BARNES GROUP INC
Form 10-K
February 26, 2019
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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K
x ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2018
¨ 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	06-0247840
(State of incorporation)	(I.R.S. Employer Identification No.)
123 Main Street, Bristol, Connecticut	06010
(Address of Principal Executive Office)	(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	Name of each exchange on which registered
Common Stock, $0.01 Par Value	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 x 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 x
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 x 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 x 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 x	Accelerated filer o
Non-accelerated filer o	Smaller reporting company o
	Emerging growth company ¨

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 x

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 29, 2018 was approximately $2,798,420,456 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 51,354,856 shares of common stock as of February 20, 2019.

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 3, 2019 are incorporated by reference into Part III.

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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, including any potential adverse effects associated with a U.S. government shutdown; the impact of new or revised tax laws and regulations;

changes in raw material or product prices and availability; integration of acquired businesses; restructuring costs or savings; the continuing impact of prior acquisitions and divestitures, including the ongoing impact of the acquisition of Gimatic S.r.l., including integration efforts; 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; government tariffs, trade agreements and trade policies; and other risks and uncertainties described in this Annual Report. The Company assumes no obligation to update its forward-looking statements.

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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 Brescia, 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.

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(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.

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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.

In the third quarter of 2016, the Company, through three of its subsidiaries, completed its acquisition of the molds business of Adval Tech Holding AG and Adval Tech Holdings (Asia) Pte. Ltd. ("FOBOHA"). FOBOHA is headquartered in Haslach, Germany and operates out of manufacturing facilities located in Germany and China. FOBOHA specializes in the development and manufacture of complex plastic injection molds for packaging, medical, consumer and automotive applications. FOBOHA 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 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, high-precision punched and fine-blanked components and retention rings.

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. For additional information regarding net sales by geographic area, refer to Note 20 of the Consolidated Financial Statements. Sales by Industrial to its three largest customers accounted for approximately 10% of its sales in 2018.

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.

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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 54%, 15% and 9% of its sales in 2018, respectively. Sales to its next three largest customers in 2018 collectively accounted for approximately 7% of its total sales.

FINANCIAL INFORMATION

The backlog of the Company's orders believed to be firm at the end of 2018 was $1,169 million as compared with $1,039 million at the end of 2017. Of the 2018 year-end backlog, $858 million was attributable to Aerospace and $311 million was attributable to Industrial. Approximately 59% of the Company's consolidated year-end backlog is scheduled to be shipped during 2019. The remainder of the Company's backlog is scheduled to be shipped after 2019.

We have a global manufacturing footprint and a technical service network to service 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 3 and 20 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, as well as within our Aerospace and our other Industrial businesses. Many of the products manufactured by us are custom parts made to 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, $15 million and $13 million in 2018, 2017 and 2016, 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 (including trade secrets, patents and trademarks). 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 2018, our net sales to General Electric and its subsidiaries accounted for 18% of our total sales and approximately 54% 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 9%, respectively, of Aerospace's net sales in 2018. Approximately 7% of Aerospace's net sales in 2018 were to its next three largest customers. Approximately 10% of Industrial's sales in 2018 were to its three 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

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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, Swiss franc and Thai baht. 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.

Although we have obtained property damage and business interruption insurance, a major catastrophe such as an earthquake, windstorm, flood or other natural disaster at any of our sites, or significant labor strikes, work stoppages, political unrest, or any of the events described above, in any of the areas where we 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. 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

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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, and we may incur significant professional fees in conjunction with the audit. We may also be subject to unanticipated income taxes, excise 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. Under the current presidential administration, the U.S. government has indicated its intent to alter its approach to international trade policy and in some cases to renegotiate, or potentially terminate, certain existing bilateral or multi-lateral trade agreements and treaties with foreign countries, including the North American Free Trade Agreement (“NAFTA”). For example, on September 30, 2018, the U.S., Mexico, and Canada reached a preliminary U.S.-Mexico-Canada Agreement (“USMCA”) which, if finalized and approved by relevant governmental bodies in each participating country, would replace NAFTA. In addition, the U.S. government has recently imposed certain tariffs and is considering imposing further tariffs on certain foreign goods, including steel. Meanwhile, certain foreign governments, including the government of the People’s Republic of China, have imposed or are considering imposing tariffs on certain U.S. goods. It remains unclear what the U.S. federal government or foreign governments will or will not do in the future with respect to tariffs, NAFTA 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, 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. For instance, the European Union General Data Protection Regulation (the "GDPR"), which took effect in May 2018, among other things, mandates new requirements regarding the handling of personal data of employees and customers, including its use, protection and the ability of persons whose data is stored to correct or delete such data about themselves. If we fail to comply with these laws or regulations, we could be subject to significant litigation, monetary damages, regulatory enforcement actions or fines in one or more jurisdictions. A failure to comply with the GDPR could potentially result in fines up to the greater of €20 million or 4% of annual global revenues.

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, 2018, we had consolidated debt obligations of $944.0 million, representing

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approximately 44% 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, 2018, we and our subsidiaries had $944.0 million aggregate principal amount of consolidated debt obligations outstanding, of which approximately 78% 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, 2018 would result in an approximate $7.3 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, 2018, our inventories totaled $266.0 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".

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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, 2018, our goodwill totaled $955.5 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 sooner if triggering events warrant. 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, 2018, we had $1,169.2 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 needs or purchasing budgets.

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, 2018 equaled $299.5 million, all of which have been paid. At December 31, 2018, the remaining unamortized balance of these participation fees was $177.5 million.

We entered into Component Repair Programs ("CRPs"), also with GE, during 2015, 2014 and 2013. The CRPs 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 aircraft 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, 2018 equaled $111.8 million, all of which have been paid. At December 31, 2018, the remaining unamortized balance the CRPs was $89.9 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.

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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. Our operations expose us 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, or 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 component designed, manufactured or sold by us, or the failure of an aircraft 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.

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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 17% of our U.S. employees are covered by collective bargaining agreements and more than 46% 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 300 employees. The current CBA will expire in August 2020, at which time we expect to negotiate a successor agreement. The local CBA for the Corry, Pennsylvania facility of the Associated Spring business unit will expire on May 31, 2019, 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. We also completed negotiations resulting in wage adjustments at eight locations in our Industrial Segment, collectively, covering a total of approximately 1,400 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, 2018 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. 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 has 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.

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.

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Our products and services may be rendered obsolete by new products, technologies and processes. 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. See Note 9 of the Consolidated Financial Statements.

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

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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	0	10
Europe	10	0	0	10
Asia	1	0	0	1
Central and Latin America	2	0	0	2
	18	5	0	23
Non-Manufacturing:				
North America	0	0	1*	1
Europe	2	0	0	2
	2	0	1	3

* The Company's Corporate office

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Number of Facilities - Leased

Location	Industrial	Aerospace	Other	Total
Manufacturing:				
North America	4	6	0	10
Europe	4	0	0	4
Asia	4	5	0	9
	12	11	0	23
Non-Manufacturing:				
North America	8	1	1**	10
Europe	26	1	0	27
Asia	24	0	0	24
Central and Latin America	3	0	0	3
	61	2	1	64

** Industrial Segment headquarters and certain Shared Services groups.

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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 involving 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 such proceedings, individually or in the aggregate, will not have a material adverse effect on our financial condition or results of operations.

Item 4. Mine Safety Disclosures

Not applicable.

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PART II

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

(a) Market Information

The Company's common stock is traded on the New York Stock Exchange under the symbol "B". The following table sets forth, for the periods indicated, the low and high sales intra-day trading price per share, as reported by the New York Stock Exchange, and dividends declared and paid.

	2018		
	Low	High	Dividends
Quarter ended March 31	$57.93	$69.41	$ 0.14
Quarter ended June 30	52.42	63.79	0.16
Quarter ended September 30	58.09	72.70	0.16
Quarter ended December 31	49.06	71.84	0.16

	2017		
	Low	High	Dividends
Quarter ended March 31	$45.47	$51.97	$ 0.13
Quarter ended June 30	49.31	60.74	0.14
Quarter ended September 30	57.70	70.84	0.14
Quarter ended December 31	61.06	72.87	0.14

Stockholders

As of February 19, 2019, there were approximately 2,916 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. See the table above for dividend information for 2018 and 2017.

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.

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Performance Graph

A stock performance graph based on cumulative total returns (price change plus reinvested dividends) for $100 invested the Company on December 31, 2013 is set forth below.

	2013	2014	2015	2016	2017	2018
BGI	$100.00	$97.80	$94.68	$128.58	$173.21	$148.25
S&P 600	$100.00	$105.74	$103.62	$131.03	$148.27	$135.63
Russell 2000	$100.00	$104.90	$100.27	$121.60	$139.39	$124.02

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

(c) 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, 2018	1,992		$ 69.55	—	1,479,806
November 1-30, 2018	308		$ 58.41	—	1,479,806
December 1-31, 2018	1,656		$ 53.69	—	1,479,806
Total	3,956	[1]	$ 62.05	—	

(1) All acquisitions of equity securities during the fourth quarter of 2018 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) The program was publicly announced on October 20, 2011 (the "2011 Program") authorizing repurchase of up to 5.0 million shares of common stock. At December 31, 2015, 1.1 million shares of common stock had not been purchased under the 2011 Program. On February 10, 2016, the Board of Directors of the Company increased the number of shares authorized for repurchase under the 2011 Program by 3.9 million shares of common stock (5.0 million authorized, in total). The 2011 Program permits open market purchases, purchases under a Rule 10b5-1 trading plan and privately negotiated transactions.

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Item 6. Selected Financial Data

	2018[5][6]	2017 [7][8][9]	2016 [7][10]	2015 [7][11]	2014[7]
Per common share [1]					
Income from continuing operations					
Basic	$3.18	$1.10	$2.50	$2.21	$2.20
Diluted	3.15	1.09	2.48	2.19	2.16
Net income					
Basic	3.18	1.10	2.50	2.21	2.16
Diluted	3.15	1.09	2.48	2.19	2.12
Dividends declared and paid	0.62	0.55	0.51	0.48	0.45
Stockholders’ equity (at year-end)	23.44	23.61	21.72	20.94	20.40
Stock price (at year-end)	53.62	63.27	47.42	35.39	37.01
For the year (in thousands)					
Net sales	$1,495,889	$1,436,499	$1,230,754	$1,193,975	$1,262,006
Operating income	231,764	206,451	194,296	183,542	181,167
As a percent of net sales	15.5 %	14.4 %	15.8 %	15.4 %	14.4 %
Income from continuing operations	$166,186	$59,415	$135,601	$121,380	$120,541
As a percent of net sales	11.1 %	4.1 %	11.0 %	10.2 %	9.6 %
Net income	$166,186	$59,415	$135,601	$121,380	$118,370
As a percent of net sales	11.1 %	4.1 %	11.0 %	10.2 %	9.4 %
As a percent of average stockholders’ equity [2]	13.5 %	4.7 %	11.6 %	10.7 %	10.3 %
Depreciation and amortization	$94,238	$90,150	$80,154	$78,242	$81,395
Capital expenditures	57,273	58,712	47,577	45,982	57,365
Weighted average common shares outstanding – basic	52,304	54,073	54,191	55,028	54,791
Weighted average common shares outstanding – diluted	52,832	54,605	54,631	55,513	55,723
Year-end financial position (in thousands)					
Working capital	$448,286	$452,960	$306,609	$359,038	$323,306
Goodwill	955,524	690,223	633,436	587,992	594,949
Other intangible assets, net	636,538	507,042	522,258	528,322	554,694
Property, plant and equipment, net	370,531	359,298	334,489	308,856	299,435
Total assets	2,808,970	2,365,716	2,137,539	2,061,866	2,073,885
Long-term debt and notes payable	944,016	532,596	500,954	509,906	504,734
Stockholders’ equity	1,203,056	1,260,321	1,168,358	1,127,753	1,111,793
Debt as a percent of total capitalization [3]	44.0 %	29.7 %	30.0 %	31.1 %	31.2 %
Statistics					
Employees at year-end [4]	5,908	5,375	5,036	4,735	4,515

(1) Income from continuing operations and net income per common share are 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, 2017 and December 31, 2018 (13-month average).

(3) Debt includes all interest-bearing debt and total capitalization includes interest-bearing debt and stockholders’ equity.

(4) The number of employees at each year-end includes employees of continuing operations and excludes prior employees of discontinued operations.

(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 3 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, 2015 and 2014. 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 14 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.

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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 $1,495.9 million in 2018, an increase of $59.4 million, or 4.1%, from 2017. Organic sales (net sales excluding both foreign currency and acquisition impacts) increased by $27.0 million, or 1.9%, including an increase of $38.6 million, or 8.3%, at Aerospace, partially offset by a decrease of $11.6 million, 1.2%, at Industrial. Sales in the Industrial segment were impacted by changes in foreign currency which increased sales by approximately $14.2 million as the U.S. dollar weakened against foreign currencies. Within Industrial, acquisitions provided incremental sales of $18.2 million during the 2018 period.

Operating income increased 12.3% from $206.5 million in 2017 to $231.8 million in 2018 and operating margin increased from 14.4% in 2017 to 15.5% in 2018. Operating income was impacted by increased leverage of organic sales growth within Aerospace, cost productivity improvements and the absence of 2017 restructuring costs, partially offset by scheduled price deflation at Aerospace. Acquisitions made during 2018 resulted in increased due diligence and acquisition transaction costs, in addition to short-term purchase accounting adjustments, impacting operating profit accordingly.

The Company focused on profitable sales growth both organically and through acquisition, in addition to productivity improvements, as key strategic objectives in 2018. Management continued its focus on cash flow and working capital management in 2018 and generated $237.2 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 the injection molding and automation markets.

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. Headquartered in Brescia, 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 362.4 million Euro ($409.9 million) which was financed using cash on hand and borrowings under the Company's revolving credit facility, including the utilization of funds made available through the accordion feature provided by the facility. See "Item 7 - Liquidity and Capital Resources" for additional information related to the financing of Gimatic. The purchase price includes preliminary adjustments under the terms of the Gimatic Sale and Purchase Agreement, including approximately 7.8 million Euro ($8.8 million) related to cash acquired. In connection with the acquisition, the Company recorded $158.8 million of intangible assets and $271.3 million of goodwill. See Notes 2 and 6 to the Consolidated Financial Statements. The acquisition of Gimatic resulted in the Company's establishment of the Automation business unit, which will operate within the Industrial segment.

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.

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 post closing 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. In connection with the acquisition, the Company recorded $14.1 million of goodwill and $15.3 million of intangible assets. See Notes 2 and 6 to the Consolidated Financial Statements.

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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"). 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.

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 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. The Company acquired the assets of Gammaflux for an aggregate purchase price of $8.9 million, 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. In connection with the acquisition, the Company recorded $1.5 million of goodwill and $3.7 million of intangible assets. See Notes 2 and 6 to the Consolidated Financial Statements.

In the third quarter of 2016, the Company, through three of its subsidiaries (collectively, the "Purchaser"), completed its acquisition of the molds business of Adval Tech Holding AG and Adval Tech Holdings (Asia) Pte. Ltd. ("FOBOHA"). FOBOHA is headquartered in Haslach, Germany and currently operates out of two manufacturing facilities located in Germany and China. At the time of acquisition, FOBOHA also operated out of a manufacturing facility located in Switzerland; however, this location was consolidated and closed during 2017. See Note 9 to the Consolidated Financial Statements. FOBOHA specializes in the development and manufacture of complex plastic injection molds for packaging, medical, consumer and automotive applications. The Company acquired FOBOHA for an aggregate cash purchase price of CHF 137.9 million ($140.2 million) 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 FOBOHA Share Purchase Agreement, including approximately CHF 11.3 million ($11.5 million) related to cash acquired. In connection with the acquisition, the Company recorded $39.8 million of intangible assets and $75.6 million of goodwill. See Notes 2 and 6 to the Consolidated Financial Statements.

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 returns.

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. 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.

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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, and days working 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 planes 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

($ in millions)	2018	2017	$ Change	% Change		2016
Industrial	$994.7	$973.9	$ 20.8	2.1	%	$824.2
Aerospace	501.2	462.6	38.5	8.3	%	406.5
Total	$1,495.9	$1,436.5	$ 59.4	4.1	%	$1,230.8

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.

2017 vs. 2016:

The Company reported net sales of $1,436.5 million in 2017, an increase of $205.7 million, or 16.7%, from 2016. Acquired businesses contributed incremental sales of $56.3 million during the 2017 period. Organic sales within Industrial increased by $81.0 million, or 9.8% during 2017, driven primarily by continued strength in our Force & Motion Control and

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Molding Solutions business units. Aerospace recorded sales of $462.6 million in 2017, a $56.1 million, or 13.8% increase from 2016 as newer, more technologically advanced engine platforms increased volumes at the original equipment manufacturing business within Aerospace. Sales within the aftermarket businesses also improved throughout 2017. The impact of foreign currency translation increased sales within Industrial by approximately $12.4 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 19.8% year-over-year, while domestic sales increased 13.0%, largely a result of Aerospace sales being primarily U.S. based. Excluding the impact of foreign currency translation on sales, however, the Company's international sales in 2017 increased 18.0%, inclusive of sales through acquisition, from 2016.

Expenses and Operating Income

($ in millions)	2018	2017	$ Change	% Change	2016
Cost of sales	$963.5	$943.8	$ 19.7	2.1 %	$788.7
% sales	64.4 %	65.7 %			64.1 %
Gross profit (1)	$532.4	$492.7	$ 39.6	8.0 %	$442.0
% sales	35.6 %	34.3 %			35.9 %
Selling and administrative expenses	$300.6	$286.3	$ 14.3	5.0 %	$247.7
% sales	20.1 %	19.9 %			20.1 %
Operating income	$231.8	$206.5	$ 25.3	12.3 %	$194.3
% sales	15.5 %	14.4 %			15.8 %

(1) Sales less cost of sales

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, 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.

2017 vs. 2016:

Cost of sales in 2017 increased 19.7% from 2016, while gross profit margin decreased from 35.9% in 2016 to 34.3% in 2017. Gross margins improved at Aerospace and declined at Industrial. Gross profit improved within both segments, driven primarily by organic growth within each of the business units. At Industrial, gross margins decreased during 2017 as a result of pre-tax restructuring charges of $7.5 million and lower productivity, primarily a result of additional costs incurred on certain programs at Engineered Components. Incremental costs include expedited freight, increased scrap and costs related to the transfer of work to other facilities. A lower margin contribution on acquisition sales also had an impact on the overall lower gross margins at Industrial. Gross profit at Industrial increased, however, driven by the profit impact of organic growth within our Molding Solutions and Force & Motion Control business units, partially offset by the additional costs at Engineered Components discussed above. Gross profits during both the 2017 and 2016 periods were negatively impacted by $2.3 million of short-term purchase accounting adjustments related to the acquisition of FOBOHA. Within Aerospace, improvement in gross profit relates primarily to organic growth within each of the businesses, combined with favorable productivity, partially offset

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by scheduled price deflation and the absence of the $1.4 million gain related to the contract termination arbitration award in 2016. Increased volumes in the maintenance repair and overhaul and spare parts businesses, in particular, contributed to the gross margin improvement during 2017. Selling and administrative expenses in 2017 increased 15.6% from the 2016 period, due primarily to corresponding increases in sales volumes, incentive compensation and the amortization of intangible assets related to the acquisition of FOBOHA, partially offset by the absence of $3.0 million of costs related to a customer termination dispute and a $1.2 million reduction in transaction costs related to the acquisition of FOBOHA in 2016. As a percentage of sales, selling and administrative costs slightly decreased from 20.1% in the 2016 period to 19.9% in the 2017 period. Operating income in 2017 increased to $206.5 million from the 2016 period and operating income margin decreased from 15.8% to 14.4%.

Interest expense

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.

2017 vs. 2016:

Interest expense in 2017 increased $2.7 million to $14.6 million from 2016, primarily as a result of higher average interest rates.

Other expense (income), net

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 12 for details related to the other components of net periodic benefit cost and Note 9 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.

2017 vs. 2016:

Other expense (income), net in 2017 was $(3.8) million compared to $(0.2) million in 2016. Other expense (income) in 2017 and 2016 included other components of pension expense (income) of $(3.8) million and $2.1 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. Foreign currency gains of $0.8 million in the 2017 period compared with gains of $1.9 million in the 2016 period. Interest income of $0.8 million in 2017 compared with interest income of $2.3 million during 2016, with the decrease being primarily attributed to the $1.4 million of interest income that resulted from the Triumph arbitration in 2016.

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 was included within the Transition Tax.

The Act also establishes new law that affects 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 (“NOLS”) 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 enactment date of the Act.

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 has 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 has analyzed the final regulations and has determined that they do 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 has 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 do 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

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indefinite reinvestment criteria is met. On December 31, 2018, the Company's unremitted foreign earnings were approximately $1,397.1 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 has applied the Proposed Regulations and has calculated a GILTI inclusion within 2018 taxable income in the U.S., which results in $2.5 million of tax expense 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").

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 global intangible low-taxed income ("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.

In 2019 the Company expects the effective tax rate to be between 23.5% and 24.5%, an increase from the 20% rate in 2018, primarily due to the absence of current year excess tax benefit on stock awards and the absence of the release of certain valuation allowances.

2017 vs. 2016:

The Company's effective tax rate was 69.6% in 2017 compared with 25.7% in 2016. The increase in the 2017 effective tax rate is primarily due to taxes recorded as a result of U.S. Tax Reform. Excluding the impact of $99.2 million of discrete tax expense related to the Act, partially offset by a benefit of $2.5 million on the current year repatriation, the effective tax rate would have been 20.2% in 2017. The comparable decrease in the effective tax rate, excluding the impacts of the Act, are primarily due to the adjustment of the Swiss valuation reserves, the settlement of tax audits and closure of tax years for various tax jurisdictions and the change in the mix of earnings attributable to higher-taxing jurisdictions, partially offset by the expiration of certain tax holidays. During 2017, the Company repatriated a dividend from a portion of the current year foreign earnings to the U.S. in the amount of $7.3 million, compared to $8.3 million in 2016. Pursuant to the Act, this current year dividend is not taxable in the U.S.

See Note 14 of the Consolidated Financial Statements for a reconciliation of the U.S. federal statutory income tax rate to the consolidated effective income tax rate.

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Income and Income Per Share

(in millions, except per share)	2018	2017	Change	% Change	2016
Net income	$166.2	$59.4	$106.8	NM	$135.6
Net income per common share:					
Basic	$3.18	$1.10	$2.08	NM	$2.50
Diluted	$3.15	$1.09	$2.06	NM	$2.48
Weighted average common shares outstanding:					
Basic	52.3	54.1	(1.8)	(3.3)%	54.2
Diluted	52.8	54.6	(1.8)	(3.2)%	54.6

Basic and diluted net income per common share increased for 2018 as compared to 2017. The increases were driven by increases in net income year over year combined with reductions in both basic and diluted weighted average common shares outstanding which decreased due to the repurchase of 677,100 and 2,292,100 shares during 2017 and 2018, respectively, as part of the Company's 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)	2018	2017	$ Change	% Change	2016
Sales	$994.7	$973.9	$ 20.8	2.1 %	$824.2
Operating profit	130.4	122.8	7.6	6.1 %	131.8
Operating margin	13.1 %	12.6 %			16.0 %

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 China 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 9 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 FOBOHA. Operating margin increased from 12.6% in the 2017 period to 13.1% in the 2018 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-

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markets, manufacturing Purchasing Managers' Indices ("PMIs") remain above 50 in North America and Europe, however the indices in both regions have continued to weaken in the latter part of 2018. PMI in China has also moderated throughout 2018, declining to below 50 during the fourth quarter, indicative of a slowing economy. Global forecasted production for light vehicles continued to dampen throughout 2018 and is expected to grow only nominally during 2019, with production expected to decline slightly within the North American market. Within our Molding Solutions businesses, global medical and personal care hot runner and mold markets remain healthy, while the automotive hot runner market has softened. Overall industrial end-markets may be impacted by uncertainty related to current and proposed tariffs recently announced by the United States and the China governments. As noted above, our sales were positively impacted by $14.2 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 relative to the prior year periods. 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. Operating profit may also be impacted by 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, current and proposed tariffs recently announced by the United States government 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.

2017 vs. 2016:

Sales at Industrial were $973.9 million in 2017, an increase of $149.7 million, or 18.2%, from 2016. Acquired businesses contributed incremental sales of $56.3 million during the 2017 period. Organic sales increased by $81.0 million, or $9.8%, during 2017, driven primarily by continued strength in our Force & Motion Control and Molding Solutions business units. A continuation of favorable demand trends in our tool and die, transportation and other industrial end-markets have largely contributed to the organic growth within these business units. The impact of foreign currency translation increased sales by approximately $12.4 million as the U.S. dollar weakened against foreign currencies.

Operating profit in 2017 at Industrial was $122.8 million, a decrease of 6.8% from 2016. The decrease was driven by pre-tax restructuring charges of $7.5 million and lower productivity, primarily driven by the increased costs incurred on certain programs within Engineered Components. Incremental costs include expedited freight, increased scrap and costs related to the transfer of work to other facilities. Employee related costs also increased during the 2017 period, primarily due to incentive compensation at certain Industrial businesses. Industrial's ability to leverage increased sales volumes partially offset this decrease in operating profit. The 2016 period included $3.5 million of short-term purchase accounting adjustments and transaction costs related to business acquisitions, whereas the 2017 period included $2.3 million of short-term purchase accounting adjustments. Operating margins decreased from 16.0% in the 2016 period to 12.6% in the 2017 period primarily as a result of these items. Lower margins at FOBOHA also impacted the 2017 period.

Aerospace

($ in millions)	2018	2017	$ Change	% Change	2016
Sales	$501.2	$462.6	$ 38.5	8.3 %	$406.5
Operating profit	101.4	83.6	17.8	21.2 %	62.5
Operating margin	20.2 %	18.1 %			15.4 %

2018 vs. 2017:

Aerospace recorded sales of $501.2 million in 2018, a 8.3% increase from 2017. 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 newer platforms, partially offset by scheduled price deflation as certain engine programs transition into the early production stages. Sales within the aftermarket repair and overhaul ("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.

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 new engines, driven by a forecasted increase in commercial aircraft production levels. The Company anticipates further shifts in the production mix from legacy engine programs to the continual ramping of several new engine programs. Backlog at OEM was $845.1 million at December 31, 2018, an increase of 18.4% since December 31, 2017 (backlog of $713.8 million), primarily attributed to an increase in orders related to newer engine platforms. Approximately 45% 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 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. 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.

2017 vs. 2016:

Aerospace recorded sales of $462.6 million in 2017, a 13.8% increase from 2016. Sales increased within all of the Aerospace businesses. The original equipment manufacturing ("OEM") business continued to transition from the manufacture of components on legacy engine platforms to newer, more technologically advanced platforms. Increased volume generated by ramping programs was partially offset by lower volumes and scheduled price deflation on more mature engine platforms. Sales within the aftermarket maintenance repair and overhaul ("MRO") business also increased during the 2017 period as the Company continued to obtain additional sales volume from new and existing customers, a trend that began during the second half of 2016. Volumes within the spare parts business also increased during the 2017 period. Sales were not impacted by changes in foreign currency as sales within the segment are largely denominated in U.S. dollars.

Operating profit at Aerospace increased 33.8% from 2016 to $83.6 million. The operating profit increase resulted from the increased volumes discussed above, coupled with favorable productivity, resulting from our ability to leverage production volumes, partially offset by scheduled price deflation and an increase in incentive compensation. Operating profit during the

2016 period included a $3.0 million charge related to the contract termination dispute and a $1.4 million benefit from the contract termination arbitration award.

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 2019 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 increases the facility from $750.0 million to $850.0 million and extends the maturity date from September 2018 to February 2022. The Amended Credit Agreement also increases the existing accordion feature from $250.0 million, allowing the Company to now 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. 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 existing accordion feature. The Administrative Agent for the lenders has 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 Company completed funding of the transaction and issued the 3.97% Senior Notes on October 17, 2014. 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, 2018, 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 qualifies. 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 are allowed for a period of four fiscal quarters subsequent to the close of the permitted acquisition. At December 31, 2018, the Company was in compliance with all covenants under the Agreements. The Company's most restrictive financial covenant is the Senior Debt Ratio, which, with a

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permitted acquisition, requires the Company to maintain a ratio of Consolidated Senior Debt to Consolidated EBITDA of not more than 3.50 times at December 31, 2018. The actual ratio at December 31, 2018 was 2.59 times, as defined.

In 2018, 2017 and 2016, the Company acquired 2.3 million shares, 0.7 million shares and 0.6 million shares of the Company's common stock, respectively, at a cost of $138.3 million, $40.8 million and $20.5 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, 2018, the Company had $169.0 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, 2018, additional borrowings of $607.6 million of Total Debt including $333.8 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 $2.0 million in borrowings under short-term bank credit lines at December 31, 2018.

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, 2018, the Company's total borrowings were comprised of approximately 22% fixed rate debt and 78% variable rate debt. At December 31, 2017, the Company's total borrowings were comprised of approximately 39% fixed rate debt and 61% variable rate debt.

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 increased from $43.7 million at December 31, 2017 to $71.4 million at December 31, 2018 as the decrease in the fair value of the pension plan assets exceeded the decrease in the projected benefit obligations ("PBOs"), following an update of certain actuarial assumptions. The Company recorded $15.4 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 unfavorable variances between expected and actual returns on pension plan assets, partially offset by changes in actuarial assumptions, primarily the increase in the discount rate and the amortization of actuarial losses recorded earlier. In 2018, the Company made no discretionary contributions to the U.S. qualified pension plans. The Company expects to contribute approximately $4.7 million to its various defined benefit pension plans in 2019. No discretionary contributions to the U.S. Qualified pension plans are currently planned in 2019. See Note 12 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.

At December 31, 2018, the Company held $100.7 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. As noted above, during 2017, the Company recorded a provisional tax expense of $6.9 million to account for estimated withholding and income taxes on expected future cash repatriations. During 2018, the Company repatriated $62.4 million between certain foreign entities, incurring $5.2 million in tax. In 2018, as part of its ongoing evaluation, the Company determined that it would not be repatriating income from certain foreign entities, thereby resulting in a $1.2 million reduction from the previously recorded deferred tax liability. The evaluation of potential repatriation is dependent upon several variables, including foreign taxation of dividends and the impact of withholding tax. The Company repatriated $228.8 million to the U.S. during 2018.

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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

($ in millions)	2018	2017	$ Change	% Change	2016
Operating activities	$237.2	$203.9	$33.3	16.3 %	$217.6
Investing activities	(493.2)	(68.0)	(425.1)	NM	(179.5)
Financing activities	215.6	(63.8)	279.3	NM	(53.3)
Exchange rate effect	(4.1)	6.7	(10.9)	NM	(2.3)
(Decrease) increase in cash	$(44.6)	$78.8	$(123.4)	NM	$(17.5)

NM – Not meaningful

Operating activities provided $237.2 million in 2018 compared to $203.9 million in 2017. Operating cash flows in the 2018 period were positively impacted by improved operating results which were partially offset by higher outflows for accrued liabilities, primarily related to incentive compensation, in the 2018 period. Net income during the 2017 period was impacted by $96.7 million of tax expense related to the enactment of the Act, having no impact to cash outflows during the 2017 period. Cash from operating activities during the 2018 period includes the use of $6.9 million for the required installment payments related to the Transition Tax. See Note 14 of the Consolidated Financial Statements. Operating cash flows in the 2018 period were also positively impacted by a reduction in cash used for working capital compared to 2017 driven by accounts receivable. Cash flows in the 2017 period were negatively impacted by outflows of $10.0 million related to discretionary contributions to the U.S. Qualified pension plans.

Investing activities used $493.2 million in 2018 and $68.0 million in 2017. In 2018, investing activities included capital expenditures of $57.3 million compared to $58.7 million in 2017. The Company expects capital spending in 2019 to be between $60 million and $65 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 2018 and 2017 also included outflows of $430.5 million and $8.9 million, respectively, to fund the acquisitions of IGS and Gimatic in 2018 and Gammaflux in 2017. Investing activities also included a $5.8 million participation fee payment related to the aftermarket Revenue Sharing Programs in 2018 and payments of $1.0 million and $3.0 million in 2018 and 2017, respectively, related to an Aerospace agreement,which are reflected in Other Investing activities.

Cash provided by financing activities in 2018 included a net increase in borrowings of $402.0 million compared to a net increase of $30.7 million in 2017. In 2018, the Company borrowed 179.0 million Euros ($208.6 million) 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 $1.1 million and $2.4 million in 2018 and 2017, respectively. In 2018, the Company repurchased 2.3 million shares of the Company's stock at a cost of $138.3 million, compared with the purchase of 0.7 million shares at a cost of $40.8 million in 2017. Total cash used to pay dividends increased slightly to $32.2 million in 2018 compared to $29.6 million in 2017, reflecting an increase in dividends paid per share. Withholding taxes paid on stock issuances were $5.4 million in both the 2018 and 2017 periods. Other financing cash flows during 2018 and 2017 include $10.8 million and $18.2 million, respectively, of net cash payments related to the settlement of foreign currency hedges related to intercompany financings and $0.5 million and $2.5 million, respectively, of fees paid in connection with the Amended Credit Agreement.

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):

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	2018
Net income	$166.2
Add back:	
Interest expense	16.8
Income taxes	41.3
Depreciation and amortization	94.2
Adjustment for non-cash stock based compensation	12.3
Adjustment for acquired businesses	20.0
Amortization of Gimatic and IGS acquisition inventory step-ups	5.6
Due diligence and transaction expenses	5.4
Other adjustments	3.2
Consolidated EBITDA, as defined within the Amended Credit Agreement	$365.1
Consolidated Senior Debt, as defined, as of December 31, 2018	$944.0
Ratio of Consolidated Senior Debt to Consolidated EBITDA	2.59
Maximum	3.50
Consolidated Total Debt, as defined, as of December 31, 2018	$944.0
Ratio of Consolidated Total Debt to Consolidated EBITDA	2.59
Maximum	4.25
Consolidated Cash Interest Expense, as defined, as of December 31, 2018	$27.1
Ratio of Consolidated EBITDA to Consolidated Cash Interest Expense	13.45
Minimum	4.25

The Amended Credit Agreement allows for certain adjustments within the calculation of the financial covenants. The adjustment for acquired businesses reflects the unaudited pre-acquisition operations of IGS and Gimatic for the periods from January 1, 2018 through July 23, 2018 and October 31, 2018, respectively. Other adjustments consist of net losses on the sale of assets, changes in accounting and restructuring charges 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, 2018, additional borrowings of $607.6 million of Total Debt including $333.8 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, 2018 were $169.0 million.

Contractual Obligations and Commitments

At December 31, 2018, 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]	$941.9	$ 5.8	$2.8	$832.3	$ 101.0
Estimated interest payments under long-term obligations [2]	99.9	20.6	40.9	27.2	11.1
Operating lease obligations	38.8	11.9	14.2	5.0	7.7
Purchase obligations [3]	223.5	189.8	30.6	3.1	—
Expected pension contributions [4]	4.7	4.7	—	—	—
Expected benefit payments – other postretirement benefit plans[5]	26.6	3.5	6.4	5.6	11.1
Long-term U.S. Tax Reform obligations[6]	73.0	—	13.9	20.0	39.1
Total	$1,408.3	$ 236.4	$108.8	$893.1	$ 170.0

(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, 2018.

The amounts do not include purchase obligations reflected as current liabilities on the consolidated balance sheet.

(3) 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.

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(4) 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.

(5) Amounts reflect anticipated benefit payments under the Company's various other postretirement benefit plans based on current actuarial assumptions. Expected benefit payments do not extend beyond 2028. See Note 12 of the Consolidated Financial Statements.

(6) 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 14 of the Consolidated Financial Statements. The amount payable in 2019 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 14 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 3 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, 2018, the Company had $955.5 million and $365.3 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 Notes 6 of the Consolidated Financial Statements.

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Goodwill and indefinite-lived intangible assets are subject to impairment testing annually or earlier 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 elected to early adopt 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 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 second quarter assessment, the estimated fair value of all reporting units significantly exceeded their carrying values and there was no goodwill impairment at any reporting units. 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 2018 and determined that there were no impairments.

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 2018.

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 $177.5 million at December 31, 2018. 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 entered into Component Repair Programs ("CRPs") with GE during 2015, 2014 and 2013. The CRPs 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 aircraft 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, 2018 equaled $111.8 million, all of which have been paid. At December 31, 2018, the carrying value of the CRPs was $89.9 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 6 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 12 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, 2018, the Company selected a discount rate of 4.40% based on a bond matching model for its U.S. pension plans. Market interest rates have increased in 2018 as compared with 2017 and, as a result, the discount rate used to measure pension liabilities increased from 3.90% at December 31, 2017. 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, 2018 would impact the Company's 2019 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, 2018 would decrease the Company's 2019 pre-tax income by approximately $1.0 million. The Company reviews these and other assumptions at least annually.

The Company recorded $15.4 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 unfavorable variances between expected and actual returns on pension plan assets, partially offset by changes in actuarial assumptions, primarily the increase in the discount rate, and the amortization of actuarial losses recorded earlier. During 2018, the fair value of the Company's pension plan assets decreased by $58.2 million and the projected benefit obligation decreased by $30.5 million. The decrease in the projected benefit obligation included a $24.4 million (pre-tax) decrease due to actuarial gains resulting primarily from a change in the discount rates used to measure pension liabilities, $31.6 million in benefits paid and $3.1 million of foreign exchange impacts. These increases were partially offset by annual service and interest costs of $6.0 million and $17.4 million, respectively, and $3.5 million of transfers in, resulting from employees that were hired during the period. Changes to other actuarial assumptions in 2018 did not have a material impact on our stockholders equity or projected benefit obligation. Actual pre-tax losses on total pension plan assets were $32.6 million compared with an expected pre-tax return on pension assets of $29.9 million. Pension expense for 2019 is expected to decrease from $5.6 million in 2018 to $4.6 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, 2018, the Company had recognized $20.5