer Products	367.5	337.0	323.4
Aerospace Aftermarket Products and Services	185.1	164.2	139.2
Total net sales	<u>\$ 1,491.1</u>	<u>\$ 1,495.9</u>	<u>\$ 1,436.5</u>

BARNES GROUP INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS—(Continued)

The following table (in millions) summarizes total net sales and long-lived assets of the Company by geographic area:

		Domestic		International		Other		Total Company
Sales								
	2019	\$ 630.0	\$	949.4	\$	(88.4)	\$	1,491.1
	2018	624.3		958.7		(87.1)		1,495.9
	2017	638.6		868.3		(70.4)		1,436.5
Long-lived assets								
	2019	\$ 372.2	\$	1,580.5	\$	—	\$	1,952.7
	2018	366.1		1,616.2		—		1,982.4
	2017	366.7		1,218.1		—		1,584.8

Notes:

Germany, with sales of \$302.0 million, \$331.4 million and \$301.7 million in 2019, 2018 and 2017, respectively, and Singapore, with sales of \$225.7 million and \$193.6 million in 2019 and 2018, respectively, represent the only international countries with revenues in excess of 10% of the Company's total revenues in those years.

"Other" revenues represent the elimination of inter-company sales between geographic locations, of which approximately 68%, 72% and 78% were sales from international locations to domestic locations in 2019, 2018 and 2017, respectively.

Germany, with long-lived assets of \$480.3 million, \$494.0 million and \$514.0 million as of December 31, 2019, 2018 and 2017, respectively, Singapore, with long-lived assets of \$226.5 million, \$233.3 million and \$237.6 million as of December 31, 2019, 2018 and 2017, respectively, Italy, with long-lived assets of \$402.1 million and \$412.0 million as of December 31, 2019 and 2018, respectively, and Switzerland, with long-lived assets of \$160.0 million as of December 31, 2017, represent the international countries with long-lived assets that exceeded 10% of the Company's total long-lived assets in those years.

23. Commitments and Contingencies

Product Warranties

The Company provides product warranties in connection with the sale of certain products. From time to time, the Company is subject to customer claims with respect to product warranties. The Company accrues its estimated exposure for warranty claims at the time of sale based upon the length of the warranty period, historical experience and other related information known to the Company. Liabilities related to product warranties and extended warranties were not material as of December 31, 2019 or 2018.

Litigation

The Company is subject to litigation from time to time in the ordinary course of business and various other suits, proceedings and claims are pending involving the Company and its subsidiaries. The Company records a loss contingency liability when a loss is considered probable and the amount can be reasonably estimated. While it is not possible to determine the ultimate disposition of each of these proceedings and whether they will be resolved consistent with the Company's beliefs, the Company expects that the outcome of such proceedings, individually or in the aggregate, will not have a material adverse effect on financial condition or results of operations.

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Barnes Group Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Barnes Group Inc. and its subsidiaries (the “Company”) as of December 31, 2019 and 2018, and the related consolidated statements of income, of comprehensive income, of changes in stockholders’ equity and of cash flows for each of the three years in the period ended December 31, 2019, including the related notes and schedule of valuation and qualifying accounts for each of the three years in the period ended December 31, 2019 appearing under Item 15(c) (collectively referred to as the “consolidated financial statements”). We also have audited the Company's internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2019 and 2018 and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Changes in Accounting Principles

As discussed in Note 1 to the consolidated financial statements, the Company changed the manner in which it accounts for leases in 2019 and the manner in which it accounts for revenues from contracts with customers in 2018.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Report on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit

preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matters

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that (i) relates to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Quantitative Goodwill Impairment Assessment

As described in Notes 1 and 7 to the consolidated financial statements, the Company's consolidated goodwill balance was \$933 million as of December 31, 2019. Goodwill is subject to an impairment test annually as of April 1, or more frequently if an event or change in circumstances indicates that the fair value of a reporting unit has been reduced below its carrying value. Management utilized the option to first assess qualitative factors to determine whether it is necessary to perform the Step 1 quantitative goodwill impairment test. If management determined that a Step 1 quantitative impairment test is required, management estimated the fair value of the reporting unit primarily using the income approach, which reflects management's cash flow projections. Inherent in management's cash flow projections are assumptions and estimates, including those related to future earnings, growth rates, and the weighted average cost of capital.

The principal considerations for our determination that performing procedures relating to the quantitative goodwill impairment assessment is a critical audit matter are there was significant judgment by management when developing the fair value measurement of any reporting units where a quantitative test was performed. This in turn led to a high degree of auditor judgment, subjectivity, and effort in performing procedures and evaluating audit evidence relating to management's cash flow projections, including significant assumptions related to future earnings, growth rates, and the weighted average cost of capital. In addition, the audit effort involved the use of professionals with specialized skill and knowledge to assist in performing these procedures and evaluating the audit evidence obtained.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to management's quantitative goodwill impairment assessment, including controls over the valuation of any reporting units for which a quantitative test was performed. These procedures also included, among others, testing management's process for developing the fair value estimate. This included evaluating the appropriateness of the income approach, testing the completeness, accuracy, and relevance of underlying data used in the estimate, and evaluating the significant assumptions used by management, including future earnings, growth rates, and the weighted average cost of capital. Evaluating management's assumptions related to future earnings, growth rates, and the weighted average cost of capital involved evaluating whether the assumptions used by management were reasonable considering (i) the current and past performance of the reporting unit, (ii) the consistency with external market and industry data, and (iii) whether these assumptions were consistent with evidence obtained in other areas of the audit. Professionals with specialized skill and knowledge were used to assist in the evaluation of the appropriateness of the Company's income approach and reasonableness of management's significant assumption for the weighted average cost of capital.

/s/ PRICEWATERHOUSECOOPERS LLP

Hartford, Connecticut

February 24, 2020

We have served as the Company's auditor since 1994.

QUARTERLY DATA (UNAUDITED)

(Dollars in millions, except per share data)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter ⁽²⁾	Full Year ⁽²⁾
2019					
Net sales	\$ 376.7	\$ 371.7	\$ 372.6	\$ 370.1	\$ 1,491.1
Gross profit ⁽¹⁾	132.0	133.4	138.2	143.4	547.0
Operating income	50.6	57.0	67.6	61.3	236.4
Net income	34.0	37.6	45.8	41.0	158.4
Per common share:					
Basic	0.66	0.73	0.90	0.80	3.09
Diluted	0.65	0.73	0.89	0.80	3.07
Dividends	0.16	0.16	0.16	0.16	0.64
Market prices (high - low)	\$61.98-51.00	\$58.22-50.84	\$57.50-42.39	\$63.14-47.66	\$63.14-42.39
2018					
Net sales	\$ 366.7	\$ 375.3	\$ 369.8	\$ 384.1	\$ 1,495.9
Gross profit ⁽¹⁾	129.5	137.7	132.9	132.2	532.4
Operating income	56.6	63.9	59.1	52.2	231.8
Net income	38.8	49.4	39.1	38.8	166.2
Per common share:					
Basic	0.73	0.94	0.76	0.75	3.18
Diluted	0.72	0.93	0.75	0.75	3.15
Dividends	0.14	0.16	0.16	0.16	0.62
Market prices (high - low)	\$69.41-57.93	\$63.79-52.42	\$72.70-58.09	\$71.84-49.06	\$72.70-49.06

(1) Sales less cost of sales.

(2) Net income and net income per common share include a non-cash impairment charge of \$5.6 million related to the sale of the Seeger business during the three and twelve month periods ended December 31, 2019. See Note 3 of the Consolidated Financial Statements. The impairment charge had the effect of decreasing Net income per common share (Basic and Diluted) by \$0.11 during the three and twelve month periods ended December 31, 2019.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

None.

Item 9A. Controls and Procedures

Disclosure Controls and Procedures

Management, including the Company's President and Chief Executive Officer and Chief Financial Officer, has evaluated the effectiveness of the design and operation of the Company's disclosure controls and procedures as of the end of the period covered by this report. Based upon, and as of the date of, that evaluation, the President and Chief Executive Officer and Chief Financial Officer concluded that the disclosure controls and procedures were effective, in all material respects, and designed to provide reasonable assurance that the information required to be disclosed in the reports the Company files and submits under the Securities Exchange Act of 1934 (the "Exchange Act"), as amended, is (i) recorded, processed, summarized and reported as and when required and (ii) is accumulated and communicated to the Company's management, including our President and Chief Executive Officer and Chief Financial Officer, as appropriate to allow timely decisions regarding required disclosure.

Management's Report on Internal Control Over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rule 13a-15(f). Under the supervision and with the participation of management, including the principal executive officer and principal financial officer, the Company conducted an assessment of the effectiveness of its

internal control over financial reporting based on the framework in the “Internal Control - Integrated Framework 2013” issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on the assessment under this framework, management concluded that the Company’s internal control over financial reporting was effective as of December 31, 2019.

PricewaterhouseCoopers LLP, the independent registered public accounting firm that audited the financial statements included in this Annual Report, has issued an attestation report on the Company’s internal control over financial reporting as of December 31, 2019, which appears within Item 8 of this Annual Report on Form 10-K.

Changes in Internal Control Over Financial Reporting

There has been no change to our internal control over financial reporting during the Company’s fourth fiscal quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

Information with respect to our directors and corporate governance may be found in the “Governance” and “Stock Ownership” sections of our definitive proxy statement to be delivered to stockholders in connection with the Annual Meeting of Stockholders to be held on May 8, 2020 (the “Proxy Statement”). Such information is incorporated herein by reference.

EXECUTIVE OFFICERS

The Company’s executive officers as of the date of this Annual Report are as follows:

<u>Executive Officer</u>	<u>Position</u>	<u>Age as of December 31, 2019</u>
Patrick J. Dempsey	President and Chief Executive Officer	55
Michael A. Beck	Senior Vice President, Barnes Group Inc., and President, Barnes Aerospace	59
Dawn N. Edwards	Senior Vice President, Human Resources	51
Peter A. Gutermann	Senior Vice President, General Counsel and Secretary	60
Patrick T. Hurley	Senior Vice President & Chief Technology Officer	47
Stephen G. Moule	Senior Vice President, Barnes Group Inc., and President, Barnes Industrial	47
Christopher J. Stephens, Jr.	Senior Vice President, Finance and Chief Financial Officer	55

Each officer holds office until his or her successor is appointed and qualified or otherwise as provided in the Company’s Amended and Restated By-Laws. No family relationships exist among the executive officers of the Company. Except for Messrs. Beck, Gutermann, Hurley and Moule, each of the Company’s executive officers has been employed by the Company or its subsidiaries in an executive or managerial capacity for at least the past five years.

Mr. Dempsey was appointed President and Chief Executive Officer effective March 1, 2013. From February 2012 until such appointment, he served as Senior Vice President and Chief Operating Officer. From October 2008 until February 2012, he served as Vice President, Barnes Group Inc. and President, Logistics and Manufacturing Services. Prior to that, he held a series of roles of increasing responsibility since joining the Company in October 2000. In October 2007, he was appointed Vice President, Barnes Group Inc. and President, Barnes Distribution. In November 2004, he was promoted to Vice President, Barnes Group Inc. and President, Barnes Aerospace. Mr. Dempsey is currently a director of Nucor Corporation, having been appointed as of December 1, 2016.

Mr. Beck was appointed Senior Vice President, Barnes Group Inc. and President, Barnes Aerospace effective March 1, 2016. Mr. Beck came to Barnes Group with over 27 years of global aerospace experience. Prior to joining Barnes Group, Mr. Beck was the Senior Vice President & General Manager, Fuel and Motion Control, a \$1B division of Eaton’s Aerospace Group. Prior to this, he was the Chief Executive Officer of GKN’s Aerospace Engine Systems business, where he led the due diligence, business synergies and integration of a significant acquisition. Prior to that, he was the President and Chief Executive Officer of GKN’s global Propulsion Systems and Special Products business. Earlier in his career, Mr. Beck was the Chief Operating Officer and Site Executive for GKN’s St. Louis, Missouri business.

Ms. Edwards was appointed Senior Vice President, Human Resources effective August 2009. From December 2008 until August 2009, she served as Vice President of Human Resources - Global Operations. From September 1998 until December 2008, Ms. Edwards served as Group Director, Human Resources for Barnes Aerospace, Associated Spring and Barnes Industrial. Ms. Edwards joined the Company in September 1998.

Mr. Gutermann was appointed Senior Vice President, General Counsel and Secretary effective December 11, 2017. Before joining the Company, Mr. Gutermann served as Corporate Vice President, Chief Ethics & Compliance Officer for United Technologies Corporation. Prior to that, Mr. Gutermann held a variety of positions with increasing responsibility within United Technologies Corporation including Vice President & General Counsel, UTC Propulsion/Aerospace Systems; Vice President & General Counsel, Pratt & Whitney; Associate General Counsel, UTC Corporate; Deputy General Counsel, Otis Elevator Company; and Executive Assistant to the UTC Chairman and Chief Executive Officer. Mr. Gutermann began his career as a Litigation Associate with the law firm of Robinson & Cole. As disclosed in the Company's Current Report on Form 8-K filed with the SEC on February 18, 2020, on February 14, 2020, Mr. Gutermann notified the Company that he has decided to retire, effective March 31, 2020, following an orderly transition period. Also on February 14, 2020, the Board of Directors of the Company appointed James C. Pelletier Senior Vice President, General Counsel and Secretary, effective April 1, 2020. Mr. Pelletier currently serves as Deputy General Counsel of the Company and Segment General Counsel, Barnes Aerospace.

Mr. Hurley was appointed Senior Vice President & Chief Technology Officer effective February 7, 2019. From 2014 until joining the Company, Mr. Hurley was General Manager, Asia Pacific & Chief R&D Officer with A123 Systems, LLC. From 2011 to 2014, he held a series of roles with increasing responsibility with Johnson Controls, including Director, Global Core Components; Director, R&D; and Senior Manager, Strategic Technology Planning. From 2006 to 2011, Mr. Hurley held roles with Air Products, including the positions of Senior Principal Research Scientist / Technology Lead and Senior Research Scientist.

Mr. Moule was appointed Senior Vice President, Barnes Group Inc. and President, Barnes Industrial effective December 1, 2019. Before joining the Company, Mr. Moule was President, Americas at Gilbarco Veeder-Root (GVR), a \$1.1B operating unit within the Fortive Corporation. Mr. Moule joined GVR in 2007 and held various positions of increasing responsibility including President, North America, as well as Managing Director, United Kingdom; Managing Director, Europe; President Europe & CIS; and President, Europe, Middle East & Africa, all based in London, England.

Mr. Stephens was appointed Senior Vice President, Finance and Chief Financial Officer, Barnes Group Inc. effective January 2009. Prior to joining the Company, Mr. Stephens held key leadership roles at Honeywell International, serving as President of the Consumer Products Group from 2007 to 2008, and Vice President and Chief Financial Officer of Honeywell Transportation Systems from 2003 to 2007. Prior to Honeywell, he held roles with increasing responsibility at The Boeing Company, serving as Vice President and General Manager, Boeing Electron Dynamic Devices; Vice President, Business Operations, Boeing Space and Communications; and Vice President and Chief Financial Officer, Boeing Satellite Systems.

Items 11-14.

The information called for by Items 11-14 is incorporated by reference to the "Governance," "Stock Ownership," "Executive Compensation," "Director Compensation in 2019," "Securities Authorized for Issuance Under Equity Compensation Plans," "Related Person Transactions," and "Principal Accountant Fees and Services" sections in our Proxy Statement.

PART IV

Item 15. Exhibits, Financial Statement Schedule

- (a)(1) The following Financial Statements and Supplementary Data of the Company are set forth herein under Item 8 of this Annual Report:

Consolidated Statements of Income for the years ended December 31, 2019, 2018 and 2017

Consolidated Balance Sheets as of December 31, 2019 and 2018

Consolidated Statements of Comprehensive Income for the years ended December 31, 2019, 2018 and 2017

Consolidated Statements of Cash Flows for the years ended December 31, 2019, 2018 and 2017

Consolidated Statements of Changes in Stockholders' Equity for the years ended December 31, 2019, 2018 and 2017

Notes to Consolidated Financial Statements

Report of Independent Registered Public Accounting Firm

- (a)(2) See Financial Statement Schedule under Item 15(c).

- (a)(3) See Item 15(b) below.

- (b) The Exhibits required by Item 601 of Regulation S-K are filed within the Exhibit Index of this Annual Report, which is incorporated herein by reference.

- (c) Financial Statement Schedule.

Item 16. Form 10-K Summary

None

Schedule II—Valuation and Qualifying Accounts
Years Ended December 31, 2019, 2018 and 2017
(In thousands)

Allowances for Doubtful Accounts:	
Balance January 1, 2017	\$ 3,992
Provision charged to income	1,512
Doubtful accounts written off	(297)
Other adjustments ⁽¹⁾	(64)
Balance December 31, 2017	5,143
Provision charged to income	363
Doubtful accounts written off	(416)
Other adjustments ⁽¹⁾	(80)
Balance December 31, 2018	5,010
Provision charged to income	1,347
Doubtful accounts written off	(960)
Reclassified to assets held for sale (see Note 3)	(152)
Other adjustments ⁽¹⁾	(48)
Balance December 31, 2019	<u>\$ 5,197</u>

(1) These amounts are comprised primarily of foreign currency translation and other reclassifications.

Schedule II—Valuation and Qualifying Accounts
Years Ended December 31, 2019, 2018 and 2017
(In thousands)

Valuation Allowance on Deferred Tax Assets:	
Balance January 1, 2017	\$ 14,957
Additions charged to income tax expense	1,161
Reductions charged to other comprehensive income	(123)
Reductions credited to income tax expense ⁽¹⁾	(6,773)
Changes due to foreign currency translation	1,001
Balance December 31, 2017	10,223
Additions charged to income tax expense	546
Reductions charged to other comprehensive income	(15)
Reductions credited to income tax expense ⁽²⁾	(6,064)
Changes due to foreign currency translation	(324)
Balance December 31, 2018	4,366
Additions charged to income tax expense	953
Reductions charged to other comprehensive income	(7)
Reductions credited to income tax expense	(1,683)
Changes due to foreign currency translation	(37)
Balance December 31, 2019	<u>\$ 3,592</u>

- (1) The reductions in 2017 relate to the release of valuation allowances associated with net operating losses as a result of the Swiss legal entity reduction.
- (2) The reductions in 2018 relate primarily to the release of valuation allowances associated with net operating losses in certain foreign subsidiaries.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Company has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Date: February 24, 2020

BARNES GROUP INC.

By

/S/ PATRICK J. DEMPSEY

Patrick J. Dempsey
President and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below as of the above date by the following persons on behalf of the Company in the capacities indicated.

/S/ PATRICK J. DEMPSEY

Patrick J. Dempsey
President and Chief Executive Officer
(Principal Executive Officer), and Director

/S/ CHRISTOPHER J. STEPHENS, JR.

Christopher J. Stephens, Jr.
Senior Vice President, Finance
Chief Financial Officer
(Principal Financial Officer)

/S/ MARIAN ACKER

Marian Acker
Vice President, Controller
(Principal Accounting Officer)

/S/ THOMAS O. BARNES

Thomas O. Barnes
Director

/S/ ELIJAH K. BARNES

Elijah K. Barnes
Director

/S/ RICHARD J. HIPPLE

Richard J. Hipple
Director

/S/ THOMAS J. HOOK

Thomas J. Hook
Director

/S/ DAPHNE E. JONES

Daphne E. Jones
Director

/S/ MYLLE H. MANGUM

Mylle H. Mangum
Director

/S/ HANS-PETER MÄNNER

Hans-Peter Männer
Director

/S/ HASSELL H. MCCLELLAN

Hassell H. McClellan
Director

/S/ WILLIAM J. MORGAN

William J. Morgan
Director

/S/ ANTHONY V. NICOLOSI

Anthony V. Nicolosi
Director

/S/ JOANNA L. SOHOVICH

JoAnna L. Sohovich
Director

EXHIBIT INDEX

Barnes Group Inc.

Annual Report on Form 10-K for the Year ended December 31, 2019

<u>Exhibit No.</u>	<u>Description</u>	<u>Reference</u>
2.1*	Sale and Purchase Agreement, dated as of September 19, 2018, between Barnes GTE S.r.l., the Company and AGIC Gripper (Netherlands) B.V., HDX S.A.R.L., Asia-Germany Industry 4.0 Promotion Cross-Border Fund I L.P., Xenon Private Equity V Limited Partnership and certain other sellers named therein.	<u>Incorporated by reference to Exhibit 2.1 to Form 8-K filed by the Company on September 24, 2018.</u>
3.1	Restated Certificate of Incorporation; Certificate of Designation, Preferences and Rights of Series A Junior Participating Preferred Stock; Certificate of Change of Location of registered office and of registered agent, dated December 13, 2002; Certificate of Merger of domestic limited liability company into a domestic company, dated May 19, 2004; Certificate of Amendment of Restated Certificate of Incorporation, dated April 20, 2006; and Certificate of Amendment of Restated Certificate of Incorporation, dated as of May 3, 2013.	<u>Incorporated by reference to Exhibit 3.1 to the Company's report on Form 10-Q (Commission file number 0001-04801) for the quarter ended June 30, 2013.</u>
3.2	Amended and Restated By-Laws as of July 28, 2016.	<u>Incorporated by reference to Exhibit 3.1 to Form 8-K filed by the Company on July 29, 2016.</u>
4.1	<u>Description of Securities.</u>	Filed with this report.
10.1	(i) Fifth Amended and Restated Senior Unsecured Revolving Credit Agreement, dated September 27, 2011.	<u>Incorporated by reference to Exhibit 4.1 to the Company's report on Form 10-Q (Commission file number 0001-04801) for the quarter ended June 30, 2013.</u>
	(ii) Amendment No. 2 and Joinder to Credit Agreement dated as of September 27, 2013 (amending Fifth Amended and Restated Senior Unsecured Revolving Credit Agreement, dated as of September 27, 2011).	<u>Incorporated by reference to Exhibit 4.1 to the Company's report on Form 10-Q (Commission file number 0001-04801) for the quarter ended September 30, 2013.</u>
	(iii) Amendment No. 3 to Credit Agreement dated as of October 15, 2014.	<u>Incorporated by reference to Exhibit 10.1(iii) to the Company's report on form 10-K (Commission file number 0001-04801) for the year ended December 31 2014.</u>
	(iv) Amendment No. 4 to Credit Agreement dated as of February 2, 2017.	<u>Incorporated by reference to Exhibit 10.1 to the Company's Report on Form 10-Q for the quarter ended March 31, 2017.</u>
	(v) Amendment No. 5 to Credit Agreement dated as of October 19, 2018.	<u>Incorporated by reference to Exhibit 10.1 to the Company's Report on Form 10-Q for the quarter ended September 30, 2018.</u>
10.2	Note Purchase Agreement, dated as of October 15, 2014, among the Company and New York Life Insurance Company, New York Life Insurance and Annuity Corporation and New York Life Insurance and Annuity Corporation Institutionally Owned Life Insurance Separate Account (BOLI 30C).	<u>Incorporated by reference to Exhibit 10.1 to Form 8-K (Commission number 0001-04801) filed by the Company on October 17, 2014.</u>
10.3**	(ii) Barnes Group Inc. Management Incentive Compensation Plan, amended December 28, 2018.	<u>Incorporated by reference to Exhibit 10.3(ii) to the Company's report on Form 10-K for the year ended December 31, 2018.</u>
10.4**	(i) Offer Letter between the Company and Patrick Dempsey, dated February 22, 2013.	<u>Incorporated by reference to Exhibit 10.3 to the Company's report on Form 10-Q (Commission file number 0001-04801) for the quarter ended March 31, 2013.</u>

<u>Exhibit No.</u>	<u>Description</u>	<u>Reference</u>
	(ii) Amendment to Offer Letter to Patrick Dempsey, dated January 6, 2015.	<u>Incorporated by reference to Exhibit 10.6(ii) to the Company's report on Form 10-K (Commission number 0001-04801) for the year ended December 31, 2014.</u>
	(iii) Employee Non-Disclosure, Non-Competition, Non-Solicitation and Non-Disparagement Agreement between the Company and Patrick J. Dempsey, dated February 27, 2013.	<u>Incorporated by reference to Exhibit 10.4 to the Company's report on Form 10-Q (Commission file number 0001-04801) for the quarter ended March 31, 2013.</u>
10.5**	(i) Amendment to Offer Letter to Christopher J. Stephens, Jr., dated June 7, 2013.	<u>Incorporated by reference to Exhibit 10.2 to the Company's report on Form 10-Q (Commission file number 0001-04801) for the quarter ended June 30, 2013.</u>
	(ii) Amendment to Amended Offer Letter to Christopher J. Stephens, Jr., dated February 12, 2014.	<u>Incorporated by reference to Exhibit 10.6(ii) to the Company's report on Form 10-K (Commission file number 0001-04801) for the year ended December 31, 2013.</u>
10.6**	Offer Letter to Scott A. Mayo, dated January 28, 2014.	<u>Incorporated by reference to Exhibit 10.2 to the Company's report on Form 10-Q (Commission number 0001-04801) for the quarter ended March 31, 2014.</u>
10.7**	Offer Letter to Michael A. Beck, dated January 28, 2016.	<u>Incorporated by reference to Exhibit 10.1 to the Company's report on Form 10-Q for the quarter ended March 31, 2016</u>
10.8**	Offer Letter to Peter Gutermann, dated November 29, 2017.	<u>Incorporated by reference to Exhibit 10.44 to the Company's report on Form 10-K for the year ended December 31, 2017.</u>
10.9**	Offer Letter to Patrick T. Hurley, dated January 4, 2019.	<u>Incorporated by reference to Exhibit 10.39 to the Company's report on Form 10-K for the year ended December 31, 2018.</u>
10.10**	Transition Services and Separation Agreement between the Company and Scott A. Mayo, dated February 28, 2019.	<u>Incorporated by reference to Exhibit 10.1 to the Company's report on Form 10-Q for the quarter ended March 31, 2019.</u>
10.11**	<u>Offer Letter to Stephen Moule, dated October 24, 2019.</u>	Filed with this report.
10.12**	(i) Barnes Group Inc. Retirement Benefit Equalization Plan, as amended and restated effective January 1, 2013.	<u>Incorporated by reference to Exhibit 10.9(i) to the Company's report on Form 10-K for the year ended December 31 2017.</u>
	(ii) First Amendment to the Barnes Group Inc. Retirement Benefit Equalization Plan dated December 12, 2014.	<u>Incorporated by reference to Exhibit 10.9(ii) to the Company's report on Form 10-K (Commission number 0001-04801) for the year ended December 31, 2014.</u>
10.13**	(i) Barnes Group Inc. Supplemental Senior Officer Retirement Plan, as amended and restated effective January 1, 2009.	<u>Incorporated by reference to Exhibit 10.3 to the Company's report on Form 10-K (Commission number 0001-04801) for the year ended December 31, 2008.</u>
	(ii) Amendment to the Barnes Group Inc. Supplemental Senior Officer Retirement Plan (SSORP)	<u>Incorporated by reference to Exhibit 10.3(ii) to the Company's report on Form 10-K (Commission number 0001-04801) for the year ended December 31, 2009.</u>
	(iii) Second Amendment to the Barnes Group Inc. Supplemental Senior Officer Retirement Plan dated December 12, 2014.	<u>Incorporated by reference to Exhibit 10.10(iii) to the Company's report on Form 10-K (Commission number 0001-04801) for the year ended December 31, 2014.</u>

<u>Exhibit No.</u>	<u>Description</u>	<u>Reference</u>
10.14**	(i) Amended and Restated Supplemental Executive Retirement Plan effective April 1, 2012.	<u>Incorporated by reference to Exhibit 10.11(i) to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
	(ii) Amendment 2013-1 to the Barnes Group Inc. Supplemental Executive Retirement Plan dated July 23, 2013.	<u>Incorporated by reference to Exhibit 10.3 to the Company's report on Form 10-Q (Commission file number 0001-04801) for the quarter ended June 30, 2013.</u>
	(iii) Amendment 2014-1 to the Barnes Group Inc. Supplemental Executive Retirement Plan dated December 12, 2014.	<u>Incorporated by reference to Exhibit 10.11(iii) to the Company's report on Form 10-K (Commission number 0001-04801) for the year ended December 31, 2014.</u>
10.15**	Barnes Group Inc. Senior Executive Enhanced Life Insurance Program, as amended and restated effective April 1, 2011.	<u>Incorporated by reference to Exhibit 10.12 to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
10.16**	Barnes Group Inc. Enhanced Life Insurance Program, as amended and restated effective April 1, 2011.	<u>Incorporated by reference to Exhibit 10.13 to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
10.17**	Barnes Group Inc. Executive Group Term Life Insurance Program effective April 1, 2011.	<u>Incorporated by reference to Exhibit 10.14 to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
10.18**	Form of Barnes Group Inc. Executive Officer Severance Agreement, as amended March 31, 2010.	<u>Incorporated by reference to Exhibit 10.15 to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
10.19**	Form of Barnes Group Inc. Executive Officer Severance Agreement, effective February 19, 2014.	<u>Incorporated by reference to Exhibit 10.1 to the Company's report on Form 10-Q (Commission number 0001-04801) for the quarter ended March 31, 2014.</u>
10.20**	Barnes Group Inc. Executive Separation Pay Plan, as amended and restated effective January 1, 2012.	<u>Incorporated by reference to Exhibit 10.17 to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
10.21**	Barnes Group Inc. Executive Separation Pay plan, as amended and restated effective March 7, 2019.	<u>Incorporated by reference to Exhibit 10.2 to the Company's report on Form 10-Q for the quarter ended March 31, 2019.</u>
10.22**	(i) Trust Agreement between the Company and Fidelity Management Trust Company (Barnes Group 2009 Deferred Compensation Plan) dated September 1, 2009.	<u>Incorporated by reference to Exhibit 10.18(i) to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
	(ii) Amended and Restated Barnes Group 2009 Deferred Compensation Plan effective as of April 1, 2012.	<u>Incorporated by reference to Exhibit 10.18(ii) to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
	(iii) First Amendment to the Barnes Group 2009 Deferred Compensation Plan dated December 12, 2014.	<u>Incorporated by reference to Exhibit 10.18(iii) to the Company's report on Form 10-K (Commission number 0001-04801) for the year ended December 31, 2014.</u>
10.23**	Barnes Group Inc. Non-Employee Director Deferred Stock Plan, as amended and restated December 31, 2008.	<u>Incorporated by reference to Exhibit 10.19 to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
10.24**	Barnes Group Inc. Directors' Deferred Compensation Plan, as amended and restated December 31, 2008.	<u>Incorporated by reference to Exhibit 10.20 to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
10.25**	Barnes Group Inc. Trust Agreement for Specified Plans.	<u>Incorporated by reference to Exhibit 10.22 to the Company's report on Form 10-K for the year ended December 31, 2016.</u>

<u>Exhibit No.</u>	<u>Description</u>	<u>Reference</u>
10.26**	Form of Incentive Compensation Reimbursement Agreement between the Company and certain Officers.	<u>Incorporated by reference to Exhibit 10.23 to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
10.27**	Form of Indemnification Agreement between the Company and its Officers and Directors.	<u>Incorporated by reference to Exhibit 10.24 to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
10.28**	(i) Barnes Group Inc. Stock and Incentive Award Plan, as amended December 31, 2008.	<u>Incorporated by reference to Exhibit 10.25(i) to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
	(ii) Barnes Group Inc. Stock and Incentive Award Plan, as amended March 15, 2010.	<u>Incorporated by reference to Exhibit 10.25(ii) to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
	(iii) Exercise of Authority Relating to the Stock and Incentive Award Plan, dated March 3, 2009.	<u>Incorporated by reference to Exhibit 10.25(iii) to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
	(iv) Amendment 2010-1 approved on December 9, 2010 to the Barnes Group Inc. Stock and Incentive Award Plan as amended March 15, 2010.	<u>Incorporated by reference to Exhibit 10.25(iv) to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
10.29**	2014 Barnes Group Inc. Stock and Incentive Award Plan.	<u>Incorporated by reference to Annex A to the Company's definitive proxy statement (Commission number 0001-04801) filed with the Securities and Exchange Commission on March 25, 2014.</u>
10.30**	<u>Form of Barnes Group Inc. Stock and Incentive Award Plan Restricted Stock Unit Summary of Grant and Restricted Stock Unit Agreement for US Directors dated February 7, 2017 (for non-management directors).</u>	Filed with this report.
10.31**	Form of Barnes Group Inc. Stock and Incentive Award Plan Restricted Stock Unit Summary of Grant and Restricted Stock Unit Agreement for non-US Directors dated October 13, 2016 (for non-management directors).	<u>Incorporated by reference to Exhibit 10.25 to the Company's report on Form 10-K for the year ended December 31, 2018.</u>
10.32**	Form of Barnes Group Inc. Stock and Incentive Award Plan Stock Option Summary of Grant and Stock Option Agreement for Employees in Grade 21 and up dated as of February 8, 2011.	<u>Incorporated by reference to Exhibit 10.3 to the Company's report on Form 10-Q (Commission file number 0001-04801) for the quarter ended March 31, 2011.</u>
10.33**	Form of Barnes Group Inc. Stock and Incentive Award Plan Stock Option Summary of Grant and Stock Option Agreement for Employees in Grade 21 and up dated May 9, 2014.	<u>Incorporated by reference to Exhibit 10.4 to the Company's report on Form 10-Q (Commission number 0001-04801) for the quarter ended June 30, 2014.</u>
10.34**	Form of Barnes Group Inc. Stock and Incentive Award Plan Stock Option Summary of Grant and Stock Option Agreement for Employees in Grade 21 and up dated February 9, 2016.	<u>Incorporated by reference to Exhibit 10.33 to the Company's report on Form 10-K for the year ended December 31, 2015.</u>
10.35**	Form of Barnes Group Inc. Stock and Incentive Award Plan Restricted Stock Unit Summary of Grant for Employees and Restricted Stock Unit Agreement dated February 9, 2016.	<u>Incorporated by reference to Exhibit 10.32 to the Company's report on Form 10-K for the year ended December 31, 2018.</u>

<u>Exhibit No.</u>	<u>Description</u>	<u>Reference</u>
10.36**	Form of Barnes Group Inc. Stock and Incentive Award Plan Performance Share Award Summary of Grant and Performance Share Award Agreement for Officers and Other Individuals as Designated by the Compensation and Management Development Committee dated as of February 9, 2016.	<u>Incorporated by reference to Exhibit 10.42 to the Company's report on Form 10-K for the year ended December 31, 2015.</u>
10.37**	Form of Barnes Group Inc. Stock and Incentive Award Plan Performance Share Award Summary of Grant and Performance Share Award Agreement for Officers and Other Individuals as Designated by the Compensation and Management Development Committee dated as of February 8, 2018.	<u>Incorporated by reference to Exhibit 10.41(ii) to the Company's report on Form 10-K for the year ended December 31, 2017.</u>
10.38**	Form of Barnes Group Inc. Stock and Incentive Award Plan Performance Share Award Summary of Grant and Performance Share Award Agreement for Officers and Other Individuals as Designated by the Compensation and Management Development Committee dated as of February 13, 2019.	<u>Incorporated by reference to Exhibit 10.35 to the Company's report on Form 10-K for the year ended December 31, 2018.</u>
10.39**	Performance-Linked Bonus Plan for Selected Executive Officers approved by Shareholders on May 6, 2016.	<u>Incorporated by reference to Exhibit 10.42 to the Company's report on Form 10-K for the year ended December 31, 2016.</u>
21	<u>List of Subsidiaries.</u>	Filed with this report.
23	<u>Consent of Independent Registered Public Accounting Firm.</u>	Filed with this report.
31.1	<u>Certification pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</u>	Filed with this report.
31.2	<u>Certification pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</u>	Filed with this report.
32	<u>Certification pursuant to 18 U.S.C. Section 1350 as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</u>	Furnished with this report.
101.INS	XBRL Instance Document.	Filed with this report.
101.SCH	XBRL Taxonomy Extension Schema Document.	Filed with this report.
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document.	Filed with this report.
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document.	Filed with this report.
101.LAB	XBRL Taxonomy Extension Label Linkbase Document.	Filed with this report.
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document.	Filed with this report.

* The Company hereby agrees to provide the Commission upon request copies of any omitted exhibits or schedules to this exhibit required by Item 601(b)(2) of Regulation S-K.

** Management contract or compensatory plan or arrangement.

The Company agrees to furnish to the Commission, upon request, a copy of each instrument with respect to which there are outstanding issues of unregistered long-term debt of the Company and its subsidiaries, the authorized principal amount of which does not exceed 10% of the total assets of the Company and its subsidiaries on a consolidated basis.

BARNES GROUP INC.

CONSOLIDATED SUBSIDIARIES

as of December 31, 2019

<u>Name</u>	<u>Jurisdiction of Incorporation</u>
AS Monterrey, S. de R.L. de C.V.	Mexico
Associated Spring (Tianjin) Company, Ltd.	China
Associated Spring (UK) Ltd.	United Kingdom
Associated Spring Asia Pte. Ltd.	Singapore
Associated Spring Corporation	United States - Connecticut
Associated Spring do Brasil Ltda.	Brazil
Associated Spring Mexico, S. de R.L. de C.V.	Mexico
Associated Spring Raymond (Shanghai) Co., Ltd.	China
Associated Spring Raymond GmbH	Germany
Barnes Airmotive Malaysia SND. BHD.	Malaysia
Barnes Financing Delaware LLC	United States - Delaware
Barnes Group (Bermuda) Limited	Bermuda
Barnes Group (Delaware) LLC	United States - Delaware
Barnes Group (Germany) GmbH	Germany
Barnes Group (Scotland) Limited	Scotland
Barnes Group (Thailand) Ltd.	Thailand
Barnes Group (U.K.) 2 Limited	United Kingdom
Barnes Group (U.K.) Limited	United Kingdom
Barnes Group Acquisition GmbH	Germany
Barnes Group Canada Corp.	Canada
Barnes Group Finance Company (Bermuda) Limited	Bermuda
Barnes Group Finance Company (Delaware)	United States - Delaware
Barnes Group Holding LLC	United States - Delaware
Barnes Group Luxembourg (No. 1) S.à r.l.	Luxembourg
Barnes Group Luxembourg (No. 2) S.à r.l.	Luxembourg
Barnes Group Spain, S.R.L.	Spain
Barnes Group Suisse Industries GmbH	Switzerland
Barnes Group Switzerland GmbH	Switzerland
Barnes Industrial Group India Private Limited	India
Barnes Korea Ltd.	Korea
Barnes Molding Solutions (Jiangsu) Co., Ltd.	China
Blitz F16-34 GmbH	Germany
Curtiss Industries (U.K.) Limited	United Kingdom
FOBOHA (Germany) GmbH	Germany
FOBOHA Holding GmbH	Germany

<u>Name</u>	<u>Jurisdiction of Incorporation</u>
Gammaflux Controls, Inc.	United States - Connecticut
GF Controls GmbH	Germany
Gimatic Automation Engineering (Changshu) Co., Ltd.	China
Gimatic Automation India Pvt Ltd.	India
Gimatic Automation Technology (Shanghai) Co., Ltd.	China
Gimatic Balkan d.o.o. Beograd – Savski Venac	Serbia
Gimatic Czech Republic s.r.o.	Czech Republic
Gimatic France S.a.r.l.	France
Gimatic Japan Limited	Japan
Gimatic Korea Limited	Korea
Gimatic Nordic A.B.	Sweden
Gimatic Otomasyon Ticaret Anonim Şirketi	Turkey
Gimatic Polska sp. z o.o.	Poland
Gimatic S.r.l.	Italy
Gimatic Sisteme RO SRL	Romania
Gimatic Sistemi industrijska avtomatizacija, d.o.o.	Slovenia
Gimatic Spain S.L.	Spain
Gimatic UK Limited	United Kingdom
Gimatic Vertrieb GmbH	Germany
Gimatrade S.r.l.	Italy
Industrial Gas Springs Group Holdings Limited	United Kingdom
Industrial Gas Springs Inc.	United States - Pennsylvania
Industrial Gas Springs Limited	United Kingdom
Manner Hong Kong Limited	Hong Kong
männer Japan Co. Ltd.	Japan
Manner USA, Inc.	United States - Georgia
MTM S.r.l.	Italy
OOO Gimatic Rus	Russia
Otto Männer GmbH	Germany
Otto Männer Immobilien GmbH	Germany
Otto Männer Innovation GmbH	Germany
Priamus System Technologies GmbH	Germany
Priamus System Technologies LLC	United States - Ohio
Raymond Distribution-Mexico, S.A. de C.V.	Mexico
Resortes Argentina S.A.	Argentina
Ressorts SPEC SAS	France
Seeger-Orbis GmbH & Co. OHG	Germany
Seeger-Orbis Mechanical Components (Tianjin) Co., Ltd.	China
Sign Holdings Limited	United Kingdom
Strömsholmen AB	Sweden

<u>Name</u>	<u>Jurisdiction</u>
Synventive Acquisition B.V.	Netherlands
Synventive Acquisition GmbH	Germany
Synventive Acquisition Inc.	United States - Delaware
Synventive Acquisition UK Ltd.	United Kingdom
Synventive Acquisition Unlimited	United Kingdom
Synventive B.V.	Netherlands
Synventive Fertigungstechnik GmbH	Germany
Synventive Holding B.V.	Netherlands
Synventive Holding Limited	United Kingdom
Synventive Molding Solutions (Suzhou) Co., Ltd.	China
Synventive Molding Solutions B.V.	Netherlands
Synventive Molding Solutions Canada, Inc.	Canada
Synventive Molding Solutions Co., Ltd.	Hong Kong
Synventive Molding Solutions GmbH	Germany
Synventive Molding Solutions JBJ Private Limited	India
Synventive Molding Solutions K.K.	Japan
Synventive Molding Solutions Lda	Portugal
Synventive Molding Solutions Limited	United Kingdom
Synventive Molding Solutions LLC	United States - Delaware
Synventive Molding Solutions LTDA.	Brazil
Synventive Molding Solutions Pte Ltd.	Singapore
Synventive Molding Solutions s.r.o.	Czech Republic
Synventive Molding Solutions SL	Spain
Synventive Molding Solutions, Inc.	United States - Delaware
Synventive Parent Inc.	United States - Delaware
The Wallace Barnes Company	United States - Connecticut
Thermoplay Brasil Sistemas de Injecao Ltda	Brazil
Thermoplay Deutschland GmbH	Germany
Thermoplay France S.a.r.l.	France
Thermoplay India Private Limited	India
Thermoplay Portugal Unipessoal LDA	Portugal
Thermoplay S.p.A.	Italy
Thermoplay U.K. Ltd.	United Kingdom
Windsor Airmotive Asia Pte. Ltd.	Singapore

The foregoing does not constitute a complete list of all subsidiaries of the registrant. The subsidiaries that have been omitted do not, if considered in the aggregate as a single subsidiary, constitute a “Significant Subsidiary” as defined by the Securities and Exchange Commission.

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-8 (Nos. 333-205952, 333-196013, 333-150741, and 333-133597) of Barnes Group Inc. of our report dated February 24, 2020 relating to the financial statements, financial statement schedule and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PRICEWATERHOUSECOOPERS LLP

Hartford, Connecticut
February 24, 2020

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BOARD OF DIRECTORS

Thomas O. Barnes

Chairman of the Board,
Barnes Group Inc.

Elijah K. Barnes

Principal, Avison Young

Patrick J. Dempsey

President and Chief Executive Officer,
Barnes Group Inc.

Richard J. Hipple

Former Executive Chairman,
Materion Corporation

Thomas J. Hook

Chief Executive Officer,
Q Holding Company

Daphne E. Jones

Former Senior Vice President,
Digital/Future of Work for GE
Healthcare

Mylle H. Mangum

Chief Executive Officer,
IBT Holdings, LLC

Hans-Peter Männer

Managing Director,
HPM Invest GmbH

Hassell H. McClellan

Former Associate Professor of
Finance and Policy,
Boston College's Wallace E. Carroll
School of Management

William J. Morgan

Former Partner,
KPMG LLP

Anthony V. Nicolosi

Former Regional Risk Management
Partner for the Americas,
KPMG LLP

JoAnna L. Sohovich

Chief Executive Officer,
The Chamberlain Group, Inc.

OFFICERS

Patrick J. Dempsey

President and Chief Executive Officer

Marian Acker

Vice President,
Controller

Michael A. Beck

Senior Vice President,
Barnes Group Inc. and
President, Barnes Aerospace

Dawn N. Edwards

Senior Vice President,
Human Resources

Peter A. Gutermann

Senior Vice President,
General Counsel and Secretary

Lukas Hovorka

Vice President,
Corporate Development

Patrick T. Hurley

Senior Vice President and
Chief Technology Officer

Michael V. Kennedy

Vice President,
Tax and Treasury

Stephen G. Moule

Senior Vice President, Barnes Group Inc.
and President, Barnes Industrial

Christopher J. Stephens, Jr.

Senior Vice President, Finance
and Chief Financial Officer

CORPORATE INFORMATION

Transfer Agent and Registrar

Computershare
P.O. Box 30170,
College Station, TX 77842-3170

Phone: 1-800-801-9519 (Continental U.S. only)

Phone: 1-201-680-6578 (Outside U.S.)

For the hearing impaired:
1-800-231-5469 (Continental U.S. only)

1-201-680-6610 (Outside U.S.)
www.computershare.com/investor

Use the above address, phone numbers and Internet address for information about the following services:

Direct Deposit of Dividends, Stockholders Inquiries,
Change of Name or Address, Consolidations, Lost
Certificates, Replacement.

**Direct Stock Purchase Plan/
Dividend Reinvestment**

Initial purchases of Barnes Group common stock can be made through the Direct Stock Purchase Plan. Dividends on Barnes Group common stock may be automatically invested in additional shares.

Stock Exchange

New York Stock Exchange
Stock Trading Symbol: B

Independent Registered Public Accounting Firm

PricewaterhouseCoopers LLP
185 Asylum Street, Hartford, CT 06103

Communications

For press releases and other information about the Company, go to our Internet address at www.BGInc.com or contact:

Investor Relations

William E. Pitts
Director, Investor Relations
IR@BGInc.com

Barnes Group Inc.

123 Main Street
Bristol, CT 06010-6376 USA
Phone: 1-860-583-7070

ANNUAL MEETING

The Barnes Group Inc. Annual Meeting of Stockholders will be held at **11:00 a.m., Friday, May 8, 2020**, at the **DoubleTree by Hilton Hotel, Bristol, Connecticut**.

Note: As part of our precautions regarding the coronavirus or COVID-19, and related public health measures taken in response to the coronavirus or COVID-19, we will monitor the need to potentially alter the location of the Annual Meeting of Stockholders or to switch to a virtual meeting format. If we take this step, we will announce the decision to do so in advance via a press release and the filing of additional proxy materials with the Securities and Exchange Commission. In such case, details on how to participate will also be available at www.bginc.com. Please monitor our website at www.bginc.com for updated information. If you are planning to attend our meeting, please check the website one week prior to the meeting date. As always, we encourage you to vote your shares prior to the meeting.



Corporate Office
123 Main Street
Bristol, CT 06010-6376
USA
BGInc.com