UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31, 2019

or

☐ **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 1-12981

AMETEK, Inc.
(Exact name of registrant as specified in its charter)

Delaware **(State or other jurisdiction of incorporation or organization)**	**14-1682544** **(I.R.S. Employer Identification No.)**
1100 Cassatt Road **Berwyn, Pennsylvania** **(Address of principal executive offices)**	**19312-1177** **(Zip Code)**

Registrant's telephone number, including area code: (610) 647-2121

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

Title of each class	Trading symbol(s)	Name of each exchange on which registered
Common Stock, $0.01 Par Value (voting)	AME	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

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

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

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

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted 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 such files). Yes ☒ No ☐

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.

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
		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 ☒

The aggregate market value of the voting stock held by non-affiliates of the registrant was approximately $20.7 billion as of June 28, 2019, the last business day of the registrant's most recently completed second fiscal quarter.

The number of shares of the registrant's Common Stock outstanding as of January 31, 2020 was 229,124,099.

Documents Incorporated by Reference

Part III incorporates information by reference from the Proxy Statement for the Annual Meeting of Stockholders on May 6, 2020.

AMETEK, Inc.

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PART I

Item 1. Business

General Development of Business

AMETEK, Inc. ("AMETEK" or the "Company") is incorporated in Delaware. Its predecessor was originally incorporated in Delaware in 1930 under the name American Machine and Metals, Inc. AMETEK is a leading global manufacturer of electronic instruments and electromechanical devices with operations in North America, Europe, Asia and South America. AMETEK maintains its principal executive offices in suburban Philadelphia at 1100 Cassatt Road, Berwyn, Pennsylvania, 19312. Listed on the New York Stock Exchange (symbol: AME), the common stock of AMETEK is a component of the Standard and Poor's 500 and the Russell 1000 Indices.

Available Information

AMETEK's annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and all amendments to those reports filed or furnished pursuant to Section 13(a) of the Securities Exchange Act of 1934 are made available free of charge on the Company's website at www.ametek.com in the "Investors – Financial Information" section as soon as reasonably practicable after such material is electronically filed with, or furnished to, the U.S. Securities and Exchange Commission. All reports filed with the Securities Exchange Commission can also be viewed on their website at www.sec.gov. AMETEK has posted in the "Investors – Governance" section of its website its corporate governance guidelines, Board committee charters and codes of ethics. Those documents also are available free of charge in published form to any stockholder who requests them by writing to the Investor Relations Department at AMETEK, Inc., 1100 Cassatt Road, Berwyn, Pennsylvania, 19312.

Products and Services

AMETEK's products are marketed and sold worldwide through two operating groups: Electronic Instruments ("EIG") and Electromechanical ("EMG"). Electronic Instruments is a leader in the design and manufacture of advanced instruments for the process, power and industrial, and aerospace markets. Electromechanical is a differentiated supplier of precision motion control solutions, thermal management systems, specialty metals and electrical interconnects. Its end markets include aerospace and defense, medical, automation and other industrial markets.

Competitive Strengths

Management believes AMETEK has significant competitive advantages that help strengthen and sustain its market positions. Those advantages include:

Significant Market Share. AMETEK maintains significant market share in a number of targeted niche markets through its ability to produce and deliver high-quality products at competitive prices. EIG has significant market positions in niche segments of the process, power and industrial, and aerospace markets. EMG holds significant positions in niche segments of the aerospace and defense, automation and medical markets.

Technological and Development Capabilities. AMETEK believes it has certain technological advantages over its competitors that allow it to maintain its leading market positions. Historically, it has demonstrated an ability to develop innovative new products and solutions that anticipate customer needs. It has consistently added to its investment in research, development and engineering, and improved its new product development efforts with the adoption of Design for Six Sigma and Value Analysis/Value Engineering methodologies. These have improved the pace and quality of product innovation and resulted in the introduction of a steady stream of new products across all of AMETEK's lines of business.

Efficient and Low-Cost Manufacturing Operations. Through its Operational Excellence initiatives, AMETEK has established a lean manufacturing platform for its businesses. In its effort to achieve best-cost manufacturing, AMETEK had plants, as of December 31, 2019, in Brazil, China, the Czech Republic, Malaysia, Mexico, and Serbia. These plants offer proximity to customers and provide opportunities for increasing international sales. Acquisitions also have allowed AMETEK to reduce costs and achieve operating synergies by consolidating operations, product lines and distribution channels, benefitting both of AMETEK's operating groups.

Experienced Management Team. Another component of AMETEK's success is the strength of its management team and that team's commitment to improving Company performance. AMETEK senior management has extensive industry experience and an average of approximately 27 years of AMETEK service. The management team is focused on delivering strong, consistent and profitable growth, and growing shareholder value. Individual performance is tied to financial results through Company-established stock ownership guidelines and equity incentive programs.

Business Strategy

AMETEK is committed to achieving earnings growth through the successful implementation of the AMETEK Growth Model. The goal of that model is double-digit annual percentage growth in sales and earnings per share over the business cycle and a superior return on total capital. In addition, other financial initiatives have been or may be undertaken, including public and private debt or equity issuance, bank debt refinancing, local financing in certain foreign countries and share repurchases.

AMETEK's Growth Model integrates the four growth strategies of Operational Excellence, Strategic Acquisitions, Global and Market Expansion, and New Product Development with a focus on cash generation and capital deployment.

Operational Excellence. Operational Excellence is AMETEK's cornerstone strategy for accelerating growth, improving profit margins and strengthening its competitive position across its businesses. Operational Excellence focuses on initiatives to drive increased organic sales growth, improvements in operating efficiencies and sustainable practices. It emphasizes team building and a participative management culture. AMETEK's Operational Excellence strategies include lean manufacturing, global sourcing, Design for Six Sigma, Value Engineering/Value Analysis and growth kaizens. Each plays an important role in improving efficiency, enhancing the pace and quality of innovation and driving profitable sales growth. Operational Excellence initiatives have yielded lower operating and administrative costs, shortened manufacturing cycle times, resulted in higher cash flow from operations and increased customer satisfaction. They also have played a key role in achieving synergies from newly acquired companies.

Strategic Acquisitions. Acquisitions are a key to achieving the goals of the AMETEK Growth Model. Since the beginning of 2015 through December 31, 2019, AMETEK has completed 18 acquisitions with annualized sales totaling more than $1.1 billion, including two acquisitions in 2019 (see "Recent Acquisitions"). AMETEK targets companies that offer compelling strategic, technical and cultural fit. It seeks to acquire businesses in adjacent markets with complementary products and technologies. It also looks for businesses that provide attractive growth opportunities, often in new and emerging markets. Through these and prior acquisitions, AMETEK's management team has developed considerable skill in identifying, acquiring and integrating new businesses. As it has executed its acquisition strategy, AMETEK's mix of businesses has shifted toward those that are more highly differentiated and, therefore, offer better opportunities for growth and profitability.

Global & Market Expansion. AMETEK has experienced strong growth outside the United States, reflecting an expanding international customer base, investments in its global infrastructure and the attractive growth potential of its businesses in overseas markets. While Europe remains its largest overseas market, AMETEK has pursued growth opportunities worldwide, especially in key emerging markets. It has grown sales in Latin America and Asia by strategically building, acquiring and expanding manufacturing facilities. AMETEK also has expanded its sales and service capabilities in China and enhanced its sales presence and engineering capabilities in India. Elsewhere in Asia and the Middle East, it has expanded sales, service and technical support. Recently acquired businesses have further added to AMETEK's international presence.

New Products. New products are essential to AMETEK's long-term growth. As a result, AMETEK has maintained a consistent investment in new product development and engineering. In 2019, AMETEK added to its highly differentiated product portfolio with a range of new products across many of its businesses. They included:

- AMETEK Programmable Power launched the RX0424, a rugged accelerometer instrument for measuring acceleration forces in extreme environmental conditions

- AMETEK SMP added two new titanium strip grades to expand their product portfolio for medical application that will ultimately help in the treatment of Parkinson's disease, sleep apnea and chronic pain without the use of opioids

- Barben Analytical introduced the second generation OXYvisor®, a trace to percent level, optical process oxygen analyzer to help prevent the corrosion of capital equipment and ensure product quality

- The SPECTROGREEN is the latest inductively coupled plasma optical emission spectrometer from SPECTRO Analytical Instruments that features revolutionary Dual Side-On Interface plasma viewing technology

- Vision Research launched several new cameras, including the Phantom® S640 and VEO 440 high-speed cameras as well as the Phantom Miro C320J and C320 for automotive crash testing

- AMETEK Land launched two new continuous emission monitoring systems, the4650-PM and 4750-PM, to accurately and reliably measure particulate matter from the industrial combustion processes

- Creaform launched two new handheld scanners, the HandySCAN BLACK and the Go!SCAN SPARK, both of which are third-generation versions of the company's patented 3D scanning technology

- To better detect leaks in Modified Atmosphere Packaging, AMETEK MOCON developed the Dansensor LeakPointer 3 and LeakPointer 3+ for the food industry, where micro leaks in packaging can drastically affect product integrity

- Adding to their legacy of innovation, Haydon Kerk Pittman launched the EC042B IDEA Motor Series, a brushless motor with integrated drive optimized for specialized motion applications

- AMETEK Grabner Instruments launched the MINIFLASH FP Vision, which determines the flashpoint of flammable liquid mixtures with faster cooling cycles and sample turnaround times thanks to advanced Peltier technology

- The EIKOS-UV, a new atom probe microscope from AMETEK CAMECA, delivers nanoscale structural information to help develop products across industrial applications

- AMETEK EDAX, a leader in X-ray microanalysis and electron diffraction instrumentation, launched the OIM Matrix™ software package, Elite T Ultra EDS System and the Velocity™ Super EBSD Camera, which was developed in partnership with the Vision Research team.

Cash Flow Generation and Disciplined Capital Deployment. AMETEK generates strong cash flow given its asset-light business model and strong operational execution. This cash flow supports AMETEK's capital deployment strategy with its primary focus on strategic, value-enhancing acquisitions. We are committed to paying a modest quarterly dividend.

2019 OVERVIEW

Operating Performance

In 2019, the Company posted record sales, operating income, net income, diluted earnings per share, orders, backlog and operating cash flow. The Company achieved these results from organic sales growth in both EIG and EMG, contributions from recent acquisitions, as well as from the Company's Operational Excellence initiatives. See "Results of Operations" in Part II, Item 7 Management's Discussion and Analysis of Financial Condition and Results of Operations for further details.

In 2019, AMETEK achieved sales of $5,158.6 million, an increase of 6.5% from 2018 due to 2% organic sales growth, a 5% increase from the 2019 and 2018 acquisitions, partially offset by unfavorable foreign currency translation. Diluted earnings per share for 2019 were $3.75, an increase of $0.41 or 12.3%, compared with $3.34 per diluted share in 2018.

Recent Acquisitions

AMETEK spent $1,061.9 million in cash, net of cash acquired, to acquire two businesses in 2019.

In September 2019, AMETEK acquired Pacific Design Technologies, Inc. ("PDT"), a provider of advanced, mission-critical thermal management solutions. PDT is part of EMG.

In October 2019, AMETEK acquired Gatan, a provider of instrumentation and software used to enhance and extend the operation and performance of electron microscopes. Gatan is part of EIG.

Financing

In the fourth quarter of 2019, the Company paid in full, at maturity, $100 million in aggregate principal amount of 6.30% private placement senior notes.

In December 2018, the Company completed a private placement agreement to sell $575 million and 75 million Euros in senior notes to a group of institutional investors (the "2018 Private Placement") utilizing two funding dates. The first funding occurred in December 2018 for $475 million and 75 million Euros ($85.1 million). The second funding was in January 2019 for $100 million. The proceeds from the fundings of the 2018 Private Placement were used to pay down domestic borrowings under the Company's revolving credit facility. See Note 10 to the Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K for further details

Recent Accounting Pronouncements

Effective January 1, 2019, the Company adopted the requirements of Financial Accounting Standards Board Accounting Standards Update ("ASU") No. 2016-02 (ASC 842), *Leases*, using the effective date transition method. Also, effective January 1, 2019, the Company adopted ASU No. 2018-02, *Income Statement – Reporting*

Comprehensive Income (Topic 220), Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income. Upon adoption, the Company did not elect to reclassify the stranded income tax effects of the Tax Act from accumulated other comprehensive income to retained earnings. See Note 2 to the Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K for further details.

Financial Information About Reportable Segments, Foreign Operations and Export Sales

Information with respect to reportable segments and geographic areas is set forth in Note 3 and Note 15 to the Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K.

AMETEK's international sales increased 1.1% to $2,474.9 million in 2019. International sales represented 48.0% of consolidated net sales in 2019 compared with 50.5% in 2018.

Description of Business

Described below are the products and markets of each reportable segment:

EIG

EIG is a leader in the design and manufacture of advanced analytical, test and measurement instruments for the process, aerospace, medical, research, power and industrial markets. Its growth is based on the strategies outlined in the AMETEK Growth Model. In many instances, its products differ from or are technologically superior to its competitors' products. It has achieved competitive advantage through continued investment in research, development and engineering to develop market-leading products and solutions that serve niche markets. It also has expanded its sales and service capabilities globally to serve its customers.

EIG is a leader in many of the specialized markets it serves. Products supplied to these markets include process control instruments for the oil and gas, petrochemical, pharmaceutical, semiconductor, automation, and food and beverage industries. It provides a growing range of instruments to the research and laboratory equipment, ultraprecision manufacturing, medical, and test and measurement markets. It is a leader in power quality monitoring and metering, uninterruptible power systems, programmable power equipment, electromagnetic compatibility ("EMC") test equipment, sensors for gas turbines, dashboard instruments for heavy trucks, and instrumentation and controls for the food and beverage industries. It supplies the aerospace industry with aircraft and engine sensors, monitoring systems, power supplies, fuel and fluid measurement systems, and data acquisition systems.

In 2019, 49% of EIG's net sales were to customers outside the United States. At December 31, 2019, EIG employed approximately 10,300 people, of whom approximately 900 were covered by collective bargaining agreements. At December 31, 2019, EIG had operating facilities in the United States, the United Kingdom, Germany, Canada, China, Denmark, Finland, France, Switzerland, Argentina, Austria and Mexico. EIG also shares operating facilities with EMG in Brazil, China and Mexico.

Process and Analytical Instrumentation Markets and Products

Process and analytical instrumentation sales represented 72% of EIG's 2019 net sales. These businesses include process analyzers, emission monitors and spectrometers; elemental and surface analysis instruments; level, pressure and temperature sensors and transmitters; radiation measurement devices; level measurement devices; precision manufacturing systems; materials- and force-testing instruments; contact and non-contact metrology products; and clinical and educational communication solutions. Among the industries it serves are oil, gas and petrochemical refining; power generation; pharmaceutical manufacturing; medical and healthcare; water and waste treatment; natural gas distribution; and semiconductor manufacturing. Its instruments are used for precision measurement in a number of applications, including radiation detection, trace element and materials analysis, nanotechnology research, ultraprecise manufacturing, and test and measurement.

Acquired in October 2019, Gatan is a leading manufacturer of instrumentation and software used to enhance and extend the operation and performance of electron microscopes. Gatan's differentiated technology solutions, premier brand and leadership positions in growth markets complements the Company's existing portfolio of specialized offerings in high-end analytical instrumentation.

Acquired in November 2018, Spectro Scientific is a provider of machine condition monitoring solutions for critical assets in high-value industrial applications. Spectro Scientific's differentiated solutions serve an increasing need for predictive maintenance in a broad and growing set of end markets, including military and defense, process, power generation and transportation. Spectro Scientific expands the Company's strategy to integrate instrumentation data with cloud-based software and analytics.

Acquired in October 2018, Telular is a provider of communication solutions for logistics management, tank monitoring and security applications. Telular's end-to-end solutions include purpose-built hardware, proprietary software and wireless connectivity services to enhance the efficiency and safety of critical assets. The combination of Telular's IoT capabilities and the Company's highly differentiated measurement technology provides additional growth opportunities for its businesses.

Acquired in October 2018, Forza Silicon Corporation ("Forza") is a leader in the design and production of high-performance imaging sensors used in medical, defense and industrial applications. Forza provides the Vision Research business with custom sensor design and production capability, allowing for accelerated development of next-generation sensor technology for use across the Company's market-leading, high-speed cameras.

Acquired in April 2018, SoundCom Systems ("SoundCom") is a provider of design, integration, installation and support of clinical workflow and communication systems for healthcare facilities, educational institutions and corporations. SoundCom expands Rauland's presence in the healthcare and education markets in the Midwest while providing customers with expanded value-added solutions and services.

Aerospace and Power Instrumentation Markets and Products

Aerospace and Power Instrumentation sales represented 28% of EIG's 2019 net sales. These businesses produce a wide array of instrumentation, systems and sensors for applications in the aerospace, power and industrial markets.

These businesses produce power monitoring and metering instruments, uninterruptible power supply systems and programmable power supplies used in a wide range of industrial settings. It is a leader in the design and manufacture of power measurement, quality monitoring and event recorders for use in power generation, transmission and distribution. It provides uninterruptible power supply systems, multifunction electric meters, annunciators, alarm monitoring systems and highly specialized communications equipment for smart grid applications. It also offers precision power supplies and power conditioning products, and electrical immunity and EMC test equipment, sensors for gas turbines, dashboard instruments for heavy trucks and other vehicles, and instrumentation and controls for the food and beverage industries.

AMETEK's aerospace products are designed to customer specifications and manufactured to stringent operational and reliability requirements. These products include airborne data systems, turbine engine temperature measurement products, vibration-monitoring systems, cockpit instruments and displays, fuel and fluid measurement products, and sensors and switches. AMETEK serves all segments of the commercial and military aerospace market, including commercial airliners, business jets, regional aircraft and helicopters.

AMETEK operates in highly specialized aerospace market segments in which it has proven technological or manufacturing advantages versus its competition. Among its more significant competitive advantages is its 70-year-plus reputation as an established aerospace supplier. It has long-standing relationships with the world's leading commercial and military aircraft, jet engine and original equipment manufacturers and aerospace system integrators. AMETEK also is a leading provider of spare part sales, repairs and overhaul services to commercial aerospace.

Acquired in June 2018, Motec is a provider of integrated vision systems serving the high-growth mobile machine vision market. Motec's ruggedized vision products and integrated software solutions provide customers with improved operational efficiency and enhanced safety across a variety of critical mobile machine applications in transportation, agriculture, logistics and construction which complement the Company's existing instrumentation businesses by expanding its portfolio of solutions to its customers.

Customers

EIG is not dependent on any single customer such that the loss of that customer would have a material adverse effect on EIG's operations. Approximately 8% of EIG's 2019 net sales were made to its five largest customers. No single customer comprises more than 5% of net sales.

EMG

EMG is a differentiated supplier of automation solutions, thermal management systems, specialty metals and electrical interconnects. EMG is a leader in many of the niche markets in which it competes. Products supplied to these markets include its advanced precision motion control solutions, which are used in a wide range of automation applications across the medical, semiconductor, aerospace, defense, and food and beverage industries, as well as its highly engineered electrical connectors and electronics packaging used in aerospace and defense, medical, and industrial applications.

EMG supplies high-purity powdered metals, strip and foil, specialty clad metals and metal matrix composites. Its blowers and heat exchangers provide electronic cooling and environmental control for the aerospace and defense industries. Its motors are widely used in commercial appliances, fitness equipment, food and beverage machines, hydraulic pumps and industrial blowers. Additionally, it operates a global network of aviation maintenance, repair and overhaul ("MRO") facilities.

EMG designs and manufactures products that, in many instances, are significantly different from or technologically superior to competitors' products. It has achieved competitive advantage through continued investment in research, development and engineering, efficiency improvements from operational excellence, acquisition synergies and improved supply chain management.

In 2019, 46% of EMG's net sales were to customers outside the United States. At December 31, 2019, EMG employed approximately 7,500 people, of whom approximately 1,600 were covered by collective bargaining agreements. At December 31, 2019, EMG had operating facilities in the United States, the United Kingdom, China, Germany, France, Italy, Mexico, Serbia, Brazil, the Czech Republic, Malaysia and Taiwan.

Automation and Engineered Solutions Markets and Products

Automation and Engineered Solution sales represented 73% of EMG's 2019 net sales. These businesses produce precision motion control solutions, brushless motors, blowers and pumps, heat exchangers and other electromechanical systems. These products are used in a wide variety of automation applications, semiconductor equipment, medical equipment and power industries among others. Additionally, these businesses produce specialty motors which are used in a wide range of products, such as household, commercial and personal care appliances, fitness equipment, food and beverage machines, hydraulic pumps and industrial blowers.

AMETEK is a leader in highly engineered electrical connectors and electronics packaging used to protect sensitive devices andmission-critical electronics. Its electrical connectors, terminals, headers and packaging are designed specifically for harsh environments and highly customized applications. In addition, AMETEK is an innovator and market leader in specialized metal powder, strip, wire and bonded products used in medical, aerospace and defense, telecommunications, automotive and general industrial applications.

Aerospace Markets and Products

Aerospace sales represented 27% of EMG's 2019 net sales. These businesses produce motor-blower systems and heat exchangers used in thermal management and other applications on a variety of military and commercial aircraft and military ground vehicles. In addition, these businesses provide the commercial and military aerospace industry with third-party MRO services on a global basis with facilities in the United States, Europe and Asia.

Acquired in September 2019, PDT designs and manufactures a complete range of custom-engineered, liquid cooling systems and components used in a broad set of current and next-generation commercial aerospace, defense and space platforms. PDT enhances the Company's position in the aerospace and defense sectors with its innovative technology and differentiated solutions in thermal management systems.

Acquired in January 2018, FMH Aerospace ("FMH") is a provider of complex, highly engineered solutions for the aerospace, defense and space industries. FMH's products and solutions further broaden the Company's differentiated product offerings in the aerospace and defense markets.

Customers

EMG is not dependent on any single customer such that the loss of that customer would have a material adverse effect on EMG's operations. Approximately 13% of EMG's 2019 net sales were made to its five largest customers. No single customer comprises greater than 5% of net sales.

Marketing

AMETEK's marketing efforts generally are organized and carried out at the business level. EIG makes use of distributors and sales representatives to market its products along with a direct sales force for its technically sophisticated products. Within aerospace, the specialized customer base of aircraft and jet engine manufacturers is served primarily by direct sales engineers. Given the technical nature of its many products, as well as its significant worldwide market share, EMG conducts much of its domestic and international marketing activities through a direct sales force and makes some use of sales representatives and distributors, both in the United States and in other countries.

Competition

In general, AMETEK's markets are highly competitive with competition based on technology, performance, quality, service and price.

In EIG's markets, AMETEK believes it ranks as a leader in certain analytical measurement and control instruments, and power and industrial markets. It also is a major instrument and sensor supplier to commercial aviation. In process and analytical instruments, numerous companies compete in each market on the basis of product quality, performance and innovation. In power and industrial and in aerospace, AMETEK competes with a number of companies depending on the specific market segment.

EMG's businesses compete with a number of companies in each of its markets. Competition is generally based on product innovation, performance and price. There also is competition from alternative materials and processes.

Availability of Raw Materials

AMETEK’s reportable segments obtain raw materials and supplies from a variety of sources and generally from more than one supplier. For EMG, however, certain items, including various base metals and certain steel components, are available from only a limited number of suppliers. AMETEK believes its sources and supplies of raw materials are adequate for its needs.

Backlog and Seasonal Variations of Business

AMETEK’s backlog of unfilled orders by reportable segment was as follows at December 31:

	2019	2018	2017
		(In millions)	
Electronic Instruments	**$ 842.5**	$ 765.5	$ 718.1
Electromechanical	**875.4**	836.6	678.0
Total	**$1,717.9**	$1,602.1	$1,396.1

Of the total backlog of unfilled orders at December 31, 2019, approximately 86% is expected to be shipped by December 31, 2020. The Company believes that neither its business, nor either of its reportable segments, is subject to significant seasonal variations, although certain individual operations experience some seasonal variability.

Research, Development and Engineering

AMETEK is committed to, and has consistently invested in, research, development and engineering activities. These investments support AMETEK’s efforts in designing and developing new and improved products and solutions for our customers. Research, development and engineering costs before customer reimbursement were $260.3 million in 2019, $230.2 million in 2018 and $221.2 million in 2017, respectively. Customer reimbursements in 2019, 2018 and 2017 were $3.2 million, $5.2 million and $5.4 million, respectively. These amounts included research and development expenses of $161.9 million, $141.0 million and $130.4 million in 2019, 2018 and 2017, respectively. All such expenditures were directed toward the development of new products and solutions and the improvement of existing products and solutions.

Environmental Matters

Information with respect to environmental matters is set forth in Part II, Item 7 Management’s Discussion and Analysis of Financial Condition and Results of Operations section entitled “Environmental Matters” and in Note 13 to the Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K.

Patents, Licenses and Trademarks

AMETEK owns numerous unexpired U.S. and foreign patents, including counterparts of its more important U.S. patents, in the major industrial countries of the world. It is a licensor or licensee under patent agreements of various types, and its products are marketed under various registered and unregistered U.S. and foreign trademarks and trade names. AMETEK, however, does not consider any single patent or trademark, or any group of them, essential either to its business as a whole or to either one of its reportable segments. The annual royalties received or paid under license agreements are not significant to either of its reportable segments or to AMETEK’s overall operations.

Employees

At December 31, 2019, AMETEK employed approximately 18,100 people at its EIG, EMG and corporate operations, of whom approximately 2,500 employees were covered by collective bargaining agreements. AMETEK has three collective bargaining agreements that expire in 2020, which cover fewer than 100 employees. It expects no material adverse effects from these pending labor contract negotiations.

Working Capital Practices

AMETEK does not have extraordinary working capital requirements in either of its reportable segments. Its customers generally are billed at normal trade terms that may include extended payment provisions. Inventories are closely controlled and maintained at levels related to production cycles and normal delivery requirements of customers.

Item 1A. Risk Factors

You should consider carefully the following risk factors and all other information contained in this Annual Report on Form 10-K and the documents we incorporate by reference in this Annual Report on Form 10-K. Any of the following risks could materially and adversely affect our business, financial condition, results of operations and cash flows.

A downturn in the economy generally or in the markets we serve could adversely affect our business.

A number of the industries in which we operate are cyclical in nature and therefore are affected by factors beyond our control. A downturn in the U.S. or global economy, and, in particular, in the aerospace and defense, oil and gas, process instrumentation or power markets could have an adverse effect on our business, financial condition and results of operations.

Our growth could suffer if the markets into which we sell our products and services decline, do not grow as anticipated or experience cyclicality.

Our growth depends in part on the growth of the markets which we serve. Visibility into the future performance of certain of our markets is limited (particularly for markets into which we sell through distribution). Our quarterly sales and profits depend substantially on the volume and timing of orders received during the fiscal quarter, which are difficult to forecast. Any decline or lower than expected growth in our served markets could diminish demand for our products and services, which would adversely affect our financial statements. A number of our businesses operate in industries that may experience periodic, cyclical downturns. In addition, in certain of our businesses, demand depends on customers' capital spending budgets, as well as government funding policies. Matters of public policy and government budget dynamics, as well as product and economic cycles, can affect the spending decisions of these customers. Demand for our products and services is also sensitive to changes in customer order patterns, which may be affected by announced price changes, changes in incentive programs, new product introductions and customer inventory levels. Any of these factors could adversely affect our growth and results of operations in any given period.

Our growth strategy includes strategic acquisitions. We may not be able to consummate future acquisitions or successfully integrate recent and future acquisitions.

A portion of our growth has been attributed to acquisitions of strategic businesses. Since the beginning of 2015, through December 31, 2019, we have completed 18 acquisitions. We plan to continue making strategic acquisitions to enhance our global market position and broaden our product offerings. Although we have been successful with our acquisition strategy in the past, our ability to successfully effectuate acquisitions will be dependent upon a number of factors, including:

• Our ability to identify acceptable acquisition candidates;

- The impact of increased competition for acquisitions, which may increase acquisition costs, affect our ability to consummate acquisitions on favorable terms, and result in us assuming a greater portion of the seller's liabilities;

- Successfully integrating acquired businesses, including integrating the management, technological and operational processes, procedures and controls of the acquired businesses with those of our existing operations;

- Adequate financing for acquisitions being available on terms acceptable to us;

- Unexpected losses of key employees, customers and suppliers of acquired businesses;

- Mitigating assumed, contingent and unknown liabilities; and

- Challenges in managing the increased scope, geographic diversity and complexity of our operations.

The process of integrating acquired businesses into our existing operations may result in unforeseen operating difficulties and may require additional financial resources and attention from management that would otherwise be available for the ongoing development or expansion of our existing operations. Furthermore, even if successfully integrated, the acquired business may not achieve the results we expected or produce expected benefits in the time frame planned. Failure to continue with our acquisition strategy and the successful integration of acquired businesses could have an adverse effect on our business, financial condition, results of operations and cash flows.

The indemnification provisions of acquisition agreements by which we have acquired companies may not fully protect us and as a result we may face unexpected liabilities.

Certain of the acquisition agreements by which we have acquired companies require the former owners to indemnify us against certain liabilities related to the operation of the company before we acquired it. In most of these agreements, 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 statements.

We may not properly execute, or realize anticipated cost savings or benefits from, our Operational Excellence initiatives.

Our success is partly dependent upon properly executing and realizing cost savings or other benefits from our ongoing production and procurement initiatives. These initiatives are primarily designed to make the Company more efficient, which is necessary in the Company's highly competitive industries. These initiatives are often complex, and a failure to implement them properly may, in addition to not meeting projected cost savings or benefits, adversely affect our business and operations.

Foreign and domestic economic, political, legal, compliance and business factors could negatively affect our international sales and operations.

International sales for 2019 and 2018 represented 48.0% and 50.5% of our consolidated net sales, respectively. As a result of our growth strategy, we anticipate that the percentage of sales outside the United States will increase in the future. As of December 31, 2019, we have manufacturing operations in 17 countries outside the United States, with significant operations in China, the Czech Republic, Germany, Mexico, Serbia and the United Kingdom. A disruption of our ability to obtain a supply of goods from these countries or a change in the cost to purchase, manufacture, or distribute these products could have an adverse effect on our sales and operations. International sales and operations are subject to the customary risks of operating in an international environment, including:

• Imposition of trade or foreign exchange restrictions, including in the United States;

• Overlap of different tax structures;

• Unexpected changes in regulatory requirements, including in the United States;

• Trade protection measures, such as the imposition of or increase in tariffs and other trade barriers, including in the United States;

• The difficulty and/or costs of designing and implementing an effective control environment across diverse regions and employee bases;

• Restrictions on currency repatriation;

• General economic conditions;

• Unstable political situations;

• Nationalization of assets; and

• Compliance with a wide variety of international and U.S. laws and regulatory requirements.

Furthermore, fluctuations in foreign currency exchange rates, including changes in the relative value of currencies in the countries where we operate, subject us to exchange rate exposure and may adversely affect our financial statements. For example, increased strength in the U.S. dollar will increase the effective price of our products sold overseas, which may adversely affect sales or require us to lower our prices. In addition, our consolidated financial statements are presented in U.S. dollars, and we must translate our assets, liabilities, sales and expenses into U.S. dollars for external reporting purposes. As a result, changes in the value of the U.S. dollar due to fluctuations in currency exchange rates or currency exchange controls may materially and negatively affect the value of these items in our consolidated financial statements, even if their value has not changed in their local currency.

Our international sales and operations may be adversely impacted by compliance with export laws.

We are required to comply with various import, export, export control and economic sanctions laws, which may affect our transactions with certain customers, business partners and other persons, including in certain cases dealings with or between our employees and subsidiaries. In certain circumstances, export control and economic sanctions regulations may prohibit the export of certain products, services and technologies and in other circumstances, we may be required to obtain an export license before exporting a controlled item. In addition, failure to comply with any of these regulations could result in civil and criminal, monetary and non-monetary penalties, disruptions to our business, limitations on our ability to import and export products and services and damage to our reputation.

Our reputation, ability to do business and financial statements may be impaired by improper conduct by any of our employees, agents or business partners.

We cannot provide assurance that our internal controls and compliance systems will always protect us from acts committed by employees, agents or business partners of ours (or of businesses we acquire or partner with) that would violate U.S. and/ornon-U.S. laws, including the laws governing payments to government officials, bribery, fraud, kickbacks and false claims, pricing, sales and marketing practices, conflicts of interest, competition, export and import compliance, money laundering and data privacy. In particular, the U.S. Foreign Corrupt Practices Act, the U.K. Bribery Act and similar anti-bribery laws in other jurisdictions generally prohibit companies and their intermediaries from making improper payments to government officials for the purpose of obtaining or retaining business, and we operate in many parts of the world that have experienced governmental corruption to some degree. Any such improper actions or allegations of such acts could damage our reputation and subject us to civil or criminal investigations in the U.S. and in other jurisdictions and related shareholder lawsuits could lead to substantial civil and criminal, monetary and non-monetary penalties and could cause us to incur significant legal and investigatory fees. In addition, we rely on our suppliers to adhere to our supplier standards of conduct and violations of such standards of conduct could occur that could have a material effect on our financial statements.

Any inability to hire, train and retain a sufficient number of skilled officers and other employees could impede our ability to compete successfully.

If we cannot hire, train and retain a sufficient number of qualified employees, we may not be able to effectively integrate acquired businesses and realize anticipated results from those businesses, manage our expanding international operations and otherwise profitably grow our business. Even if we do hire and retain a sufficient number of employees, the expense necessary to attract and motivate these officers and employees may adversely affect our results of operations.

If we are unable to develop new products on a timely basis, it could adversely affect our business and prospects.

We believe that our future success depends, in part, on our ability to develop, on a timely basis, technologically advanced products that meet or exceed appropriate industry standards. Maintaining our existing technological advantages will require us to continue investing in research and development and sales and marketing. There can be no assurance that we will have sufficient resources to make such investments, that we will be able to make the technological advances necessary to maintain such competitive advantages or that we can recover major research and development expenses. We are not currently aware of any emerging standards or new products which could render our existing products obsolete, although there can be no assurance that this will not occur or that we will be able to develop and successfully market new products.

Our technology is important to our success and our failure to protect this technology could put us at a competitive disadvantage.

Many of our products rely on proprietary technology; therefore, we endeavor to protect our intellectual property rights through patents, copyrights, trade secrets, trademarks, confidentiality agreements and other contractual provisions. Despite our efforts to protect proprietary rights, unauthorized parties or competitors may copy or otherwise obtain and use our products or technology. In addition, our ability to protect and enforce our intellectual property rights may be limited in certain countries outside the U.S. Actions to enforce our rights may result in substantial costs and diversion of resources and we make no assurances that any such actions will be successful.

A disruption in, shortage of, or price increases for, supply of our components and raw materials may adversely impact our operations.

While we manufacture certain parts and components used in our products, we require substantial amounts of raw materials and purchase some parts and components from suppliers. The availability and prices for raw materials, parts and components may be subject to curtailment or change due to, among other things, supplier's allocation to other purchasers, interruptions in production by suppliers, changes in exchange rates and prevailing price levels. In addition, our facilities, supply chains, distribution systems, and products may be impacted by natural orman-made disruptions, including armed conflict, damaging weather or other acts of nature, pandemics or other public health crises. A shutdown of, or inability to utilize, one or more of our facilities, our supply chain, or our distribution system could significantly disrupt our operations, delay production and shipments, our relationships and reputation with customers, suppliers, employees, stockholders and others, result in lost sales, result in the misappropriation or corruption of data, or result in legal exposure and large remediation or other expenses. Furthermore, certain items, including base metals and certain steel components, are available only from a limited number of suppliers and are subject to commodity market fluctuations. Shortages in raw materials or price increases therefore could affect the prices we charge, our operating costs and our competitive position, which could adversely affect our business, financial condition, results of operations and cash flows.

Certain environmental risks may cause us to be liable for costs associated with hazardous or toxic substanceclean-up which may adversely affect our financial condition.

Our businesses, operations and facilities are subject to a number of federal, state, local and foreign environmental and occupational health and safety laws and regulations concerning, among other things, air emissions, discharges to waters and the use, manufacturing, generation, handling, storage, transportation and disposal of hazardous substances and wastes. Environmental risks are inherent in many of our manufacturing operations. Certain laws provide that a current or previous owner or operator of property may be liable for the costs of investigating, removing and remediating hazardous materials at such property, regardless of whether the owner or operator knew of, or was responsible for, the presence of such hazardous materials. In addition, the Comprehensive Environmental Response, Compensation and Liability Act generally imposes joint and several liability for clean-up costs, without regard to fault, on parties contributing hazardous substances to sites designated for clean-up under the Act. We have been named a potentially responsible party at several sites, which are the subject of government-mandated clean-ups. As the result of our ownership and operation of facilities that use, manufacture, store, handle and dispose of various hazardous materials, we may incur substantial costs for investigation, removal, remediation and capital expenditures related to compliance with environmental laws. While it is not possible to precisely quantify the potential financial impact of pending environmental matters, based on our experience to date, we believe that the outcome of these matters is not likely to have a material adverse effect on our financial position or future results of operations. In addition, new laws and regulations, new classification of hazardous materials, 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 the basis for new or increased liabilities that could have a material adverse effect on our business, financial condition and results of operations. There can be no assurance that future environmental liabilities will not occur or that environmental damages due to prior or present practices will not result in future liabilities.

We are subject to numerous governmental regulations, which may be burdensome or lead to significant costs.

Our operations are subject to numerous federal, state, local and foreign governmental laws and regulations. In addition, existing laws and regulations may be revised or reinterpreted and new laws and regulations, including with respect to privacy legislation and climate change, may be adopted or become applicable to us or customers for our products. For example, we are subject to federal, state and international privacy laws relating to the collection, use, retention, security and transfer of personally identifiable information. In many cases, these laws apply not only to third-party transactions, but also to transfers of information between the Company and its subsidiaries, and among the Company, its subsidiaries and other parties with which the Company has commercial relations. Several jurisdictions have passed laws in this area, and other jurisdictions are considering imposing additional restrictions. These laws continue to develop and may be inconsistent from jurisdiction to jurisdiction. Complying with emerging and changing international requirements may cause the Company to incur substantial costs or require the Company to change its business practices. We cannot predict the form any such new laws or regulations will take or the impact any of these laws and regulations will have on our business or operations.

We are subject to a variety of litigation and other legal and regulatory proceedings in the course of our business that could adversely affect our financial statements.

We are subject to a variety of litigation and other legal and regulatory proceedings incidental to our business (or the business operations of previously owned entities), including claims for damages arising out of the use of products or services and claims relating to intellectual property matters, employment matters, tax matters, commercial disputes, competition and sales and trading practices, environmental matters, personal injury, insurance coverage and acquisition-related matters, as well as regulatory investigations or enforcement. These lawsuits may include claims for compensatory damages, punitive and consequential damages and/or injunctive relief. The defense of these lawsuits may divert our management's attention, we may incur significant expenses in defending these lawsuits, and we may be required to pay damage awards or settlements or become subject to equitable remedies that could adversely affect our operations and financial statements. Moreover, any insurance or indemnification rights that we may have may be insufficient or unavailable to protect us against such losses. In addition, developments in proceedings in any given period may require us to adjust the loss contingency estimates that we have recorded in our financial statements, record estimates for liabilities or assets previously not susceptible of reasonable estimates or pay cash settlements or judgments. Any of these developments could adversely affect our financial statements in any particular period. We cannot assure you that our liabilities in connection with litigation and other legal and regulatory proceedings will not exceed our estimates or adversely affect our financial statements and reputation. However, based on our experience, current information and applicable law, we do not believe that any amounts we may be required to pay in connection with litigation and other legal and regulatory proceedings in excess of our reserves as of the date of this information statement will have a material effect on our financial statements.

We operate in highly competitive industries, which may adversely affect our results of operations or ability to expand our business.

Our markets are highly competitive. We compete, domestically and internationally, with individual producers, as well as with vertically integrated manufacturers, some of which have resources greater than we do. The principal elements of competition for our products are product technology, quality, service, distribution and price. Although we believe EIG is a market leader, competition is strong and could intensify in the markets served by EIG. In the aerospace markets served by EIG, a limited number of companies compete on the basis of product quality, performance and innovation. EMG's competition in specialty metal products stems from alternative materials and processes. Our competitors may develop new or improve existing products that are superior to our products or may adapt more readily to new technologies or changing requirements of our customers. There can be no assurance that our business will not be adversely affected by increased competition in the markets in which it operates or that our products will be able to compete successfully with those of our competitors.

Restrictions contained in our revolving credit facility and other debt agreements may limit our ability to incur additional indebtedness.

Our existing revolving credit facility and other debt agreements (each a "Debt Facility" and collectively, "Debt Facilities") contain restrictive covenants, including restrictions on our ability to incur indebtedness. These restrictions could limit our ability to effectuate future acquisitions, limit our ability to pay dividends, limit our ability to make capital expenditures or restrict our financial flexibility. Our Debt Facilities contain covenants requiring us to achieve certain financial and operating results and maintain compliance with specified financial ratios. Our ability to meet the financial covenants or requirements in our Debt Facilities may be affected by events beyond our control, and we may not be able to satisfy such covenants and requirements. A breach of these covenants or our inability to comply with the financial ratios, tests or other restrictions contained in a Debt Facility could result in an event of default under one or more of our other Debt Facilities. Upon the occurrence of an event of default under a Debt Facility, and the expiration of any grace periods, the lenders could elect to declare all amounts outstanding under one or more of our other Debt Facilities, together with accrued interest, to be immediately due and payable. If this were to occur, our assets may not be sufficient to fully repay the amounts due under our Debt Facilities or our other indebtedness.

Our business and financial performance could be adversely impacted by a significant disruption in, or breach in security of, our information technology systems.

We rely on information technology systems, some of which are managed by third-parties, to process, transmit and store electronic information (including sensitive data such as confidential business information and personally identifiable data relating to employees, customers, other business partners and patients), and to manage or support a variety of critical business processes and activities (such as receiving and fulfilling orders, billing, collecting and making payments, shipping products, providing services and support to customers and fulfilling contractual obligations). These systems, products and services may be damaged, disrupted or shut down due to attacks by computer hackers, computer viruses, ransomware, human error or malfeasance, power outages, hardware failures, telecommunication or utility failures, catastrophes or other unforeseen events. In any such circumstances our system redundancy and other disaster recovery planning may be ineffective or inadequate. Attacks may also target hardware, software and information installed, stored or transmitted in our products after such products have been purchased and incorporated into third-party products, facilities or infrastructure. Like most multinational corporations, our information technology systems have been subject to computer viruses, malicious codes, unauthorized access and other cyber-attacks and we expect the sophistication and frequency of such attacks to continue to increase. Any of the attacks, breaches or other disruptions or damage described above could interrupt our operations or the operations of our customers and partners, delay production and shipments, result in theft of intellectual property and trade secrets, damage customer and business partner relationships and our reputation or result in defective products or services, legal claims and proceedings, liability and penalties under privacy laws and increased costs for security and remediation, each of which could adversely affect our business, reputation and financial statements. Although we maintain cyber risk insurance, damages and claims arising from such incidents may not be covered or may exceed the amount of any insurance available.

Our goodwill and other intangible assets represent a substantial proportion of our total assets and the impairment of such substantial goodwill and intangible assets could have a negative impact on our financial condition and results of operations.

Our total assets include substantial amounts of intangible assets, primarily goodwill. At December 31, 2019, goodwill and other intangible assets, net of accumulated amortization, totaled $6,810.4 million or 69% of our total assets. The goodwill results from our acquisitions, representing the excess of cost over the fair value of the net tangible and other identifiable intangible assets we have acquired. At a minimum, we assess annually whether there has been impairment in the value of our intangible assets. If future operating performance at one or more of our reporting units were to fall significantly below current levels, we could record, under current applicable accounting rules, a non-cash charge to operating income for goodwill or other intangible asset impairment. Any determination requiring the impairment of a significant portion of goodwill or other intangible assets would negatively affect our financial condition and results of operations.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

At December 31, 2019, the Company conducted business from office and operating facilities at owned and leased locations throughout the United States and select global markets. The Company's leases a facility in Berwyn, Pennsylvania for its corporate headquarters.

The Company believes that all facilities have been adequately maintained, are in good operating condition, and are suitable for our current needs.

Item 3. Legal Proceedings

Please refer to "Environmental Matters" in Part II, Item 7 Management's Discussion and Analysis of Financial Condition and Results of Operations and Note 13 to the Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K for information regarding certain litigation matters.

The Company is subject to a variety of litigation and other legal and regulatory proceedings incidental to its business (or the business operations of previously owned entities), including claims for damages arising out of the use of the Company's products or services and claims relating to intellectual property matters, employment matters, tax matters, commercial disputes, competition and sales and trading practices, environmental matters, personal injury, insurance coverage and acquisition-related matters, as well as regulatory investigations or enforcement. Based upon the Company's experience, the Company does not believe that these proceedings and claims will have a material adverse effect on its results of operations, financial position or cash flows.

Item 4. Mine Safety Disclosures

Not Applicable.

PART II

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

The principal market on which the Company's common stock is traded is the New York Stock Exchange and it is traded under the symbol "AME." On January 31, 2020, there were approximately 1,800 holders of record of the Company's common stock.

Market price and dividend information with respect to the Company's common stock is set forth below. Future dividend payments by the Company will be dependent on future earnings, financial requirements, contractual provisions of debt agreements and other relevant factors.

Under its share repurchase program, the Company repurchased approximately 133,000 shares of its common stock for $11.9 million in 2019 and approximately 5,079,000 shares of its common stock for $367.7 million in 2018.

Issuer Purchases of Equity Securities

The following table reflects purchases of AMETEK, Inc. common stock by the Company during the three months ended December 31, 2019:

Period	Total Number of Shares Purchased (1)(2)	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plan (2)	Approximate Dollar Value of Shares that May Yet Be Purchased Under the Plan
October 1, 2019 to October 31, 2019	—	$ —	—	$ 494,436,704
November 1, 2019 to November 30, 2019	55,211	96.20	55,211	489,125,278
December 1, 2019 to December 31, 2019	—	—	—	489,125,278
Total	55,211	96.20	55,211	

(1) Represents shares surrendered to the Company to satisfy tax withholding obligations in connection with employees' share-based compensation awards.

(2) Consists of the number of shares purchased pursuant to the Company's Board of Directors $500 million authorization for the repurchase of its common stock announced in February 2019. Such purchases may be effected from time to time in the open market or in private transactions, subject to market conditions and at management's discretion.

Securities Authorized for Issuance Under Equity Compensation Plan Information

The following table sets forth information as of December 31, 2019 regarding all of the Company's existing compensation plans pursuant to which equity securities are authorized for issuance to employees and nonemployee directors:

Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Equity compensation plans approved by security holders	4,302,540	$ 62.50	4,579,533
Equity compensation plans not approved by security holders	—	—	—
Total	4,302,540	62.50	4,579,533

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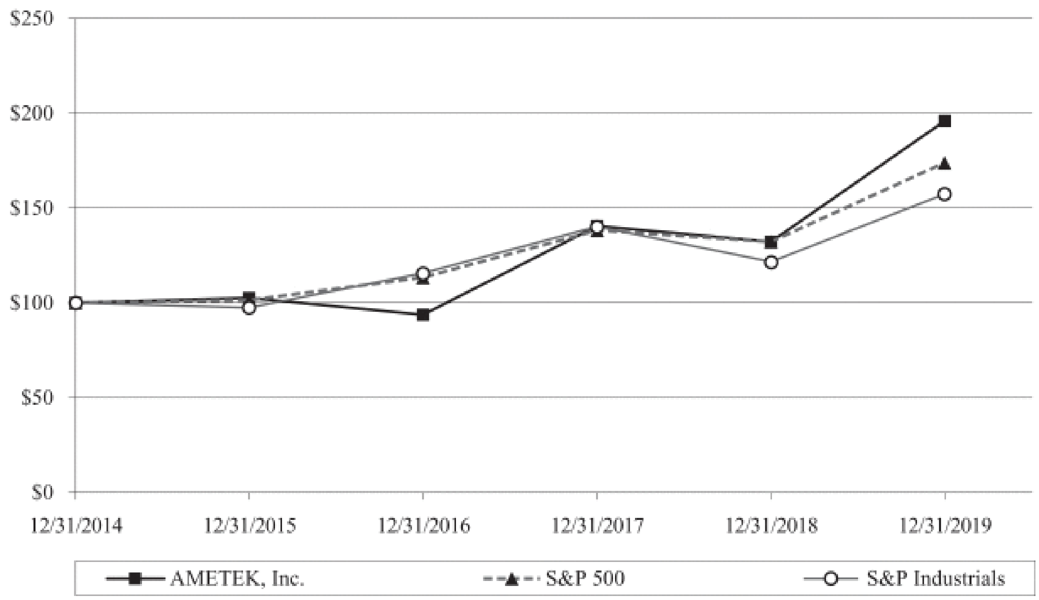
Stock Performance Graph

The following graph and accompanying table compare the cumulative total stockholder return for AMETEK over the last five years ended December 31, 2019 with total returns for the same period for the Standard and Poor's ("S&P") 500 Index and S&P Industrials. AMETEK's stock price is a component of both indices. The performance graph and table assume a $100 investment made on December 31, 2014 and reinvestment of all dividends. The stock performance shown on the graph below is based on historical data and is not necessarily indicative of future stock price performance.

COMPARISON OF FIVE-YEAR CUMULATIVE TOTAL RETURN



	December 31,					
	2014	2015	2016	2017	2018	2019
AMETEK, Inc.	$ 100.00	$ 102.51	$ 93.66	$ 140.48	$ 132.20	$ 196.00
S&P 500 Index	100.00	101.38	113.51	138.29	132.23	173.86
S&P Industrials	100.00	97.47	115.85	140.22	121.58	157.29

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Item 6. Selected Financial Data

The following financial information for the five years ended December 31, 2019, has been derived from the Company's consolidated financial statements. This information should be read in conjunction with Management's Discussion and Analysis of Financial Condition and Results of Operations and the consolidated financial statements and related notes thereto included elsewhere in this Annual Report on Form 10-K.

	2019	2018	2017	2016	2015
		(In millions, except per share amounts)			
Consolidated Operating Results (Year Ended December 31):					
Net sales	**$5,158.6**	$4,845.9	$4,300.2	$3,840.1	$3,974.3
Operating income[1]	**$1,177.4**	$1,075.5	$ 903.6	$ 791.0	$ 907.7
Interest expense	**$ 88.5**	$ 82.2	$ 98.0	$ 94.3	$ 91.8
Net income	**$ 861.3**	$ 777.9	$ 681.5	$ 512.2	$ 590.9
Earnings per share:					
Basic	**$ 3.78**	$ 3.37	$ 2.96	$ 2.20	$ 2.46
Diluted	**$ 3.75**	$ 3.34	$ 2.94	$ 2.19	$ 2.45
Dividends declared and paid per share	**$ 0.56**	$ 0.56	$ 0.36	$ 0.36	$ 0.36
Weighted average common shares outstanding:					
Basic	**227.8**	230.8	230.2	232.6	239.9
Diluted	**229.4**	232.7	231.8	233.7	241.6
Performance Measures and Other Data:					
Operating income — Return on net sales[1]	**22.8%**	22.2%	21.0%	20.6%	22.8%
— Return on average total assets[1]	**12.7%**	13.1%	12.1%	11.5%	13.9%
Net income — Return on average total capital	**11.7%**	11.9%	11.6%	9.5%	11.6%
— Return on average stockholders' equity	**18.4%**	18.8%	18.7%	15.7%	18.2%
EBITDA[2]	**$1,388.3**	$1,267.7	$1,076.0	$ 966.0	$1,046.9
Ratio of EBITDA to interest expense[2]	**15.7x**	15.4x	11.0x	10.2x	11.4x
Depreciation and amortization	**$ 234.0**	$ 199.5	$ 183.2	$ 179.7	$ 149.5
Capital expenditures	**$ 102.3**	$ 82.1	$ 75.1	$ 63.3	$ 69.1
Cash provided by operating activities	**$1,114.4**	$ 925.5	$ 833.3	$ 756.8	$ 672.5
Free cash flow[3]	**$1,012.1**	$ 843.4	$ 758.2	$ 693.5	$ 603.4
Consolidated Financial Position (At December 31):					
Current assets	**$2,025.8**	$1,836.1	$1,934.7	$1,928.2	$1,618.8
Current liabilities	**$1,425.9**	$1,258.7	$1,138.7	$ 924.4	$1,024.0
Property, plant and equipment, net	**$ 548.9**	$ 554.1	$ 493.3	$ 473.2	$ 484.5
Total assets	**$9,844.6**	$8,662.3	$7,796.1	$7,100.7	$6,660.5
Long-term debt, net	**$2,271.3**	$2,273.8	$1,866.2	$2,062.6	$1,553.1
Total debt, net	**$2,768.7**	$2,632.7	$2,174.3	$2,341.6	$1,938.0
Stockholders' equity	**$5,115.5**	$4,241.9	$4,027.6	$3,256.5	$3,254.6
Stockholders' equity per share	**$ 22.33**	$ 18.68	$ 17.42	$ 14.20	$ 13.82
Total debt as a percentage of capitalization	**35.1%**	38.3%	35.1%	41.8%	37.3%
Net debt as a percentage of capitalization[4]	**31.7%**	34.9%	27.5%	33.3%	32.4%

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Notes to Selected Financial Data

(1) Amounts prior to 2016 do not reflect the adoption of ASU No. 2017-07, *Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost* ("ASU 2017-07").

(2) EBITDA represents earnings before interest, income taxes, depreciation and amortization. EBITDA is presented because the Company is aware that it is used by rating agencies, securities analysts, investors and other parties in evaluating the Company. It should not be considered, however, as an alternative to operating income as an indicator of the Company's operating performance or as an alternative to cash flows as a measure of the Company's overall liquidity as presented in the Company's consolidated financial statements. Furthermore, EBITDA measures shown for the Company may not be comparable to similarly titled measures used by other companies. The following table presents the reconciliation of net income reported in accordance with U.S. generally accepted accounting principles ("GAAP") to EBITDA:

	Year Ended December 31,				
	2019	2018	2017	2016	2015
			(In millions)		
Net income	**$ 861.3**	$ 777.9	$ 681.5	$512.2	$ 590.9
Add (deduct):					
Interest expense	**88.5**	82.2	98.0	94.3	91.8
Interest income	**(4.0)**	(1.7)	(2.0)	(1.1)	(0.8)
Income taxes	**208.5**	209.8	115.3	180.9	215.5
Depreciation	**101.4**	85.4	82.0	74.8	68.7
Amortization	**132.6**	114.1	101.2	104.9	80.8
Total adjustments	**527.0**	489.8	394.5	453.8	456.0
EBITDA	**$1,388.3**	$1,267.7	$1,076.0	$966.0	$1,046.9

(3) Free cash flow represents cash flow from operating activities less capital expenditures. Free cash flow is presented because the Company is aware that it is used by rating agencies, securities analysts, investors and other parties in evaluating the Company. The following table presents the reconciliation of cash flow from operating activities reported in accordance with U.S. GAAP to free cash flow:

	Year Ended December 31,				
	2019	2018	2017	2016	2015
			(In millions)		
Cash provided by operating activities	**$1,114.4**	$925.5	$833.3	$756.8	$672.5
Deduct: Capital expenditures	**(102.3)**	(82.1)	(75.1)	(63.3)	(69.1)
Free cash flow	**$1,012.1**	$843.4	$758.2	$693.5	$603.4

(4) Net debt represents total debt, net minus cash and cash equivalents. Net debt is presented because the Company is aware that it is used by rating agencies, securities analysts, investors and other parties in evaluating the Company. The following table presents the reconciliation of total debt, net reported in accordance with U.S. GAAP to net debt:

	December 31,				
	2019	2018	2017	2016	2015
			(In millions)		
Total debt, net	**$2,768.7**	$2,632.7	$2,174.3	$2,341.6	$1,938.0
Less: Cash and cash equivalents	**(393.0)**	(354.0)	(646.3)	(717.3)	(381.0)
Net debt	**2,375.7**	2,278.7	1,528.0	1,624.3	1,557.0
Stockholders' equity	**5,115.5**	4,241.9	4,027.6	3,256.5	3,254.6
Capitalization (net debt plus stockholders' equity)	**$7,491.2**	$6,520.6	$5,555.6	$4,880.8	$4,811.6
Net debt as a percentage of capitalization	**31.7%**	34.9%	27.5%	33.3%	32.4%

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

This report includes forward-looking statements based on the Company's current assumptions, expectations and projections about future events. When used in this report, the words "believes," "anticipates," "may," "expect," "intend," "estimate," "project" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain such words. In this report, the Company discloses important factors that could cause actual results to differ materially from management's expectations. For more information on these and other factors, see "Forward-Looking Information" herein.

The following Management's Discussion and Analysis of Financial Condition and Results of Operations should be read in conjunction with "Item 1A. Risk Factors," "Item 6. Selected Financial Data" and the consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K.

Business Overview

AMETEK's operations are affected by global, regional and industry economic factors. However, the Company's strategic geographic and industry diversification, and its mix of products and services, have helped to mitigate the potential adverse impact of any unfavorable developments in any one industry or the economy of any single country on its consolidated operating results. In 2019, the Company posted record backlog, orders, sales, operating income, net income, diluted earnings per share and operating cash flow. The Company's record backlog, contributions from recent acquisitions, and continued focus on and implementation of Operational Excellence initiatives, had a positive impact on 2019 results. The Company also benefited from its strategic initiatives under AMETEK's four key strategies: Operational Excellence, Strategic Acquisitions, Global & Market Expansion and New Products.

Highlights of 2019 were:

- Orders for 2019 were $5,274.3 million, an increase of $222.5 million or 4.4%, compared with $5,051.8 million in 2018. As a result, the Company's backlog of unfilled orders at December 31, 2019 was $1,717.9 million.

- Net sales for 2019 were $5,158.6 million, an increase of $312.7 million or 6.5%, compared with $4,845.9 million in 2018. The increase in net sales for 2019 was due to 2% organic sales growth, a 5% increase from the 2019 and 2018 acquisitions, partially offset by unfavorable foreign currency translation.

- Net income for 2019 was $861.3 million, an increase of $83.4 million or 10.7%, compared with $777.9 million in 2018.

- Diluted earnings per share for 2019 were $3.75, an increase of $0.41 or 12.3%, compared with $3.34 per diluted share in 2018.

- Cash flow provided by operating activities for 2019 was $1,114.4 million, an increase of $188.9 million or 20.4%, compared with $925.5 million in 2018.

- During 2019, the Company spent $1,061.9 million in cash, net of cash acquired, to acquire two businesses:

  - In September 2019, AMETEK acquired Pacific Design Technologies, Inc. ("PDT"), a provider of advanced, mission-critical thermal management solutions; and

  - In October 2019, AMETEK acquired Gatan, a provider of instrumentation and software used to enhance and extend the operation and performance of electron telescopes.

- In the fourth quarter of 2019, the Company paid in full, at maturity, $100 million in aggregate principal amount of 6.30% private placement senior notes.

- A $100 million second funding of the December 2018 Private Placement occurred in January 2019.

- In 2019, the Company repurchased approximately 133,000 shares of its common stock for $11.9 million.

- The Company continued its emphasis on investment in research, development and engineering, spending $260.3 million in 2019 before customer reimbursement of $3.2 million.

Results of Operations

The following table sets forth net sales and income by reportable segment and on a consolidated basis:

	Year Ended December 31,		
	2019	**2018**	**2017**
		(In thousands)	
Net sales:			
Electronic Instruments	**$3,322,881**	$3,028,959	$2,690,554
Electromechanical	**1,835,676**	1,816,913	1,609,616
Consolidated net sales	**$5,158,557**	$4,845,872	$4,300,170
Operating income and income before income taxes:			
Segment operating income:			
Electronic Instruments	**$ 865,307**	$ 782,144	$ 671,646
Electromechanical	**387,931**	363,765	306,779
Total segment operating income	**1,253,238**	1,145,909	978,425
Corporate administrative expenses	**(75,858)**	(70,369)	(74,805)
Consolidated operating income	**1,177,380**	1,075,540	903,620
Interest expense	**(88,481)**	(82,180)	(98,029)
Other expense, net	**(19,151)**	(5,615)	(8,862)
Consolidated income before income taxes	**$1,069,748**	$ 987,745	$ 796,729

The following “Results of Operations of the year ended December 31, 2019 compared with the year ended December 31, 2018” section presents an analysis of the Company’s consolidated operating results displayed in the Consolidated Statement of Income. A discussion regarding our financial condition and results of operations for the year ended December 31, 2018 compared to the year ended December 31, 2017 can be found under Item 7 in our Annual Report on Form 10-K for the fiscal year ended December 31, 2018, filed with the Securities and Exchange Commission on February 21, 2019.

Results of Operations for the year ended December 31, 2019 compared with the year ended December 31, 2018

In 2019, the Company posted record sales, operating income, net income, diluted earnings per share, orders, backlog and operating cash flow. The Company achieved these results from organic sales growth in both EIG and EMG, contributions from the 2019 acquisitions of Gatan and PDT and 2018 acquisitions of Spectro Scientific, Telular, Forza, Motec and SoundCom, as well as from the Company’s Operational Excellence initiatives.

The Company's record backlog, the full year impact of the 2019 acquisitions and continued focus on and implementation of Operational Excellence initiatives are expected to have a positive impact on the Company's 2020 results.

Net sales for 2019 were $5,158.6 million, an increase of $312.7 million or 6.5%, compared with net sales of $4,845.9 million in 2018. The increase in net sales for 2019 was due to 2% organic sales growth, a 5% increase from acquisitions, partially offset by unfavorable foreign currency translation. EIG net sales were $3,322.9 million in 2019, an increase of 9.7%, compared with $3,029.0 million in 2018. EMG net sales were $1,835.7 million in 2019, an increase of 1.0%, compared with $1,816.9 million in 2018.

Total international sales for 2019 were $2,474.9 million or 48.0% of net sales, an increase of $26.4 million or 1.1%, compared with international sales of $2,448.5 million or 50.5% of net sales in 2018. The increase in international sales was primarily driven by recent acquisitions. Export shipments from the United States, which are included in total international sales, were $1,306.2 million in 2019, an increase of $36.8 million or 2.9%, compared with $1,269.4 million in 2018.

Orders for 2019 were $5,274.3 million, an increase of $222.5 million or 4.4%, compared with $5,051.8 million in 2018. The increase in orders for 2019 was driven by the 2018 and 2019 acquisitions. The Company's backlog of unfilled orders at December 31, 2019 was $1,717.9 million, an increase of $115.8 million or 7.2%, compared with $1,602.1 million at December 31, 2018.

Segment operating income for 2019 was $1,253.2 million, an increase of $107.3 million or 9.4%, compared with segment operating income of $1,145.9 million in 2018. Segment operating income, as a percentage of net sales, increased to 24.3% in 2019, compared with 23.6% in 2018. The increase in segment operating income and segment operating margins for 2019 resulted primarily from the increase in net sales, as well as the benefits of the Company's Operational Excellence initiatives.

Cost of sales for 2019 was $3,370.9 million or 65.3% of net sales, an increase of $184.6 million or 5.8%, compared with $3,186.3 million or 65.8% of net sales for 2018. Cost of sales increased primarily due to the increase in net sales noted above.

Selling, general and administrative expenses for 2019 were $610.3 million or 11.8% of net sales, an increase of $26.3 million or 4.5%, compared with $584.0 million or 12.1% of net sales in 2018. Selling, general and administrative expenses increased primarily due to the increase in net sales noted above.

Consolidated operating income was $1,177.4 million or 22.8% of net sales for 2019, an increase of $101.9 million or 9.5%, compared with $1,075.5 million or 22.2% of net sales in 2018.

Interest expense was $88.5 million for 2019, an increase of $6.3 million or 7.7%, compared with $82.2 million in 2018. The interest expense increase for 2019 was primarily driven by the 2018 private placement senior notes issued in December 2018 ($475 million and 75 million Euros) and January 2019 ($100 million), partially offset by a decrease related to the repayment in full, at maturity, of $80 million in aggregate principal amount of 6.35% private placement senior notes and $160 million in aggregate principal amount of 7.08% private placement senior notes in the third quarter of 2018, $65 million in aggregate principal amount of 7.18% private placement senior notes in the fourth quarter of 2018, and $100 million in aggregate principal amount of 6.03% private placement senior notes in the fourth quarter of 2019.

Other expense, net was $19.2 million for 2019, an increase of $13.6 million, compared with $5.6 million in 2018. The Other expense, net increase for 2019 was primarily due to lower defined benefit pension income included in Other expenses.

The effective tax rate for 2019 was 19.5%, compared with 21.2% in 2018. The lower rate for 2019 mainly reflects higher year over year tax benefits related to share-based payment transactions as well as lower tax cost on foreign source income. The 2019 and 2018 effective tax rates also reflect the release of uncertain tax position liabilities primarily relating to statute expirations for U.S. Federal and State jurisdictions totaling $23.3 million and $11.4 million, respectively. See Note 9 to the Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K for further details.

Net income for 2019 was $861.3 million, an increase of $83.4 million or 10.7%, compared with $777.9 million in 2018. Diluted earnings per share for 2019 were $3.75, an increase of $0.41 or 12.3%, compared with $3.34 per diluted share in 2018.

Segment Results

EIG's net sales totaled $3,322.9 million for 2019, an increase of $293.9 million or 9.7%, compared with $3,029.0 million in 2018. The net sales increase was due to 3% organic sales growth, an 8% increase from the 2019 acquisition of Gatan and the 2018 acquisitions of Spectro Scientific, Telular, Forza, Motec and SoundCom, partially offset by an unfavorable 1% effect of foreign currency translation.

EIG's operating income was $865.3 million for 2019, an increase of $83.2 million or 10.6%, compared with $782.1 million in 2018. EIG's operating margins were 26.0% of net sales for 2019, compared with 25.8% of net sales in 2018. The increase in EIG's operating income and operating margins for 2019 resulted primarily from the increase in net sales noted above, as well as the benefits of the Group's Operational Excellence initiatives.

EMG's net sales totaled $1,835.7 million for 2019, an increase of $18.8 million or 1.0%, compared with $1,816.9 million in 2018. The net sales increase was due to 2% organic sales growth, a 1% increase from the 2019 acquisition of PDT and the 2018 acquisition of FMH, partially offset by unfavorable 2% foreign currency translation.

EMG's operating income was $387.9 million for 2019, an increase of $24.1 million or 6.6%, compared with $363.8 million in 2018. EMG's operating margins were 21.1% of net sales for 2019, compared with 20.0% of net sales in 2018. The increase in EMG's operating income in 2019 resulted primarily from the increase in net sales noted above, as well as the benefits of the Group's Operational Excellence initiatives.

Liquidity and Capital Resources

Cash provided by operating activities totaled $1,114.4 million in 2019, an increase of $188.9 million or 20.4%, compared with $925.5 million in 2018. The increase in cash provided by operating activities for 2019 was primarily due to higher net income of $83.4 million and lower deferred income taxes.

Free cash flow (cash flow provided by operating activities less capital expenditures) was $1,012.1 million in 2019, compared with $843.4 million in 2018. EBITDA (earnings before interest, income taxes, depreciation and amortization) was $1,388.3 million in 2019, compared with $1,267.7 million in 2018. Free cash flow and EBITDA are presented because the Company is aware that they are measures used by third parties in evaluating the Company. (See the "Notes to Selected Financial Data" included in Item 6 in this Annual Report on Form 10-K for a reconciliation of U.S. GAAP measures to comparable non-GAAP measures).

Cash used for investing activities totaled $1,150.9 million in 2019, compared with $1,210.0 million in 2018. In 2019, the Company paid $1,061.9, net of cash acquired, to acquire PDT in September 2019 and Gatan in October 2019. In 2018, the Company paid $1,129.3 million, net of cash acquired, to acquire Spectro Scientific in November 2018, Telular and Forza in October 2018, Motec in June 2018, SoundCom in April 2018 and FMH in January 2018. Additions to property, plant and equipment totaled $102.3 million in 2019, compared with $82.1 million in 2018.

Cash provided by financing activities totaled $72.9 million in 2019, compared with $13.0 million of cash provided by financing activities in 2018. At December 31, 2019, total debt, net was $2,768.7 million, compared with $2,632.7 million at December 31, 2018. In 2019, short-term borrowings increased $130.7 million, compared with an increase of $258.3 million in 2018. There was no net change in long-term borrowings in 2019, compared with an increase of $255.1 million in 2018.

In October 2018, the Company along with certain of its foreign subsidiaries amended and restated its Credit Agreement. The Credit Agreement amends and restates the Company's existing $850 million revolving credit facility, which was due to expire in March 2021. The amended Credit Agreement consists of a five-year revolving credit facility in an aggregate principal amount of $1.5 billion with a final maturity date in October 2023. The revolving credit facility total borrowing capacity excludes an accordion feature that permits the Company to request up to an additional $500 million in revolving credit commitments at any time during the life of the Credit Agreement under certain conditions. The revolving credit facility provides the Company with additional financial flexibility to support its growth plans, including its acquisition strategy. At December 31, 2019, the Company had available borrowing capacity of $1,580.5 million under its revolving credit facility, including the $500 million accordion feature.

In December 2018, the Company completed the 2018 private placement agreement to sell $575 million and 75 million Euros in senior notes to a group of institutional investors utilizing two funding dates. The first funding occurred in December 2018 for $475 million and 75 million Euros ($85.1 million). The second funding occurred in January 2019 for $100 million. The 2018 Private Placement senior notes carry a weighted average interest rate of 3.93% and are subject to certain customary covenants, including financial covenants that, among other things, require the Company to maintain certain debt-to-EBITDA and interest coverage ratios. The proceeds from the 2018 Private Placement fundings were used to pay down domestic borrowings under the Company's revolving credit facility.

In the fourth quarter of 2019, $100 million of 6.30% senior notes matured and were paid. In the third quarter of 2018, $80 million of 6.35% senior notes and $160 million of 7.08% senior notes matured and were paid. In the fourth quarter of 2018, $65 million of 7.18% senior notes matured and were paid. The debt-to-capital ratio was 35.1% at December 31, 2019, compared with 38.3% at December 31, 2018. The netdebt-to-capital ratio (total debt, net less cash and cash equivalents divided by the sum of net debt and stockholders' equity) was 31.7% at December 31, 2019, compared with 34.9% at December 31, 2018. The net debt-to-capital ratio is presented because the Company is aware that this measure is used by third parties in evaluating the Company. (See the "Notes to Selected Financial Data" included in Item 6 in this Annual Report on Form 10-K for a reconciliation of U.S. GAAP measures to comparable non-GAAP measures).

In 2019, the Company repurchased approximately 133,000 shares of its common stock for $11.9 million, compared with $367.7 million used for repurchases of approximately 5,079,000 shares in 2018. At December 31, 2019, $489.1 million was available under the Company's Board of Directors authorization for future share repurchases. On February 12, 2019, the Company's Board of Directors approved an increase of $500 million in the authorization for the repurchase of the Company's common stock.

Additional financing activities for 2019 included cash dividends paid of $127.5 million, compared with $128.9 million in 2018. Proceeds from the exercise of employee stock options were $90.4 million in 2019, compared with $30.0 million in 2018. In the fourth quarter of 2018, the Company made a $30.0 million contingent payment related to the Rauland acquisition. Cash provided by financing activities includes $25.5 million related to the acquisition date estimated fair value of the contingent payment liability, which was based on a probabilistic approach using level 3 inputs. See Note 6 to the Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K for further details.

As a result of all of the Company's cash flow activities in 2019, cash and cash equivalents at December 31, 2019 totaled $393.0 million, compared with $354.0 million at December 31, 2018. At December 31, 2019, the

Company had $357.9 million in cash outside the United States, compared with $311.2 million at December 31, 2018. The Company utilizes this cash to fund its international operations, as well as to acquire international businesses. The Company is in compliance with all covenants, including financial covenants, for all of its debt agreements. The Company believes it has sufficient cash-generating capabilities from domestic and unrestricted foreign sources, available credit facilities and access to long-term capital funds to enable it to meet its operating needs and contractual obligations in the foreseeable future.

Subsequent Event

Effective February 12, 2020, the Company's Board of Directors approved a 29% increase in the quarterly cash dividend on the Company's common stock to $0.18 per common share from $0.14 per common share.

The following table summarizes AMETEK's contractual cash obligations and the effect such obligations are expected to have on the Company's liquidity and cash flows in future years at December 31, 2019.

	Payments Due				
Contractual Obligations[1]	**Total**	**Less Than One Year**	**One to Three Years**	**Four to Five Years**	**After Five Years**
			(In millions)		
Long-term debt borrowings[2]	$2,382.1	$ 106.1	$ 56.8	$ 725.0	$ 1,494.2
Revolving credit loans[3]	384.8	384.8	—	—	—
Other indebtedness	9.2	9.2	—	—	—
Total debt[4]	2,776.1	500.1	56.8	725.0	1,494.2
Interest on long-term fixed-rate debt	516.2	73.6	139.0	134.9	168.7
Noncancellable operating leases[5]	208.0	49.4	76.2	43.4	39.0
Purchase obligations[6]	505.2	478.5	23.0	2.8	0.9
Restructuring and other	23.8	23.8	—	—	—
Total	$4,029.3	$ 1,125.4	$ 295.0	$ 906.1	$ 1,702.8

(1) The liability for uncertain tax positions was not included in the table of contractual obligations as of December 31, 2019 because the timing of the settlements of these uncertain tax positions cannot be reasonably estimated at this time. See Note 9 to the Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K for further details.
(2) See Note 10 to the Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form10-K for further details.
(3) Although not contractually obligated, the Company expects to have the capability to repay the revolving credit loan within one year as permitted in the Credit Agreement. Accordingly, $384.8 million was classified as short-term debt at December 31, 2019.
(4) Excludes debt issuance costs of $7.4 million, of which $2.7 million is classified as current and $4.7 million is classified as long-term. See Note 10 to the Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K for further details.
(5) The leases expire over a range of years from 2020 to 2034, except for a single land lease with 64 years remaining. Most of the leases contain renewal or purchase options, subject to various terms and conditions.
(6) Purchase obligations primarily consist of contractual commitments to purchase certain inventories at fixed prices.

Other Commitments

The Company has standby letters of credit and surety bonds of $63.8 million related to performance and payment guarantees at December 31, 2019. Based on experience with these arrangements, the Company believes that any obligations that may arise will not be material to its financial position.

Internal Reinvestment

Capital Expenditures

Capital expenditures were $102.3 million or 2.0% of net sales in 2019, compared with $82.1 million or 1.7% of net sales in 2018. In 2019, approximately 66% of capital expenditures were for improvements to existing equipment or additional equipment to increase productivity and expand capacity. Capital expenditures in 2020 are expected to be approximately 2% of net sales, with a continued emphasis on spending to improve productivity.

Research, Development and Engineering

The Company is committed to, and has consistently invested in, research, development and engineering activities to design and develop new and improved products and solutions. Research, development and engineering costs before customer reimbursement were $260.3 million in 2019, $230.2 million in 2018 and $221.2 million in 2017. Customer reimbursements in 2019, 2018 and 2017 were $3.2 million, $5.2 million and $5.4 million, respectively. These amounts included research and development expenses of $161.9 million, $141.0 million and $130.4 million in 2019, 2018 and 2017, respectively. All such expenditures were directed toward the development of new products and solutions and the improvement of existing products and solutions.

Environmental Matters

Certain historic processes in the manufacture of products have resulted in environmentally hazardous waste by-products as defined by federal and state laws and regulations. The Company believes these waste products were handled in compliance with regulations existing at that time. At December 31, 2019, the Company is named a Potentially Responsible Party ("PRP") at 13 non-AMETEK-owned former waste disposal or treatment sites (the "non-owned" sites). The Company is identified as a "de minimis" party in 12 of these sites based on the low volume of waste attributed to the Company relative to the amounts attributed to other named PRPs. In eight of these sites, the Company has reached a tentative agreement on the cost of the de minimis settlement to satisfy its obligation and is awaiting executed agreements. The tentatively agreed-to settlement amounts are fully reserved. In the other four sites, the Company is continuing to investigate the accuracy of the alleged volume attributed to the Company as estimated by the parties primarily responsible for remedial activity at the sites to establish an appropriate settlement amount. At the remaining site where the Company is a non-de minimis PRP, the Company is participating in the investigation and/or related required remediation as part of a PRP Group and reserves have been established sufficient to satisfy the Company's expected obligations. The Company historically has resolved these issues within established reserve levels and reasonably expects this result will continue. In addition to these non-owned sites, the Company has an ongoing practice of providing reserves for probable remediation activities at certain of its current or previously owned manufacturing locations (the "owned" sites). For claims and proceedings against the Company with respect to other environmental matters, reserves are established once the Company has determined that a loss is probable and estimable. This estimate is refined as the Company moves through the various stages of investigation, risk assessment, feasibility study and corrective action processes. In certain instances, the Company has developed a range of estimates for such costs and has recorded a liability based on the best estimate. It is reasonably possible that the actual cost of remediation of the individual sites could vary from the current estimates and the amounts accrued in the consolidated financial statements; however, the amounts of such variances are not expected to result in a material change to the consolidated financial statements. In estimating the Company's liability for remediation, the Company also considers the likely proportionate share of the anticipated remediation expense and the ability of the other PRPs to fulfill their obligations.

Total environmental reserves at December 31, 2019 and 2018 were $28.9 million and $27.8 million, respectively, for both non-owned and owned sites. In 2019, the Company recorded $7.0 million in reserves. Additionally, in 2019 the Company spent $6.0 million on environmental matters and the reserve increased

$0.1 million due to foreign currency translation. The Company's reserves for environmental liabilities at December 31, 2019 and 2018 included reserves of $9.0 million and $9.6 million, respectively, for an owned site acquired in connection with the 2005 acquisition of HCC Industries ("HCC"). The Company is the designated performing party for the performance of remedial activities for one of several operating units making up a Superfund site in the San Gabriel Valley of California. The Company has obtained indemnifications and other financial assurances from the former owners of HCC related to the costs of the required remedial activities.

The Company has agreements with other former owners of certain of its acquired businesses, as well as new owners of previously owned businesses. Under certain of the agreements, the former or new owners retained, or assumed and agreed to indemnify the Company against, certain environmental and other liabilities under certain circumstances. The Company and some of these other parties also carry insurance coverage for some environmental matters. To date, these parties have met their obligations in all material respects.

The Company believes it has established reserves for the environmental matters described above, which are sufficient to perform all known responsibilities under existing claims and consent orders. The Company has no reason to believe that other third parties would fail to perform their obligations in the future. In the opinion of management, based on presently available information and the Company's historical experience related to such matters, an adequate provision for probable costs has been made and the ultimate cost resulting from these actions is not expected to materially affect the consolidated results of operations, financial position or cash flows of the Company.

The Company has been remediating groundwater contamination for several contaminants, including trichloroethylene ("TCE"), at a formerly owned site in El Cajon, California. Several lawsuits have been filed against the Company alleging damages resulting from the groundwater contamination, including property damages and personal injury, and seeking compensatory and punitive damages. The Company believes that it has good and valid defenses to each of these claims and intends to defend them vigorously. The Company believes it has established reserves for these lawsuits that are sufficient to satisfy its expected exposure. The Company does not expect the outcome of these matters, either individually or in the aggregate, to materially affect the consolidated results of operations, financial position or cash flows of the Company.

Critical Accounting Policies

The Company has identified its critical accounting policies as those accounting policies that can have a significant impact on the presentation of the Company's financial condition and results of operations and that require the use of complex and subjective estimates based on the Company's historical experience and management's judgment. Because of the uncertainty inherent in such estimates, actual results may differ materially from the estimates used. The consolidated financial statements and related notes contain information that is pertinent to the Company's accounting policies and to Management's Discussion and Analysis. The information that follows represents additional specific disclosures about the Company's accounting policies regarding risks, estimates, subjective decisions or assessments whereby materially different financial condition and results of operations could have been reported had different assumptions been used or different conditions existed. Primary disclosure of the Company's significant accounting policies is in Note 1 to the Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K.

- *Business Combinations.* The Company allocates the purchase price of an acquired company, including when applicable, the acquisition date fair value of contingent consideration between tangible and intangible assets acquired and liabilities assumed from the acquired business based on their estimated fair values, with the residual of the purchase price recorded as goodwill. Third party appraisal firms and other consultants are engaged to assist management in determining the fair values of certain assets acquired and liabilities assumed. Estimating fair values requires significant judgments, estimates and assumptions, including but not limited to: discount rates, future cash flows and the economic lives of trade names, technology, customer relationships, property, plant and equipment, as well as income taxes. These estimates are based on historical experience and information obtained from the management of the acquired companies and are inherently uncertain.

- *Goodwill and Other Intangible Assets.* Goodwill and other intangible assets with indefinite lives, primarily trademarks and trade names, are not amortized; rather, they are tested for impairment at least annually. For the purpose of the goodwill impairment test, the Company can elect to perform a qualitative analysis to determine if it is more likely than not that the fair values of its reporting units are less than the respective carrying values of those reporting units. The Company elected to bypass performing the qualitative screen and performed the first step quantitative analysis of the goodwill impairment test in the current year. The Company may elect to perform the qualitative analysis in future periods. The first step in the quantitative process is to compare the carrying amount of the reporting unit's net assets to the fair value of the reporting unit. If the fair value exceeds the carrying value, no further evaluation is required, and no impairment loss is recognized. An impairment charge would be recognized to the extent the carrying amount of goodwill exceeds the reporting unit fair value.

The Company identifies its reporting units at the component level, which is one level below its operating segments. Generally, goodwill arises from acquisitions of specific operating companies and is assigned to the reporting unit in which a particular operating company resides. The Company's reporting units are divisions that are one level below its operating segments and for which discrete financial information is prepared and regularly reviewed by segment management.

The Company principally relies on a discounted cash flow analysis to determine the fair value of each reporting unit, which considers forecasted cash flows discounted at an appropriate discount rate. The Company believes that market participants would use a discounted cash flow analysis to determine the fair value of its reporting units in a sale transaction. The annual goodwill impairment test requires the Company to make a number of assumptions and estimates concerning future levels of revenue growth, operating margins, depreciation, amortization and working capital requirements, which are based on the Company's long-range plan and are considered level 3 inputs. The Company's long-range plan is updated as part of its annual planning process and is reviewed and approved by management. The discount rate is an estimate of the overall after-tax rate of return required by a market participant whose weighted average cost of capital includes both equity and debt, including a risk premium. While the Company uses the best available information to prepare its cash flow and discount rate assumptions, actual future cash flows or market conditions could differ significantly resulting in future impairment charges related to recorded goodwill balances. While there are always changes in assumptions to reflect changing business and market conditions, the Company's overall methodology and the population of assumptions used have remained unchanged. In order to evaluate the sensitivity of the goodwill impairment test to changes in the fair value calculations, the Company applied a hypothetical 10% decrease in fair values of each reporting unit. The 2019 results (expressed as a percentage of carrying value for the respective reporting unit) showed that, despite the hypothetical 10% decrease in fair value, the fair values of the Company's reporting units still exceeded their respective carrying values by 77% to 1,074% for each of the Company's reporting units.

The impairment test for indefinite-lived intangibles other than goodwill (primarily trademarks and trade names) consists of a comparison of the fair value of the indefinite-lived intangible asset to the carrying value of the asset as of the impairment testing date. The Company can elect to perform a qualitative analysis to determine if it is more likely than not that the fair values of its indefinite-lived intangible assets are less than the respective carrying values of those assets. The Company elected to bypass performing the qualitative screen. The Company may elect to perform the qualitative analysis in future periods. The Company estimates the fair value of its indefinite-lived intangibles using the relief from royalty method using level 3 inputs. The Company believes the relief from royalty method is a widely used valuation technique for such assets. The fair value derived from the relief from royalty method is measured as the discounted cash flow savings realized from owning such trademarks and trade names and not having to pay a royalty for their use.

The Company's acquisitions have generally included a significant goodwill component and the Company expects to continue to make acquisitions. At December 31, 2019, goodwill and other indefinite-lived intangible assets totaled $4,789.4 million or 48.7% of the Company's total assets. The Company completed its required annual impairment tests in the fourth quarter of 2019 and determined that the carrying values of the Company's goodwill and indefinite-lived intangibles were not impaired. There can be no assurance that goodwill or indefinite-lived intangibles impairment will not occur in the future.

Other intangible assets with finite lives are evaluated for impairment when events or changes in circumstances indicate the carrying value may not be recoverable. The carrying value of other intangible assets with finite lives is considered impaired when the total projected undiscounted cash flows from those assets are separately identifiable and are less than the carrying value. In that event, a loss is recognized based on the amount by which the carrying value exceeds the fair value of those assets. Fair value is determined primarily using present value techniques based on projected cash flows from the asset group.

- *Pensions.* The Company has U.S. and foreign defined benefit and defined contribution pension plans. The most significant elements in determining the Company's pension income or expense are the assumed pension liability discount rate and the expected return on plan assets. The pension discount rate reflects the current interest rate at which the pension liabilities could be settled at the valuation date. At the end of each year, the Company determines the assumed discount rate to be used to discount plan liabilities. In estimating this rate for 2019, the Company considered rates of return on high-quality, fixed-income investments that have maturities consistent with the anticipated funding requirements of the plan. In estimating the U.S. and foreign discount rates, the Company's actuaries developed a customized discount rate appropriate to the plans' projected benefit cash flow based on yields derived from a database of long-term bonds at consistent maturity dates. The Company determines the expected long-term rate of return based primarily on its expectation of future returns for the pension plans' investments. Additionally, the Company considers historical returns on comparable fixed-income and equity investments and adjusts its estimate as deemed appropriate.

- *Income Taxes.* The process of providing for income taxes and determining the related balance sheet accounts requires management to assess uncertainties, make judgments regarding outcomes and utilize estimates. The Company conducts a broad range of operations around the world and is therefore subject to complex tax regulations in numerous international taxing jurisdictions, resulting at times in tax audits, disputes and potential litigation, the outcome of which is uncertain. Management must make judgments currently about such uncertainties and determine estimates of the Company's tax assets and liabilities. To the extent the final outcome differs, future adjustments to the Company's tax assets and liabilities may be necessary.

The Company assesses the realizability of its deferred tax assets, taking into consideration the Company's forecast of future taxable income, available net operating loss carryforwards and available tax planning strategies that could be implemented to realize the deferred tax assets. Based on this assessment, management must evaluate the need for, and the amount of, valuation allowances against the Company's deferred tax assets. To the extent facts and circumstances change in the future, adjustments to the valuation allowances may be required.

The Company assesses the uncertainty in its tax positions, by applying a minimum recognition threshold which a tax position is required to meet before a tax benefit is recognized in the financial statements. Once the minimum threshold is met, using a more likely than not standard, a series of probability estimates is made for each item to properly measure and record a tax benefit. The tax benefit recorded is generally equal to the highest probable outcome that is more than 50% likely to be realized after full disclosure and resolution of a tax examination. The underlying probabilities are determined based on the best available objective evidence such as recent tax audit outcomes, published guidance, external expert opinion, or by analogy to the outcome of similar issues in the past. There can be no assurance that these estimates will ultimately be realized given continuous changes in tax policy, legislation and audit practice. The Company recognizes interest and penalties accrued related to uncertain tax positions in income tax expense.

Recent Accounting Pronouncements

See Note 2, Recent Accounting Pronouncements, to the Company's Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K for information regarding recently issued accounting pronouncements.

Forward-Looking Information

Certain matters discussed in this Form 10-K are "forward-looking statements" as defined in the Private Securities Litigation Reform Act of 1995 ("PSLRA"), which involve risk and uncertainties that exist in the Company's operations and business environment and can be affected by inaccurate assumptions, or by known or unknown risks and uncertainties. Many such factors will be important in determining the Company's actual future results. The Company wishes to take advantage of the "safe harbor" provisions of the PSLRA by cautioning readers that numerous important factors in some cases have caused, and in the future could cause, the Company's actual results to differ materially from those expressed in any forward-looking statements made by, or on behalf of, the Company. Some, but not all, of the factors or uncertainties that could cause actual results to differ from present expectations are set forth above and under Item 1A. Risk Factors. The Company undertakes no obligation to publicly update any forward-looking statements, whether as a result of new information, subsequent events or otherwise, unless required by the securities laws to do so.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

The Company's primary exposures to market risk are fluctuations in interest rates, foreign currency exchange rates and commodity prices, which could impact its financial condition and results of operations. The Company addresses its exposure to these risks through its normal operating and financing activities. The Company's differentiated and global business activities help to reduce the impact that any particular market risk may have on its operating income as a whole.

The Company's short-term debt carries variable interest rates and generally its long-term debt carries fixed rates. These financial instruments are more fully described in the Notes to the Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K.

The foreign currencies to which the Company has the most significant exchange rate exposure are the Euro, the British pound, the Japanese yen, the Chinese renminbi, the Canadian dollar, the Mexican peso and the Swiss franc. Exposure to foreign currency rate fluctuation is modest, monitored, and when possible, mitigated through the use of local borrowings and occasional derivative financial instruments in the foreign currency affected. The effect of translating foreign subsidiaries' balance sheets into U.S. dollars is included in other comprehensive income within stockholders' equity. Foreign currency transactions have not had a significant effect on the operating results reported by the Company because revenues and costs associated with the revenues are generally transacted in the same foreign currencies.

The primary commodities to which the Company has market exposure are raw material purchases of nickel, aluminum, copper, steel, titanium, vanadium and gold. Exposure to price changes in these commodities are generally mitigated through adjustments in selling prices of the ultimate product and purchase order pricing arrangements, although forward contracts are sometimes used to manage some of those exposures.

Based on a hypothetical ten percent adverse movement in interest rates, commodity prices or foreign currency exchange rates, the Company's best estimate is that the potential losses in future earnings, fair value of risk-sensitive financial instruments and cash flows are not material, although the actual effects may differ materially from the hypothetical analysis.

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Item 8. Financial Statements and Supplementary Data

Financial Statement Schedules (Item 15(a)(2))

Financial statement schedules have been omitted because either they are not applicable, or the required information is included in the financial statements or the notes thereto.

Management's Responsibility for Financial Statements

Management has prepared and is responsible for the integrity of the consolidated financial statements and related information. The statements are prepared in conformity with U.S. generally accepted accounting principles consistently applied and include certain amounts based on management's best estimates and judgments. Historical financial information elsewhere in this report is consistent with that in the financial statements.

In meeting its responsibility for the reliability of the financial information, management maintains a system of internal accounting and disclosure controls, including an internal audit program. The system of controls provides for appropriate division of responsibility and the application of written policies and procedures. That system, which undergoes continual reevaluation, is designed to provide reasonable assurance that assets are safeguarded, and records are adequate for the preparation of reliable financial data.

Management is responsible for establishing and maintaining adequate internal control over financial reporting. AMETEK, Inc. maintains a system of internal controls that is designed to provide reasonable assurance as to the fair and reliable preparation and presentation of the consolidated financial statements; however, there are inherent limitations in the effectiveness of any system of internal controls.

Management recognizes its responsibility for conducting the Company's activities according to the highest standards of personal and corporate conduct. That responsibility is characterized and reflected in a code of business conduct for all employees and in a financial code of ethics for the Chief Executive Officer and Senior Financial Officers, as well as in other key policy statements publicized throughout the Company.

The Audit Committee of the Board of Directors, which is composed solely of independent directors who are not employees of the Company, meets with the independent registered public accounting firm, the internal auditors and management to satisfy itself that each is properly discharging its responsibilities. The report of the Audit Committee is included in the Company's Proxy Statement for the 2020 Annual Meeting of Stockholders. Both the independent registered public accounting firm and the internal auditors have direct access to the Audit Committee.

The Company's independent registered public accounting firm, Ernst & Young LLP, is engaged to render an opinion as to whether management's financial statements present fairly, in all material respects, the Company's financial position and operating results. This report is included herein.

Management's Report on Internal Control over Financial Reporting

Management of the Company is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in the Exchange Act Rules 13a-15(f) and 15d-15(f). Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, AMETEK, Inc. conducted an evaluation of the effectiveness of the Company's internal control over financial reporting as of December 31, 2019 based on criteria established in Internal Control – Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework). Based on that evaluation, our management concluded that the Company's internal control over financial reporting was effective as of December 31, 2019.

The Company acquired Pacific Design Technologies, Inc. ("PDT") in September 2019 and Gatan in October 2019. As permitted by the U.S. Securities and Exchange Commission staff interpretative guidance for newly acquired businesses, the Company excluded PDT and Gatan from management's assessment of the effectiveness of the Company's internal control over financial reporting as of December 31, 2019. In the aggregate, PDT and Gatan constituted 11.2% of total assets as of December 31, 2019 and 1.0% of net sales for the year then ended.

The Company's internal control over financial reporting as of December 31, 2019 has been audited by Ernst & Young LLP, an independent registered public accounting firm, as stated in their report, which is included herein.

/s/ David A. Zapico	/s/ William J. Burke
Chairman of the Board and Chief Executive Officer	Executive Vice President – Chief Financial Officer

February 20, 2020

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM ON INTERNAL CONTROL OVER FINANCIAL REPORTING

To the Board of Directors and Stockholders of AMETEK, Inc.:

Opinion on Internal Control over Financial Reporting

We have audited AMETEK, Inc.'s internal control over financial reporting as of December 31, 2019, based on criteria established in Internal Control — Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, AMETEK, Inc. (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on the COSO criteria.

As indicated in the accompanying Management's Report on Internal Control over Financial Reporting, management's assessment of and conclusion on the effectiveness of internal control over financial reporting did not include the internal controls of Pacific Design Technologies, Inc. ("PDT") and Gatan, which are included in the 2019 consolidated financial statements of the Company and constituted 11.2% of total assets as of December 31, 2019 and 1.0% of net sales for the year then ended. Our audit of internal control over financial reporting of the Company also did not include an evaluation of the internal control over financial reporting of PDT and Gatan.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of AMETEK, Inc. as of December 31, 2019 and 2018, the related consolidated statements of income, comprehensive income, stockholders' equity and cash flows for each of the three years in the period ended December 31, 2019, and the related notes and our report dated February 20, 2020 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

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

/s/ ERNST & YOUNG LLP

Philadelphia, Pennsylvania
February 20, 2020

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM ON FINANCIAL STATEMENTS

To the Board of Directors and Stockholders of AMETEK, Inc.:

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of AMETEK, Inc. (the Company) as of December 31, 2019 and 2018, the related consolidated statements of income, comprehensive income, stockholders' equity and cash flows for each of the three years in the period ended December 31, 2019, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2019, based on criteria established in Internal Control – Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated February 20, 2020 expressed an unqualified opinion thereon.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Accounting for Acquisitions

Description of the Matter	As described in Note 6 to the consolidated financial statements, the Company completed the acquisition of Gatan in October 2019 for consideration of $938.5 million, net of cash acquired. This acquisition has been accounted for as a business combination. The Company also completed the acquisition of Telular Corporation in October 2018 for consideration of $525 million, net of cash acquired. This acquisition has been accounted for as a business combination and the finalization of the acquisition accounting was completed during the measurement period in 2019. Auditing the Company's accounting for the acquisitions of Telular and Gatan were complex and highly judgmental due to subjectivity of the significant assumptions used by management in the valuation of acquired identifiable intangible assets. In particular, the inputs to the valuation models used to estimate the fair value of acquired identifiable intangible assets were inherently uncertain and generally unobservable, and the resulting valuations were sensitive to changes in the underlying significant assumptions. The significant assumptions used included discount rates, royalty rates and certain assumptions that form the basis of the forecasted future cash flows, including revenue growth rates, earnings before interest, taxes, depreciation and amortization (EBITDA) margins and estimated economic lives. These significant assumptions are forward looking and could be affected by future economic or market conditions.
How We Addressed the Matter in Our Audit	We obtained an understanding, evaluated the design and tested the operating effectiveness of controls over the Company's accounting for business combinations process. For example, we tested controls over the valuation of acquired identifiable intangible assets including controls over management's review of the valuation models and the significant assumptions described above. To test the estimated fair value of the identifiable intangible assets, we performed audit procedures that included, among others, assessing the fair value methodologies utilized by management and the significant assumptions discussed above, including the underlying data used in the analyses. For example, when evaluating the significant assumptions, we compared them to current financial and operating plans, market and industry studies, historical trends, and assumptions used in prior periods. We also performed sensitivity analyses of significant assumptions to evaluate the changes in the fair value estimates of the acquired identifiable intangible assets that would result from changes in the assumptions. We involved our valuation specialists to assist in evaluating certain significant assumptions and valuation methodologies used by the Company.

Impairment Assessment of Indefinite Lived Intangible Assets (other than Goodwill)

Description of the Matter	At December 31, 2019, the Company's indefinite lived intangible assets (other than goodwill) totaled $741.9 million, consisting of trademarks and trade names. As described in Note 1 to the consolidated financial statements, indefinite lived intangible assets are not amortized but are tested for impairment at least annually in the Company's fourth quarter. Auditing management's indefinite lived intangible asset impairment tests was complex and highly judgmental due to the significant measurement uncertainty in estimating the fair value of the trademarks and trade names. In particular, the fair value estimates were sensitive to significant assumptions such as discount rate, forecasted revenues and royalty rates, which are affected by expectations about future market or economic conditions.

How We Addressed the Matter in Our Audit	We obtained an understanding, evaluated the design and tested the operating effectiveness of controls over the Company's indefinite lived intangible asset impairment process. For example, we tested controls over management's review of the valuation models and significant assumptions, including forecasted financial information, as well as management's controls to validate that the data used in the valuations was complete and accurate. To test the estimated fair value of the Company's indefinite lived intangible assets, we performed audit procedures that included, among others, assessing the fair value methodologies utilized by management and the significant assumptions discussed above, including the underlying data used in the analyses. For example, when evaluating the significant assumptions, we compared them to current financial and operating plans, market and industry studies, historical trends, and other assumptions used in prior periods. We also assessed the historical accuracy of management's forecasts and performed sensitivity analyses of significant assumptions to evaluate the changes in the fair value estimates of the trademarks and trade names that would result from changes in the assumptions. We involved our valuation specialists to assist in evaluating the discount rate, royalty rate and valuation methodologies used by the Company.

/s/ ERNST & YOUNG LLP

We have served as the Company's auditor since 1930.

Philadelphia, Pennsylvania
February 20, 2020

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AMETEK, Inc.
Consolidated Statement of Income
(In thousands, except per share amounts)

	Year Ended December 31,		
	2019	**2018**	**2017**
Net sales	**$5,158,557**	$4,845,872	$4,300,170
Cost of sales	**3,370,897**	3,186,310	2,861,370
Selling, general and administrative	**610,280**	584,022	535,180
Total operating expenses	**3,981,177**	3,770,332	3,396,550
Operating income	**1,177,380**	1,075,540	903,620
Interest expense	**(88,481)**	(82,180)	(98,029)
Other expense, net	**(19,151)**	(5,615)	(8,862)
Income before income taxes	**1,069,748**	987,745	796,729
Provision for income taxes	**208,451**	209,812	115,259
Net income	**$ 861,297**	$ 777,933	$ 681,470
Basic earnings per share	**$ 3.78**	$ 3.37	$ 2.96
Diluted earnings per share	**$ 3.75**	$ 3.34	$ 2.94
Weighted average common shares outstanding:			
Basic shares	**227,759**	230,823	230,229
Diluted shares	**229,395**	232,712	231,845

See accompanying notes.

AMETEK, Inc.
Consolidated Statement of Comprehensive Income
(In thousands)

	Year Ended December 31,		
	2019	**2018**	**2017**
Net income	**$ 861,297**	$ 777,933	$ 681,470
Other comprehensive (loss) income:			
Amounts arising during the period – gains (losses), net of tax (expense) benefit:			
Foreign currency translation:			
Translation adjustments	**23,692**	(72,112)	159,507
Change in long-term intercompany notes	**(5,999)**	(16,569)	36,320
Net investment hedge instruments gain (loss), net of tax of $581, ($12,384) and $41,178 in 2019, 2018 and 2017, respectively	**(1,803)**	38,452	(109,412)
Defined benefit pension plans:			
Net actuarial (loss) gain, net of tax of $767, ($18,825) and ($8,384) in 2019, 2018 and 2017, respectively	**(10,522)**	(75,253)	16,518
Amortization of net actuarial loss, net of tax of ($3,505), ($2,716) and ($4,680) in 2019, 2018 and 2017, respectively	**12,180**	9,313	9,910
Amortization of prior service costs, net of tax of ($83), $1,154 and $4 in 2019, 2018 and 2017, respectively	**401**	(5,639)	(41)
Unrealized holding gain (loss) on available-for-sale securities:			
Unrealized gain (loss), net of tax of $ -, $ - and ($221) in 2019, 2018 and 2017, respectively	**—**	(104)	411
Other comprehensive income (loss)	**17,949**	(121,912)	113,213
Total comprehensive income	**$ 879,246**	$ 656,021	$ 794,683

See accompanying notes.

AMETEK, Inc.
Consolidated Balance Sheet
(In thousands, except share amounts)

	December 31, 2019	December 31, 2018
ASSETS		
Current assets:		
Cash and cash equivalents	**$ 393,030**	$ 353,975
Receivables	**744,760**	732,839
Inventories, net	**624,567**	624,744
Other current assets	**263,414**	124,586
Total current assets	**2,025,771**	1,836,144
Property, plant and equipment, net	**548,908**	554,130
Right of use assets, net	**179,679**	—
Goodwill	**4,047,539**	3,612,033
Other intangibles, net	**2,762,872**	2,403,771
Investments and other assets	**279,790**	256,210
Total assets	**$ 9,844,559**	$ 8,662,288
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Short-term borrowings and current portion of long-term debt, net	**$ 497,449**	$ 358,876
Accounts payable	**377,219**	399,571
Customer advanced payments	**156,818**	137,229
Income taxes payable	**30,292**	48,597
Accrued liabilities and other	**364,080**	314,431
Total current liabilities	**1,425,858**	1,258,704
Long-term debt, net	**2,271,292**	2,273,837
Deferred income taxes	**536,140**	528,336
Other long-term liabilities	**495,777**	359,489
Total liabilities	**4,729,067**	4,420,366
Stockholders' equity:		
Preferred stock, $0.01 par value; authorized 5,000,000 shares; none issued	**—**	—
Common stock, $0.01 par value; authorized 800,000,000 shares; issued: 2019 – 265,583,732 shares; 2018 – 263,645,489 shares	**2,662**	2,640
Capital in excess of par value	**832,821**	706,743
Retained earnings	**6,387,612**	5,653,811
Accumulated other comprehensive loss	**(533,139)**	(551,088)
Treasury stock: 2019 – 36,500,908 shares; 2018 – 36,534,802 shares	**(1,574,464)**	(1,570,184)
Total stockholders' equity	**5,115,492**	4,241,922
Total liabilities and stockholders' equity	**$ 9,844,559**	$ 8,662,288

See accompanying notes.

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AMETEK, Inc.
Consolidated Statement of Stockholders' Equity
(In thousands)

	Year Ended December 31, 2019	2018	2017
Capital stock			
Preferred stock, $0.01 par value	$ —	$ —	$ —
Common stock, $0.01 par value			
Balance at the beginning of the year	2,640	2,631	2,615
Shares issued	**22**	9	16
Balance at the end of the year	**2,662**	2,640	2,631
Capital in excess of par value			
Balance at the beginning of the year	706,743	660,894	604,143
Issuance of common stock under employee stock plans	**85,684**	18,534	31,660
Share-based compensation costs	**40,394**	27,315	25,091
Balance at the end of the year	**832,821**	706,743	660,894
Retained earnings			
Balance at the beginning of the year	5,653,811	5,002,419	4,403,683
Net income	**861,297**	777,933	681,470
Cash dividends paid	**(127,496)**	(128,911)	(82,735)
Other	—	2,370	1
Balance at the end of the year	**6,387,612**	5,653,811	5,002,419
Accumulated other comprehensive (loss) income			
Foreign currency translation:			
Balance at the beginning of the year	(302,138)	(251,909)	(338,324)
Translation adjustments	**23,692**	(72,112)	159,507
Change in long-term intercompany notes	**(5,999)**	(16,569)	36,320
Net investment hedge instruments (loss) gain, net of tax of $ 581, ($12,384) and $41,178 in 2019, 2018 and 2017, respectively	**(1,803)**	38,452	(109,412)
Balance at the end of the year	**(286,248)**	(302,138)	(251,909)
Defined benefit pension plans:			
Balance at the beginning of the year	(248,950)	(177,371)	(203,758)
Net actuarial (loss) gain, net of tax of $767, ($18,825) and ($8,384) in 2019, 2018 and 2017, respectively	**(10,522)**	(75,253)	16,518
Amortization of net actuarial loss, net of tax of ($3,505), ($2,716) and ($4,680) in 2019, 2018 and 2017, respectively	**12,180**	9,313	9,910
Amortization of prior service costs, net of tax of ($83), $1,154 and $4 in 2019, 2018 and 2017, respectively	**401**	(5,639)	(41)
Balance at the end of the year	**(246,891)**	(248,950)	(177,371)
Unrealized holding gain (loss) on available-for-sale securities:			
Balance at the beginning of the year	—	104	(307)
Increase (decrease) during the year, net of tax	—	(104)	411
Balance at the end of the year	**—**	—	104
Accumulated other comprehensive loss at the end of the year	**(533,139)**	(551,088)	(429,176)
Treasury stock			
Balance at the beginning of the year	(1,570,184)	(1,209,135)	(1,211,539)
Issuance of common stock under employee stock plans	**7,644**	6,629	9,271
Purchase of treasury stock	**(11,924)**	(367,678)	(6,867)
Balance at the end of the year	**(1,574,464)**	(1,570,184)	(1,209,135)
Total stockholders' equity	**$ 5,115,492**	$ 4,241,922	$ 4,027,633

See accompanying notes.

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AMETEK, Inc.
Consolidated Statement of Cash Flows
(In thousands)

	Year Ended December 31,		
	2019	2018	2017
Cash provided by (used for):			
Operating activities:			
Net income	**$ 861,297**	$ 777,933	$ 681,470
Adjustments to reconcile net income to total operating activities:			
Depreciation and amortization	**234,042**	199,490	183,227
Deferred income taxes	**19,380**	(73,682)	(91,205)
Share-based compensation expense	**40,394**	27,315	25,091
(Gain) loss on sale of facilities	**(5,332)**	127	(1,213)
Changes in assets and liabilities, net of acquisitions:			
Decrease (increase) in receivables	**14,398**	(13,383)	(24,581)
Decrease (increase) in inventories and other current assets	**16,410**	(59,472)	(6,087)
(Decrease) increase in payables, accruals and income taxes	**(58,932)**	36,547	124,399
(Decrease) increase in other long-term liabilities	**(16,845)**	42,814	2,787
Pension contributions	**(5,609)**	(5,063)	(54,796)
Other, net	**15,219**	(7,108)	(5,833)
Total operating activities	**1,114,422**	925,518	833,259
Investing activities:			
Additions to property, plant and equipment	**(102,346)**	(82,076)	(75,074)
Purchases of businesses, net of cash acquired	**(1,061,945)**	(1,129,305)	(556,634)
Proceeds from sale of facilities	**11,306**	2,570	6,290
Other, net	**2,060**	(1,233)	(399)
Total investing activities	**(1,150,925)**	(1,210,044)	(625,817)
Financing activities:			
Net change in short-term borrowings	**130,705**	258,349	(9,616)
Proceeds from long-term borrowings	**100,000**	560,050	—
Repayments of long-term borrowings	**(100,000)**	(305,000)	(270,000)
Repurchases of common stock	**(11,924)**	(367,678)	(6,867)
Cash dividends paid	**(127,496)**	(128,911)	(82,735)
Acquisition contingent consideration	**(3,000)**	(25,500)	—
Proceeds from stock option exercises	**90,388**	30,021	40,047
Other, net	**(5,760)**	(8,291)	—
Total financing activities	**72,913**	13,040	(329,171)
Effect of exchange rate changes on cash and cash equivalents	**2,645**	(20,839)	50,770
Increase (decrease) in cash and cash equivalents	**39,055**	(292,325)	(70,959)
Cash and cash equivalents:			
Beginning of year	353,975	646,300	717,259
End of year	**$ 393,030**	$ 353,975	$ 646,300

See accompanying notes.

AMETEK, Inc.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Significant Accounting Policies

Basis of Consolidation

The accompanying consolidated financial statements reflect the results of operations, financial position and cash flows of AMETEK, Inc. (the "Company"), and include the accounts of the Company and subsidiaries, after elimination of all intercompany transactions in the consolidation.

Use of Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles ("GAAP") requires management to make estimates and assumptions that affect amounts reported in the financial statements and accompanying notes. Actual results could differ from those estimates and assumptions.

Cash Equivalents, Securities and Other Investments

All highly liquid investments with maturities of three months or less when purchased are considered cash equivalents.

Accounts Receivable

The Company maintains allowances for estimated losses resulting from the inability of specific customers to meet their financial obligations to the Company. A specific allowance for doubtful accounts is recorded against the amount due from these customers. For all other customers, the Company recognizes allowance for doubtful accounts based on the length of time specific receivables are past due based on its historical experience. Bad debt expense was $2.8 million in 2019, $1.7 million in 2018 and $2.8 million in 2017.

Inventories

The Company uses the first-in, first-out ("FIFO") method of accounting, which approximates current replacement cost, for approximately 86% of its inventories at December 31, 2019. The last-in, first-out ("LIFO") method of accounting is used to determine cost for the remaining 14% of the Company's inventory at December 31, 2019. For inventories where cost is determined by the LIFO method, the FIFO value would have been $23.4 million and $28.4 million higher than the LIFO value reported in the consolidated balance sheet at December 31, 2019 and 2018, respectively. The Company provides estimated inventory reserves for slow-moving and obsolete inventory based on current assessments about future demand, market conditions, customers who may be experiencing financial difficulties and related management initiatives.

Business Combinations

The Company allocates the purchase price of an acquired company, including when applicable, the acquisition date fair value of contingent consideration between tangible and intangible assets acquired and liabilities assumed from the acquired business based on their estimated fair values, with the residual of the purchase price recorded as goodwill. The results of operations of the acquired business are included in the Company's operating results from the date of acquisition.

Property, Plant and Equipment

Property, plant and equipment are stated at cost. Expenditures for additions to plant facilities, or that extend their useful lives, are capitalized. The cost of minor tools, jigs and dies, and maintenance and repairs is charged to expense as incurred. Depreciation of plant and equipment is calculated principally on a straight-line basis over the estimated useful lives of the related assets. The range of lives for depreciable assets is generally three to 10 years for machinery and equipment, five to 27 years for leasehold improvements and 25 to 50 years for buildings. Depreciation expense was $101.4 million, $85.4 million and $82.0 million for the years ended December 31, 2019, 2018 and 2017, respectively.

Goodwill and Other Intangible Assets

Goodwill and other intangible assets with indefinite lives, primarily trademarks and trade names, are not amortized; rather, they are tested for impairment at least annually.

The Company identifies its reporting units at the component level, which is one level below its operating segments. Generally, goodwill arises from acquisitions of specific operating companies and is assigned to the reporting unit in which the operating company resides. The Company's reporting units are divisions that are one level below its operating segments and for which discrete financial information is prepared and regularly reviewed by segment management.

The Company principally relies on a discounted cash flow analysis to determine the fair value of each reporting unit, which considers forecasted cash flows discounted at an appropriate discount rate. The Company believes that market participants would use a discounted cash flow analysis to determine the fair value of its reporting units in a sale transaction. The annual goodwill impairment test requires the Company to make several assumptions and estimates concerning future levels of revenue growth, operating margins, depreciation, amortization and working capital requirements, which are based on the Company's long-range plan and are considered level 3 inputs. The Company's long-range plan is updated as part of its annual planning process and is reviewed and approved by management. The discount rate is an estimate of the overall after-tax rate of return required by a market participant whose weighted average cost of capital includes both equity and debt, including a risk premium. While the Company uses the best available information to prepare its cash flow and discount rate assumptions, actual future cash flows or market conditions could differ significantly resulting in future impairment charges related to recorded goodwill balances.

The impairment test for indefinite-lived intangibles other than goodwill (primarily trademarks and trade names) consists of a comparison of the fair value of the indefinite-lived intangible asset to the carrying value of the asset as of the impairment testing date. The Company estimates the fair value of its indefinite-lived intangibles using the relief from royalty method using level 3 inputs for revenue growth rates and royalty rates. The fair value derived from the relief from royalty method is measured as the discounted cash flow savings realized from owning such trademarks and trade names and not having to pay a royalty for their use.

The Company completed its required annual impairment tests in the fourth quarter of 2019, 2018 and 2017 and determined that the carrying values of the Company's goodwill were not impaired. The Company completed its required annual impairment tests in the fourth quarter of 2019, 2018 and 2017 and determined that the carrying values of the Company's other intangible assets with indefinite lives were not impaired.

Other intangible assets with finite lives are evaluated for impairment when events or changes in circumstances indicate the carrying value may not be recoverable. The carrying value of other intangible assets with finite lives is considered impaired when the total projected undiscounted cash flows from the asset group are less than the carrying value. In that event, a loss is recognized based on the amount by which the carrying value exceeds the fair value of those assets. Fair value is determined primarily using present value techniques based on projected cash flows from the asset group.

AMETEK, Inc.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

Intangible assets, other than goodwill, with definite lives are amortized over their estimated useful lives. Patents and technology are being amortized over useful lives of five to 20 years, with a weighted average life of 15 years. Customer relationships are being amortized over a period of five to 20 years, with a weighted average life of 19 years. On a quarterly basis, the Company evaluates the reasonableness of the estimated useful lives of these intangible assets.

Financial Instruments and Foreign Currency Translation

Assets and liabilities of foreign operations are translated using exchange rates in effect at the balance sheet date and their results of operations are translated using average exchange rates for the year. Certain transactions of the Company and its subsidiaries are denominated in currencies other than their functional currency. Exchange gains and losses from those transactions are included in operating results for the year.

The Company makes infrequent use of derivative financial instruments. Forward contracts are entered into from time to time to hedge certain inventory purchases, export sales, debt or foreign currency transactions, thereby minimizing the Company's exposure to raw material commodity price or foreign currency fluctuation.

In instances where transactions are designated as hedges of an underlying item, the gains and losses on those transactions are included in accumulated other comprehensive income within stockholders' equity to the extent they are effective as hedges. An evaluation of hedge effectiveness is performed by the Company on an ongoing basis and any changes in the hedge are made as appropriate.

Revenue Recognition

Revenue is derived from sales of products and services. The Company's products and services are marketed and sold worldwide through two operating groups: EIG and EMG. See Note 15 *Descriptive Information about Reportable Segments*.

The majority of the Company's revenues on product sales were recognized at a point in time when the customer obtains control of the product. The transfer in control of the product to the customer was typically evidenced by one or more of the following: the customer having legal title to the product, the Company's present right to payment, the customer's physical possession of the product, the customer accepting the product, or the customer having the benefits of ownership or risk of loss. For a small percentage of sales where title and risk of loss transfers at the point of delivery, the Company recognized revenue upon delivery to the customer, which is the point that control transferred, assuming all other criteria for revenue recognition were met.

Research and Development

Research and development costs are included in Cost of sales as incurred and were $161.9 million in 2019, $141.0 million in 2018 and $130.4 million in 2017.

Shipping and Handling Costs

Shipping and handling costs are included in Cost of sales and were $66.7 million in 2019, $62.7 million in 2018 and $53.1 million in 2017.

Share-Based Compensation

The Company expenses the fair value of share-based awards made under its share-based plans in the consolidated financial statements over their requisite service period of the grants.

AMETEK, Inc.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

Income Taxes

The Company's process of providing for income taxes and determining the related balance sheet accounts requires management to assess uncertainties, make judgments regarding outcomes and utilize estimates. The Company conducts a broad range of operations around the world and is therefore subject to complex tax regulations in numerous international taxing jurisdictions, resulting at times in tax audits, disputes and potential litigation, the outcome of which is uncertain. Management must make judgments currently about such uncertainties and determine estimates of the Company's tax assets and liabilities. To the extent the final outcome differs, future adjustments to the Company's tax assets and liabilities may be necessary. The Company recognizes interest and penalties accrued related to uncertain tax positions in income tax expense.

The Company assesses the realizability of its deferred tax assets, taking into consideration the Company's forecast of future taxable income, available net operating loss carryforwards and available tax planning strategies that could be implemented to realize the deferred tax assets. Based on this assessment, management must evaluate the need for, and amount of, valuation allowances against the Company's deferred tax assets. To the extent facts and circumstances change in the future, adjustments to the valuation allowances may be required.

Pensions

The Company has U.S. and foreign defined benefit and defined contribution pension plans. The most significant elements in determining the Company's pension income or expense are the assumed pension liability discount rate and the expected return on plan assets. All unrecognized prior service costs, remaining transition obligations or assets and actuarial gains and losses have been recognized, net of tax effects, as a charge to accumulated other comprehensive income in stockholders' equity and will be amortized as a component of net periodic pension cost. The Company uses a measurement date of December 31 (its fiscal year end) for its U.S. and foreign defined benefit plans.

Earnings Per Share

The calculation of basic earnings per share is based on the weighted average number of common shares considered outstanding during the periods. The calculation of diluted earnings per share reflects the effect of all potentially dilutive securities (principally outstanding stock options and restricted stock grants). The number of weighted average shares used in the calculation of basic earnings per share and diluted earnings per share was as follows for the years ended December 31:

	2019	2018	2017
		(In thousands)	
Weighted average shares:			
Basic shares	**227,759**	230,823	230,229
Equity-based compensation plans	**1,636**	1,889	1,616
Diluted shares	**229,395**	232,712	231,845

2. Recent Accounting Pronouncements

Recently Adopted Accounting Pronouncements

In February 2016, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") No. 2016-02 Leases (ASC 842). In July 2018, the FASB issued ASU No. 2018-10, "Codification Improvements to Topic 842, Leases" (ASU 2018-10), which provides narrow amendments to

AMETEK, Inc.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

clarify how to apply certain aspects of the new lease standard, and ASU No. 2018-11, "Leases (Topic 842) – Targeted Improvements" (ASU 2018-11), which addressed implementation issues related to the new lease standard. These and certain other lease-related ASUs have generally been codified in ASC 842. ASC 842 supersedes the lease accounting requirements in Accounting Standards Codification Topic 840, Leases (ASC 840). ASC 842 establishes a right-of-use model that requires a lessee to record aright-of-use ("ROU") asset and a lease liability on the balance sheet for all leases. Under ASC 842, leases are classified as either finance or operating, with classification affecting the pattern of expense recognition in the income statement. The standard also requires disclosures to help investors and other financial statement users better understand the amount, timing and uncertainty of cash flows arising from leases. The Company adopted ASC 842 on January 1, 2019 using the effective date transition method. Prior period results continue to be presented under ASC 840 based on the accounting standards originally in effect for such periods.

The Company has elected certain practical expedients permitted under the transition guidance within ASC 842 to leases that commenced before January 1, 2019, including the package of practical expedients. The election of the package of practical expedients resulted in the Company not reassessing prior conclusions under ASC 840 related to lease identification, lease classification and initial direct costs for expired and existing leases prior to January 1, 2019. The Company did not elect the practical expedient to not record short-term leases on its consolidated balance sheet. The adoption of ASU 2016-02 did not have a significant impact on the Company's consolidated results of operations or cash flows. Upon adoption, the Company recognized a ROU asset and lease liability of $192.4 million and $198.6 million, respectively.

In February 2018, the FASB issued ASU No. 2018-02, *Income Statement – Reporting Comprehensive Income (Topic 220), Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income* ("ASU 2018-02"). ASU 2018-02 addresses a specific consequence of the Tax Act by allowing an election to reclassify from accumulated other comprehensive income (loss) to retained earnings for stranded tax effects resulting from the Tax Act's reduction of the U.S federal corporate income tax rate. ASU 2018-02 is effective for all entities for annual reporting periods beginning after December 15, 2018, and is to be applied either in the period of adoption or retrospectively to each period in which the effect of the change in the U.S. federal income tax rate in the Tax Act is recognized. The Company adopted ASU 2018-02 on January 1, 2019, and upon adoption, the Company did not elect to reclassify the stranded income tax effects of the Tax Act from accumulated other comprehensive income to retained earnings.

Recent Accounting Pronouncements

In December 2019, the FASB issued ASU No. 2019-12, *Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes* ("ASU 2019-12"), which simplifies the accounting for income taxes by removing certain exceptions to the general principles in ASC Topic 740. ASU 2019-12 is effective for fiscal years beginning after December 15, 2021. Early adoption is permitted and the amendments in this ASU should be applied on a retrospective basis to all periods presented. The Company has not determined the impact ASU 2019-12 may have on the Company's consolidated results of operations, financial position, cash flows or financial statement disclosures.

In August 2018, the FASB issued ASU No. 2018-13, *Fair Value Measurement* ("ASU 2018-13"), which changes the fair value measurement disclosure requirements of ASC Topic 820, *Fair Value Measurement* ("ASC 820"), by eliminating, modifying and adding to those requirements. ASU 2018-13 also modifies the disclosure objective paragraphs of ASC 820 to eliminate (1) "at a minimum" from the phrase "an entity shall disclose at a minimum" and (2) other similar "open ended" disclosure requirements to promote the appropriate exercise of discretion by entities. ASU 2018-13 is effective for fiscal years beginning after December 15, 2019, including interim periods therein. The Company does not expect the adoption of ASU 2018-13 to have a material impact on the Company's consolidated results of operations, financial position, cash flows and financial statement disclosures.

AMETEK, Inc.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

In August 2018, the FASB issued ASU No. 2018-14, *Compensation – Retirement Benefits – Defined Benefit Plans – General* ("ASU 2018-14"), which changes the disclosure requirements of ASC Topic 715, *Compensation – Retirement Benefits*, by eliminating, modifying and adding to those requirements. ASU 2018-14 is effective for fiscal years beginning after December 15, 2020. Early adoption is permitted and the amendments in this ASU should be applied on a retrospective basis to all periods presented. The Company has not determined the impact ASU 2018-14 may have on the Company's consolidated financial statement disclosures.

In August 2018, the FASB issued ASU No. 2018-15, *Intangibles – Goodwill and Other – Internal-Use Software* ("ASU 2018-15"), that requires implementation costs incurred by customers in cloud computing arrangements to be deferred and recognized over the term of the arrangement, if those costs would be capitalized by the customer in a software licensing arrangement under the internal-use software guidance in ASC Topic 350, *Intangibles – Goodwill and Other*. ASU 2018-15 requires a customer to disclose the nature of its hosting arrangements that are service contracts and provide disclosures as if the deferred implementation costs were a separate, major depreciable asset class. ASU 2018-15 is effective for interim and annual periods beginning after December 15, 2019. The Company does not expect the adoption of ASU 2018-15 to have a material impact on the Company's consolidated results of operations, financial position, cash flows and financial statement disclosures.

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments – Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments* ("ASU 2016-13"). The ASU replaces the incurred loss impairment methodology in current GAAP with a methodology that reflects expected credit losses and requires consideration of a broader range of reasonable and supportable information to inform credit loss estimates. The ASU is effective for the Company for interim and annual periods beginning on or after December 15, 2019. The Company does not expect the adoption of ASU 2016-13 to have a material impact on the Company's consolidated results of operations, financial position, cash flows and financial statement disclosures.

3. Revenues

The majority of the Company's revenues on product sales are recognized at a point in time when the customer obtains control of the product. The Company determined that revenues from certain of its customer contracts met the criteria of satisfying its performance obligations over time, primarily in the areas of the manufacture of custom-made equipment and for service repairs of customer-owned equipment. Recognizing revenue over time for custom-manufactured equipment is based on the Company's judgment that, in certain contracts, the product does not have an alternative use and the Company has an enforceable right to payment for performance completed to date.

The Company recognizes incremental cost of obtaining contracts as an expense when incurred if the amortization period of the contract cost assets that the Company would have otherwise recognized is one year or less. These costs are included in Selling, general and administrative expenses in the consolidated statement of income.

The determination of the revenue to be recognized in each period for performance obligations satisfied over time is based on the input method. The Company recognizes revenue over time as it performs on these contracts because the transfer of control to the customer occurs over time. Revenue is recognized based on the extent of progress towards completion of the performance obligation. The Company generally uses the total cost-to-cost input method of progress because it best depicts the transfer of control to the customer that occurs as costs are incurred. Under the cost-to-cost method, the extent of progress towards completion is measured based on the proportion of costs incurred to date to the total estimated costs at completion of the performance obligation. On certain contracts, labor hours are used as the measure of progress when it is determined to be a better depiction of the transfer of control to the customer due to the timing and pattern of labor hours incurred.

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Performance obligations also include post-delivery service, installation and training. Post-delivery service revenues are recognized over the contract term. Installation and training revenues are recognized over the period the service is provided. Warranty terms in customer contracts can also be considered separate performance obligations if the warranty provides services beyond assurance that a product complies with agreed-upon specification or if a warranty can be purchased separately. The Company does not incur significant obligations for customer returns and refunds.

The Company has certain contracts with variable consideration in the form of volume discounts, rebates and early payment options, which may affect the transaction price used as the basis for revenue recognition. In these contracts, the amount of the variable consideration is allocated among the various performance obligations in the customer contract based on the relative standalone selling price of each performance obligation to the total standalone value of all the performance obligations.

Payment terms generally begin upon shipment of the product. The Company does have contracts with multiple billing terms that are all due within one year from when the product is delivered. No significant financing component exists. Payment terms are generally 30-60 days from the time of shipment or customer acceptance, but terms can be shorter or longer, not exceeding one year. For customer contracts that have revenue recognized over time, revenue is generally recognized prior to a payment being due from the customer. In such cases, the Company recognizes a contract asset at the time the revenue is recognized. When payment becomes due based on the contract terms, the Company reduces the contract asset and records a receivable. In contracts with billing milestones or in other instances with a long production cycle or concerns about credit, customer advance payments are received. The Company may receive a payment in excess of revenue recognized to that date. In these circumstances, a contract liability is recorded. Contract liabilities are derecognized when the performance obligations are satisfied, and revenue is recognized.

The outstanding contract asset and (liability) accounts were as follows:

	2019	2018
	(In thousands)	
Contract assets – January 1	$ 58,266	$ 32,658
Contract assets – December 31	**73,039**	58,266
Change in contract assets – increase	**14,773**	25,608
Contract liabilities – January 1	146,162	117,058
Contract liabilities – December 31	**167,306**	146,162
Change in contract liabilities – increase	**(21,144)**	(29,104)
Net change	**$ (6,371)**	$ (3,496)

The net change in 2019 and 2018 was primarily driven by the receipt of advance payments from customers relatingto 2019 and 2018 acquisitions exceeding the recognition of revenue as performance obligations were satisfied prior to billing. For the years ended December 31, 2019 and 2018, the Company recognized revenue of $130 million and $97 million, respectively, that was previously included in the beginning balance of contract liabilities.

Contract assets are reported as a component of Other current assets in the consolidated balance sheet. At December 31, 2019 and 2018, $10.6 million and $8.9 million, respectively, of Customer advanced payments (contract liabilities) were recorded in Other long-term liabilities in the consolidated balance sheet.

AMETEK, Inc.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

Applying the practical expedient available under ASC 606, the remaining performance obligations exceeding one year as of December 31, 2019 and 2018 were $233.3 million and $187.2 million, respectively. Remaining performance obligations represent the transaction price of firm, noncancelable orders, with expected delivery dates to customers greater than one year from the balance sheet date, for which the performance obligation is unsatisfied or partially unsatisfied. These performance obligations will be substantially satisfied within two to three years.

Geographic Areas

Information about the Company's operations in different geographic areas for the year ended December 31, 2019 is shown below. Net sales were attributed to geographic areas based on the location of the customer.

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	2019		
	EIG	EMG (In thousands)	Total
United States	**$ 1,685,369**	**$ 998,317**	**$ 2,683,686**
International[(1)]:			
United Kingdom	**64,423**	**132,485**	**196,908**
European Union countries	**434,072**	**392,283**	**826,355**
Asia	**773,034**	**186,535**	**959,569**
Other foreign countries	**365,983**	**126,056**	**492,039**
Total international	**1,637,512**	**837,359**	**2,474,871**
Consolidated net sales	**$ 3,322,881**	**$ 1,835,676**	**$ 5,158,557**

(1) Includes U.S. export sales of $1,306.2 million.

Information about the Company's operations in different geographic areas for the year ended December 31, 2018 is shown below. Net sales were attributed to geographic areas based on the location of the customer.

	2018		
	EIG	EMG (In thousands)	Total
United States	$ 1,446,974	$ 950,358	$ 2,397,332
International[(1)]:			
United Kingdom	61,513	135,077	196,590
European Union countries	389,032	399,547	788,579
Asia	780,135	205,047	985,182
Other foreign countries	351,305	126,884	478,189
Total international	1,581,985	866,555	2,448,540
Consolidated net sales	$ 3,028,959	$ 1,816,913	$ 4,845,872

(1) Includes U.S. export sales of $1,269.4 million.

AMETEK, Inc.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

Information about the Company's operations in different geographic areas for the year ended December 31, 2017 is shown below. Net sales were attributed to geographic areas based on the location of the customer.

	2017		
	EIG	EMG	Total
		(In thousands)	
United States	$ 1,284,570	$ 801,610	$ 2,086,180
International[1]:			
United Kingdom	59,319	127,215	186,534
European Union countries	327,970	364,146	692,116
Asia	685,070	194,356	879,426
Other foreign countries	333,625	122,289	455,914
Total international	1,405,984	808,006	2,213,990
Consolidated net sales	$ 2,690,554	$ 1,609,616	$ 4,300,170

(1) Includes U.S. export sales of $1,142.3 million

Major Products and Services

The Company's major products and services in the reportable segments were as follows for the year ended December 31:

	2019		
	EIG	EMG	Total
		(In thousands)	
Process and analytical instrumentation	**$ 2,393,587**	**$ —**	**$ 2,393,587**
Aerospace and power	**929,294**	**491,171**	**1,420,465**
Automation and engineered solutions	**—**	**1,344,505**	**1,344,505**
Consolidated net sales	**$ 3,322,881**	**$ 1,835,676**	**$ 5,158,557**

	2018		
	EIG	EMG	Total
		(In thousands)	
Process and analytical instrumentation	$ 2,120,448	$ —	$ 2,120,448
Aerospace and power	908,511	456,517	1,365,028
Automation and engineered solutions	—	1,360,396	1,360,396
Consolidated net sales	$ 3,028,959	$ 1,816,913	$ 4,845,872

AMETEK, Inc.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

Timing of Revenue Recognition

The Company's timing of revenue recognition was as follows for the year ended December 31:

	2019		
	EIG	EMG	Total
		(In thousands)	
Products transferred at a point in time	**$ 2,680,296**	**$ 1,670,448**	**$ 4,350,744**
Products and services transferred over time	**642,585**	**165,228**	**807,813**
Consolidated net sales	**$ 3,322,881**	**$ 1,835,676**	**$ 5,158,557**

	2018		
	EIG	EMG	Total
		(In thousands)	
Products transferred at a point in time	$ 2,533,718	$ 1,690,124	$ 4,223,842
Products and services transferred over time	495,241	126,789	622,030
Consolidated net sales	$ 3,028,959	$ 1,816,913	$ 4,845,872

Product Warranties

The Company provides limited warranties in connection with the sale of its products. The warranty periods for products sold vary among the Company's operations, but the majority do not exceed one year. The Company calculates its warranty expense provision based on its historical warranty experience and adjustments are made periodically to reflect actual warranty expenses. Product warranty obligations are reported as a component of Accrued liabilities and other in the consolidated balance sheet.

Changes in the accrued product warranty obligation were as follows:

	2019	2018	2017
		(In thousands)	
Balance at the beginning of the year	$ 23,482	$ 22,872	$ 22,007
Accruals for warranties issued during the year	**21,145**	13,897	15,951
Settlements made during the year	**(19,637)**	(14,509)	(17,854)
Warranty accruals related to acquired businesses and other during the year	**2,621**	1,222	2,768
Balance at the end of the year	**$ 27,611**	$ 23,482	$ 22,872

4. Fair Value Measurements

Fair value is defined as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. See Note 6 for discussion of acquisition date fair value of contingent payment liability.

The Company utilizes a valuation hierarchy for disclosure of the inputs to the valuations used to measure fair value. This hierarchy prioritizes the inputs into three broad levels as follows. Level 1 inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities. Level 2 inputs are quoted prices for similar assets

AMETEK, Inc.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

and liabilities in active markets or inputs that are observable for the asset or liability, either directly or indirectly through market corroboration, for substantially the full term of the financial instrument. Level 3 inputs are unobservable inputs based on the Company's own assumptions used to measure assets and liabilities at fair value. A financial asset or liability's classification within the hierarchy is determined based on the lowest level input that is significant to the fair value measurement.

The following table provides the Company's assets that are measured at fair value on a recurring basis, consistent with the fair value hierarchy, at December 31:

	2019	2018
	Fair Value	Fair Value
	(In thousands)	
Mutual fund investments	**$ 8,390**	$ 7,655

The fair value of mutual fund investments, which are valued as level 1 investments, was based on quoted market prices. The mutual fund investments are shown as a component of long-term assets in the consolidated balance sheet.

For the years ended December 31, 2019 and 2018, gains and losses on the investments noted above were not significant.No transfers between level 1 and level 2 investments occurred during the years ended December 31, 2019 and 2018.

Financial Instruments

Cash, cash equivalents and mutual fund investments are recorded at fair value at December 31, 2019 and 2018 in the accompanying consolidated balance sheet.

The following table provides the estimated fair values of the Company's financial instrument liabilities, for which fair value is measured for disclosure purposes only, compared to the recorded amounts at December 31:

	2019		2018	
	Recorded Amount	Fair Value	Recorded Amount	Fair Value
		(In thousands)		
Long-term debt, net (including current portion)	**$ (2,382,041)**	**$ (2,531,549)**	$ (2,378,809)	$ (2,368,676)

The fair value of short-term borrowings, net approximates the carrying value. Short-term borrowings, net are valued as level 2 liabilities as they are corroborated by observable market data. The Company's long-term debt, net is all privately held with no public market for this debt, therefore, the fair value of long-term debt, net was computed based on comparable current market data for similar debt instruments and is considered to be a level 3 liability. See Note 10 for long-term debt principal amounts, interest rates and maturities.

Foreign Currency

At December 31, 2019, the Company had a Canadian dollar forward contract for a total notional value of14.0 million Canadian dollars ($0.1 million fair value unrealized gain at December 31, 2019) outstanding. At December 31, 2018, the Company had a Canadian dollar forward contract for a total notional value of 30.0 million Canadian dollars ($1.0 million fair value unrealized loss at December 31, 2018) outstanding. At December 31, 2017, the Company had a Canadian dollar forward contract for a total notional value of

83.0 million Canadian dollars ($1.5 million fair value unrealized gain at December 31, 2017) which settled in the first quarter of 2018. For the year ended December 31, 2019 and 2018, realized gains and losses on foreign currency forward contracts were not significant. The Company does not typically designate its foreign currency forward contracts as accounting hedges.

5. Hedging Activities

The Company has designated certain foreign-currency-denominated long-term borrowings as hedges of the net investment in certain foreign operations. As of December 31, 2019, and 2018, these net investment hedges included British-pound- and Euro-denominated long-term debt. These borrowings were designed to create net investment hedges in each of the designated foreign subsidiaries. The Company designated the British-pound- and Euro-denominated loans referred to above as hedging instruments to offset translation gains or losses on the net investment due to changes in the British pound and Euro exchange rates. These net investment hedges are evidenced by management's contemporaneous documentation supporting the hedge designation. Any gain or loss on the hedging instruments (the debt) following hedge designation is reported in accumulated other comprehensive income in the same manner as the translation adjustment on the hedged investment based on changes in the spot rate, which is used to measure hedge effectiveness.

At December 31, 2019 and 2018, the Company had $404.7 million and $389.2 million, respectively, of British-pound-denominated loans, which were designated as a hedge against the net investment in British pound functional currency foreign subsidiaries. At December 31, 2019 and 2018, the Company had $645.6 million and $658.7 million, respectively, in Euro-denominated loans, which were designated as a hedge against the net investment in Euro functional currency foreign subsidiaries. As a result of the British-pound- and Euro-denominated loans being designated and 100% effective as net investment hedges, $2.4 million of pre-tax currency remeasurement losses and $50.8 million of pre-tax currency remeasurement gains have been included in the foreign currency translation component of other comprehensive income for the years ended December 31, 2019 and 2018, respectively.

6. Acquisitions

The Company spent $1,061.9 million in cash, net of cash acquired, to acquire Pacific Design Technologies, Inc. ("PDT") in September 2019 and Gatan in October 2019. PDT designs and manufactures a complete range of custom-engineered, liquid cooling systems and components used in a broad set of current and next-generation commercial aerospace, defense and space platforms. Gatan is a leading manufacturer of instrumentation and software used to enhance and extend the operation and performance of electron microscopes. PDT is part of EMG and Gatan is part of EIG.

The following table represents the allocation of the aggregate purchase price for the net assets of the 2019 acquisitions based on their estimated fair values at acquisition (in millions):

	PDT	Gatan	Total
Property, plant and equipment	$ 1.0	$ 8.8	$ 9.8
Goodwill	42.3	398.9	441.2
Other intangible assets	70.0	487.6	557.6
Long-term assets	1.7	11.8	13.5
Long-term liabilities	(1.3)	(5.0)	(6.3)
Net working capital and other[1]	9.7	36.4	46.1
Total cash paid	$123.4	$938.5	$1,061.9

(1) Includes $8.1 million in accounts receivable at PDT and $37.9 million in accounts receivable at Gatan, whose fair value, contractual cash flows and expected cash flows are approximately equal.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

The amount allocated to goodwill is reflective of the benefits the Company expects to realize from the 2019 acquisitions. PDT enhances the Company’s position in the aerospace and defense sectors with its innovative technology and differentiated solutions in thermal management systems. Gatan’s differentiated technology solutions, premier brand and leadership positions in growth markets complements the Company’s existing portfolio of specialized offerings in high-end analytical instrumentation. The Company expects approximately $431 million of the goodwill recorded relating to the 2019 acquisitions will be tax deductible in future years.

At December 31, 2019, the purchase price allocated to other intangible assets of $557.6 million consists of $73.0 million of indefinite-lived intangible trade names, which are not subject to amortization. The remaining $484.6 million of other intangible assets consists of $371.1 million customer relationships, which are being amortized over a period of 17 to 20 years and $113.5 million of purchased technology, which is being amortized over a period of 15 to 17 years. Amortization expense for each of the next five years for the 2019 acquisitions is expected to approximate $28 million per year.

The Company is in the process of finalizing the measurement of certain tangible and intangible assets and liabilities for its 2019 acquisitions of PDT and Gatan including inventory, property, plant and equipment, goodwill, trade names, customer relationships and purchased technology and the accounting for income taxes.

The 2019 acquisitions had an immaterial impact on reported net sales, net income and diluted earnings per share for the year ended December 31, 2019. Had the 2019 acquisitions been made at the beginning of 2019 or 2018, unaudited pro forma net sales, net income and diluted earnings per share for the years ended December 31, 2019 and 2018, respectively, would not have been materially different than the amounts reported.

In 2018, the Company spent $1,129.3 million in cash, net of cash acquired, to acquire FMH Aerospace (“FMH”) in January 2018, SoundCom Systems (“SoundCom”) in April 2018, Motec GmbH in June 2018, Forza Silicon Corporation (“Forza”), Telular Corporation in October 2018 and Spectro Scientific Corporation in November 2018. FMH is a provider of complex, highly-engineered solutions for the aerospace, defense and space industries. SoundCom provides design, integration, installation and support of clinical workflow and communication systems for healthcare facilities, educational institutions and corporations. SoundCom also serves as a value-added reseller for Rauland-Borg Corporation (“Rauland”) in the Midwest portion of the United States. Motec is a provider of integrated vision systems serving the high growth mobile machine vision market. Motec’s ruggedized vision products and integrated software solutions provide customers with improved operational efficiency and enhanced safety across a variety of critical mobile machine applications in transportation, agriculture, logistics and construction. Forza is a leader in the design and production of high-performance imaging sensors used in medical, defense and industrial applications. Telular (total consideration paid of $525 million) is a provider of communication solutions for logistics management, tank monitoring and security applications. Spectro Scientific is a provider of machine condition monitoring solutions for critical assets in high-value industrial applications. FMH is part of EMG. SoundCom, Motec, Forza, Telular and Spectro Scientific are part of EIG.

In 2019, the Company finalized the measurements of certain tangible and intangible assets and liabilities for its 2018 acquisitions, which had no material impact to the consolidated statement of income.

In 2017, the Company spent $556.6 million in cash, net of cash acquired, to acquire Rauland in February 2017, MOCON, Inc. in June 2017 and Arizona Instrument LLC in December 2017. The Rauland acquisition included a $30 million contingent payment due upon the achievement of certain milestones as described further below. Rauland is a global provider of enterprise clinical and education communications solutions for hospitals, healthcare systems and educational facilities. MOCON is a provider of laboratory and field gas analysis instrumentation to research laboratories, production facilities and quality control departments in food and beverage, pharmaceutical and industrial applications. Arizona Instrument is a provider of differentiated, high-precision moisture and gas measurement instruments in food, pharmaceutical and environmental markets. Rauland, MOCON and Arizona Instrument are part of EIG.

The Rauland acquisition included a potential $30 million contingent payment due upon Rauland achieving a certain cumulative revenue target over the period October 1, 2016 to September 30, 2018. At the acquisition date, the estimated fair value of the contingent payment liability was $25.5 million, which was based on a probabilistic approach using level 3 inputs. At September 30, 2018, Rauland achieved the target. The $30.0 million contingent payment was made in the fourth quarter of 2018.

Assets Held for Sale

The Company and Kymera International entered into a definitive agreement for the sale of its Reading Alloys ("Reading") business for $250.0 million in cash. The transaction is expected to close in first quarter of 2020 and is subject to customary closing conditions. Reading is part of EMG.

At December 31, 2019, the Company's consolidated balance sheet contained assets held for sale of $119.6 million, including goodwill of $49.7 million, long-lived assets of $39.8 million and current assets of $30.1 million. The Company's consolidated balance sheet contained liabilities held for sale of $23.4 million.

Subsequent Event

In January 2020, the Company acquired IntelliPower, a leading provider of high-reliability, ruggedized uninterruptable power systems serving a wide range of defense and industrial applications, for approximately $115 million. IntelliPower has annual sales of approximately $40 million. IntelliPower will join EIG.

7. Goodwill and Other Intangible Assets

The changes in the carrying amounts of goodwill by segment were as follows:

	EIG	EMG	Total
		(In millions)	
Balance at December 31, 2017	$2,077.0	$1,038.6	$3,115.6
Goodwill acquired	396.2	139.0	535.2
Purchase price allocation adjustments and other	(1.6)	—	(1.6)
Foreign currency translation adjustments	(19.6)	(17.6)	(37.2)
Balance at December 31, 2018	2,452.0	1,160.0	3,612.0
Goodwill acquired	**398.9**	**42.3**	**441.2**
Purchase price allocation adjustments and other	**35.5**	**(50.0)**	**(14.5)**
Foreign currency translation adjustments	**5.8**	**3.0**	**8.8**
Balance at December 31, 2019	**$2,892.2**	**$1,155.3**	**$4,047.5**

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

Other intangible assets were as follows at December 31:

	2019	2018
	(In thousands)	
Definite-lived intangible assets (subject to amortization):		
Patents	**$ 47,872**	$ 51,348
Purchased technology	**517,464**	405,204
Customer lists	**2,282,184**	1,966,709
	2,847,520	2,423,261
Accumulated amortization:		
Patents	**(36,697)**	(37,768)
Purchased technology	**(164,231)**	(127,363)
Customer lists	**(625,591)**	(538,504)
	(826,519)	(703,635)
Net intangible assets subject to amortization	**2,021,001**	1,719,626
Indefinite-lived intangible assets (not subject to amortization):		
Trademarks and trade names	**741,871**	684,145
	$ 2,762,872	$ 2,403,771

Amortization expense was $132.6 million, $114.1 million and $101.2 for the years ended December 31, 2019, 2018 and 2017, respectively. Amortization expense for each of the next five years is expected to approximate $158 million per year, not considering the impact of potential future acquisitions.

8. Other Consolidated Balance Sheet Information

	December 31,	
	2019	2018
	(In thousands)	
INVENTORIES, NET		
Finished goods and parts	**$ 99,773**	$ 107,289
Work in process	**118,240**	117,899
Raw materials and purchased parts	**406,554**	399,556
	$ 624,567	$ 624,744
PROPERTY, PLANT AND EQUIPMENT, NET		
Land	**$ 33,516**	$ 41,751
Buildings	**295,891**	315,250
Machinery and equipment	**1,074,643**	1,022,362
	1,404,050	1,379,363
Less: Accumulated depreciation	**(855,142)**	(825,233)
	$ 548,908	$ 554,130

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	December 31, 2019	December 31, 2018
	(In thousands)	
ACCRUED LIABILITIES AND OTHER		
Employee compensation and benefits	**$137,951**	$150,006
Product warranty obligation	**27,611**	23,482
Restructuring	**23,825**	24,149
Short term lease liability	**43,025**	—
Liabilities held for sale	**23,405**	—
Contingent purchase price	—	3,000
Other	**108,263**	113,794
	$364,080	$314,431

	2019	2018	2017
		(In thousands)	
ALLOWANCES FOR POSSIBLE LOSSES ON ACCOUNTS RECEIVABLE			
Balance at the beginning of the year	**$ 9,270**	$10,401	$10,257
Additions charged to expense	**2,835**	1,667	2,800
Write-offs	**(819)**	(2,335)	(3,208)
Foreign currency translation adjustments and other	**(43)**	(463)	552
Balance at the end of the year	**$11,243**	$ 9,270	$10,401

9. Income Taxes

The components of income before income taxes and the details of the provision for income taxes were as follows for the years ended December 31:

	2019	2018	2017
		(In thousands)	
Income before income taxes:			
Domestic	**$ 766,436**	$ 555,077	$ 447,853
Foreign	**303,312**	432,668	348,876
Total	**$ 1,069,748**	$ 987,745	$ 796,729
Provision for income taxes:			
Current:			
Federal	**$ 88,526**	$ 204,712	$ 127,874
Foreign	**81,452**	51,686	71,846
State	**19,093**	27,096	6,744
Total current	**189,071**	283,494	206,464
Deferred:			
Federal	**18,005**	(62,095)	(97,465)
Foreign	**(29)**	(3,872)	6,204
State	**1,404**	(7,715)	56
Total deferred	**19,380**	(73,682)	(91,205)
Total provision	**$ 208,451**	$ 209,812	$ 115,259

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

Significant components of the deferred tax (asset) liability were as follows at December 31:

	2019	2018
	(In thousands)	
Noncurrent deferred tax (asset) liability:		
Differences in basis of property and accelerated depreciation[1]	**$ 45,747**	$ 46,103
Reserves not currently deductible	**(44,239)**	(41,159)
Pensions	**39,820**	29,624
Differences in basis of intangible assets and accelerated amortization	**537,534**	554,597
Net operating loss carryforwards	**(41,782)**	(52,142)
Share-based compensation	**(12,060)**	(15,399)
Foreign Tax Credit Carryforwards	**(333)**	—
Unremitted earnings	**12,977**	12,598
Other	**(20,889)**	(24,492)
	516,775	509,730
Less: Valuation allowance	**7,146**	8,634
	523,921	518,364
Portion included in noncurrent assets	**12,219**	9,972
Gross noncurrent deferred tax liability	**$536,140**	$528,336

(1) Presented net of deferred tax asset of approximately $35.1 million at December 31, 2019, associated with the January 1, 2019 adoption of ASC 842.

The Company's effective tax rate reconciles to the U.S. Federal statutory rate as follows for the years ended December 31:

	2019	2018	2017
U.S. Federal statutory rate	**21.0%**	21.0%	35.0%
State income taxes, net of federal income tax benefit	**1.8**	1.2	0.4
Foreign operations, net	**(0.9)**	(0.1)	(6.8)
U.S. Benefits for Manufacturing, Export and credits	**(2.0)**	(1.8)	(1.8)
Uncertain Tax Items	**(1.0)**	1.7	0.4
Stock compensation	**(1.5)**	(0.5)	(1.5)
Net deferred tax revaluation	**—**	(0.1)	(23.3)
US Tax on Foreign Earnings	**2.3**	(0.1)	11.9
Other	**(0.2)**	(0.1)	0.2
Consolidated effective tax rate	**19.5%**	21.2%	14.5%

On December 22, 2017, the U.S. enacted the Tax Cuts and Jobs Act (the "Tax Act"). The Tax Act, which is also commonly referred to as "U.S. tax reform," significantly changes U.S. corporate income tax laws by, among other things, reducing the U.S. corporate income tax rate to 21% starting in 2018 and creating a territorial tax system with a one-time mandatory tax on previously deferred foreign earnings of U.S. subsidiaries. As a result, in the fourth quarter of 2017, the Company recorded a net benefit of $91.6 million in the consolidated statement of income as a component of Provision for income taxes. The $91.6 million net benefit consisted of a

$185.8 million benefit resulting from the remeasurement of the Company's net deferred tax liabilities in the U.S. based on the new lower corporate income tax rate and $94.2 million expense mostly relating to the one-time mandatory tax on previously deferred earnings of certain non-U.S. subsidiaries that are owned either wholly or partially by a U.S. subsidiary of the Company as discussed further below.

During 2018 the Company finalized the calculations of the Tax Act transitional tax items and reported a favorable $11.8 million tax benefit of which $10.4 million relates to the one-time mandatory deemed repatriation tax and $1.4 million relates to the remeasurement of the net deferred tax liabilities in the U.S. for the impact of the lower tax rates. The Company elected to pay the cash tax cost of the one-time mandatory tax on previously deferred earnings of non-U.S. subsidiaries over an eight-year period. As of December 31, 2019, the Company has a remaining cash tax obligation of $35.9 million, of which none is payable within the next twelve months.

The Company has evaluated the impact of the global intangible low-taxed income ("GILTI") section of the Tax Act and has made a tax accounting policy election to record the annual tax cost of GILTI as a current period expense when incurred and, as such, will not be measuring an impact of GILTI in its determination of deferred taxes.

As a result of the one-time mandatory deemed repatriation and the taxable inclusions under the GILTI provisions of the Tax Act, the Company has approximately $404.0 million in previously taxed income ("PTI") as of December 31, 2019 which can be repatriated without incremental U.S. Federal tax. The Company intends to reinvest its earnings indefinitely in operations outside the United States except to the extent of the PTI. There has been no provision for U.S. deferred income taxes for the undistributed earnings over PTI of approximately $714.0 million and $828.0 million at December 31, 2019 and 2018 respectively because determination of the amount of the unrecognized deferred income tax liability on these undistributed earnings is not practicable.

As of December 31, 2019, and 2018, the Company recorded deferred income taxes totaling $13.0 million and $12.6 million respectively in state income and foreign withholding taxes expected to be incurred when the cash amounts related to the mandatory tax are ultimately repatriated to the U.S.

The Company is acquisitive and at times acquires entities with tax attributes (net operating losses or tax credits) that carry over to post-acquisition tax periods of the Company. At December 31, 2019, the Company had tax effected benefits of $41.8 million related to net operating loss carryforwards, which will be available to offset future income taxes payable, subject to certain annual or other limitations based on foreign and U.S. tax laws. This amount includes net operating loss carryforwards of $23.4 million for federal income tax purposes with no valuation allowance, $15.7 million for state income tax purposes with no valuation allowance and $2.7 million for foreign income tax purposes with a valuation allowance of $2.6 million. These net operating loss carryforwards, if not used, will expire between 2020 and 2039.

At December 31, 2019, the Company had tax effected benefits of $8.2 million related to tax credit carryforwards, which will be available to offset future income taxes payable, subject to certain annual or other limitations based on foreign and U.S. tax laws. This amount includes tax credit carryforwards of $2.1 million for federal income tax purposes with a valuation allowance of $1.3 million, $6.1 million for state income tax purposes with a valuation allowance of $1.9 million, and no remaining credit carryforwards for foreign income tax purposes. These tax credit carryforwards, if not used, will expire between 2020 and 2039.

The Company maintains a valuation allowance to reduce certain deferred tax assets to amounts that are more likely than not to be realized. This allowance primarily relates to the deferred tax assets established for state non-deductible interest expense and federal and state credit carryforwards. In 2019, the Company recorded a decrease of $1.5 million in the valuation allowance of which $0.7 million relates to foreign losses and acquired state loss and credit carryforwards that are not expected to be utilized and $2.2 million for non-deductible interest expense in states that conform to the Tax Act. There are no material uncertainties related to the realization of any deferred tax assets and their realization does not materially depend on specific tax planning strategies being implemented or changes in future levels of expected profits.

At December 31, 2019, the Company had gross unrecognized tax benefits of $109.1 million, of which $65.9 million, if recognized, would impact the effective tax rate. At December 31, 2018, the Company had gross unrecognized tax benefits of $119.3 million, of which $73.1 million, if recognized, would impact the effective tax rate.

At December 31, 2019 and 2018, the Company reported $14.2 million and $14.0 million, respectively, related to interest and penalty exposure as accrued income tax expense in the consolidated balance sheet. During 2019, 2018 and 2017, the Company recognized a net expense of $0.2 million, $8.9 million and $0.9 million, respectively, for interest and penalties related to uncertain tax positions in the consolidated statement of income as a component of income tax expense.

Approximately 70% of the Company's overall tax liability is incurred in the United States. The Company files income tax returns in various other state and foreign tax jurisdictions, in some cases for multiple legal entities per jurisdiction. Generally, the Company has open tax years subject to tax audit on average of between three and six years in these jurisdictions. At December 31, 2019, there were no tax years currently under examination by the Internal Revenue Service ("IRS") related to the U.S. consolidated tax group, although a separate examination of a pre-acquisition net operating loss is ongoing related to a recently acquired company for which no material liability is expected. The Company has not materially extended any other statutes of limitation for any significant location and has reviewed and accrued for, where necessary, tax liabilities for open periods including state and foreign jurisdictions that remain subject to examination. There have been no penalties asserted or imposed by the IRS related to substantial understatement of income, gross valuation misstatement or failure to disclose a listed or reportable transaction.

During 2019, the Company added $25.4 million of tax, interest and penalties related to identified uncertain tax positions and reversed $35.4 million of tax and interest related to statute expirations and settlement of prior uncertain positions. During 2018, the Company added $81.6 million of tax, interest and penalties related to identified uncertain tax positions and reversed $18.4 million of tax and interest related to statute expirations and settlement of prior uncertain positions.

The following is a reconciliation of the liability for uncertain tax positions at December 31:

	2019	2018	2017
		(In millions)	
Balance at the beginning of the year	**$119.3**	$ 60.3	$57.9
Additions for tax positions related to the current year	**17.5**	21.8	10.0
Additions for tax positions of prior years	**2.8**	53.5	3.1
Reductions for tax positions of prior years	**(1.3)**	(3.9)	(2.8)
Reductions related to settlements with taxing authorities	**(0.9)**	—	—
Reductions due to statute expirations	**(28.3)**	(12.4)	(7.9)
Balance at the end of the year	**$109.1**	$119.3	$60.3

In 2019, the additions above primarily reflect the increase in tax liabilities for uncertain tax positions related to certain higher transfer pricing risks for hard to value intangible assets. The reductions above primarily relate to statute expirations. In 2018, the additions above primarily reflect the increase in tax liabilities for uncertain tax positions related to certain higher transfer pricing risks for hard to value intangible assets that may more likely be asserted following U.S. tax reform as taxpayer react and adapt to new tax planning initiatives. The reductions above primarily relate to statute expirations.

At December 31, 2019, tax, interest and penalties of $121.8 million were classified as a noncurrent liability. The net change in uncertain tax positions for the year ended December 31, 2019 resulted in a decrease to income tax expense of $10.0 million, which reflects the decrease of $10.2 million in gross uncertain tax positions less offsetting benefits reported as decreases to deferred tax liabilities or increases in long-term taxes receivable.

10. Debt

Long-term debt, net consisted of the following at December 31:

	2019	2018
	(In thousands)	
U.S. dollar 6.30% senior notes due December 2019	**$ —**	$ 100,000
U.S. dollar 3.73% senior notes due September 2024	**300,000**	300,000
U.S. dollar 3.91% senior notes due June 2025	**50,000**	50,000
U.S. dollar 3.96% senior notes due August 2025	**100,000**	100,000
U.S. dollar 4.18% senior notes due December 2025	**275,000**	275,000
U.S. dollar 3.83% senior notes due September 2026	**100,000**	100,000
U.S. dollar 4.32% senior notes due December 2027	**150,000**	150,000
U.S. dollar 4.32% senior notes due December 2027	**100,000**	—
U.S. dollar 4.37% senior notes due December 2028	**50,000**	50,000
U.S. dollar 3.98% senior notes due September 2029	**100,000**	100,000
U.S. dollar 4.45% senior notes due August 2035	**50,000**	50,000
British pound 4.68% senior note due September 2020	**106,140**	102,082
British pound 2.59% senior note due November 2028	**199,011**	191,405
British pound 2.70% senior note due November 2031	**99,508**	95,700
Euro 1.34% senior notes due October 2026	**336,797**	343,666
Euro 1.71% senior notes due December 2027	**84,202**	85,916
Euro 1.53% senior notes due October 2028	**224,553**	229,108
Swiss franc 2.44% senior note due December 2021	**56,830**	55,932
Revolving credit facility borrowings	**384,816**	260,000
Other, principally foreign	**9,234**	2,278
Less: Debt issuance costs	**(7,350)**	(8,374)
Total debt, net	**2,768,741**	2,632,713
Less: Current portion, net	**(497,449)**	(358,876)
Total long-term debt, net	**$ 2,271,292**	$ 2,273,837

Maturities of long-term debt borrowings outstanding at December 31, 2019 were as follows: $56.8 million in 2021; none in 2022; none in 2023; $300.0 million in 2024; $425.0 million in 2025; and $1,489.5 million in 2026 and thereafter.

In the fourth quarter of 2019, the Company paid in full, at maturity, $100 million in aggregate principal amount of 6.30% private placement senior notes.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

In the fourth quarter of 2018, the Company paid in full, at maturity, $65 million in aggregate principal amount of 7.18% private placement senior notes.

In the third quarter of 2018, the Company paid in full, at maturity, $80 million in aggregate principal amount of 6.35% private placement senior notes and $160 million in aggregate principal amount of 7.08% private placement senior notes.

In December 2018, the Company completed a private placement agreement to sell $575 million and 75 million Euros in senior notes to a group of institutional investors (the "2018 Private Placement") utilizing two funding dates. The first funding occurred in December 2018 for $475 million and 75 million Euros ($85.1 million). The second funding was in January 2019 for $100 million. The 2018 Private Placement senior notes carry a weighted average interest rate of 3.93% and are subject to certain customary covenants, including financial covenants that, among other things, require the Company to maintain certain debt-to-EBITDA (earnings before interest, income taxes, depreciation and amortization) and interest coverage ratios. The proceeds from the 2018 Private Placement were used to pay down domestic borrowings under the Company's revolving credit facility.

In December 2007, the Company issued $100 million in aggregate principal amount of 6.30% private placement senior notes due December 2019. In July 2008, the Company issued $80 million in aggregate principal amount of 6.35% private placement senior notes due July 2018 (paid in full, at maturity, as previously noted). In September 2008, the Company issued $160 million in aggregate principal amount of 7.08% private placement senior notes due September 2018 (paid in full, at maturity, as previously noted). In December 2008, the Company issued $65 million in aggregate principal amount of 7.18% private placement senior notes due December 2018 (paid in full, at maturity, as previously noted). In September 2014, the Company issued $300 million in aggregate principal amount of 3.73% senior notes due September 2024, $100 million in aggregate principal amount of 3.83% senior notes due September 2026 and $100 million in aggregate principal amount of 3.98% senior notes due September 2029. In June 2015, the Company issued $50 million in aggregate principal amount of 3.91% senior notes due June 2025. In August 2015, the Company issued $100 million in aggregate principal amount of 3.96% senior notes due August 2025 and $50 million in aggregate principal amount of 4.45% senior notes due August 2035.

In September 2010, the Company issued an 80 million British pound ($106.1 million at December 31, 2019) 4.68% senior note due September 2020. In December 2011, the Company issued a 55 million Swiss franc ($56.8 million at December 31, 2019) 2.44% senior note due December 2021. In October 2016, the Company issued 300 million Euros ($336.8 million at December 31, 2019) in aggregate principal amount of 1.34% senior notes due October 2026 and 200 million Euros ($224.6 million at December 31, 2019) in aggregate principal amount of 1.53% senior notes due October 2028. In November 2016, the Company issued 150 million British pounds ($199.0 million at December 31, 2019) in aggregate principal amount of 2.59% senior notes due November 2028 and 75 million British pounds ($99.5 million at December 31, 2019) in aggregate principal amount of 2.70% senior notes due November 2031.

In October 2018, the Company along with certain of its foreign subsidiaries amended and restated its credit agreement dated as of September 22, 2011, as amended and restated as of March 10, 2016 (the "Credit Agreement"). The Credit Agreement amends and restates the Company's existing $850 million revolving credit facility, which was due to expire in March 2021. The Credit Agreement consists of a five-year revolving credit facility in an aggregate principal amount of $1.5 billion with a final maturity date in October 2023. The revolving credit facility total borrowing capacity excludes an accordion feature that permits the Company to request up to an additional $500 million in revolving credit commitments at any time during the life of the Credit Agreement under certain conditions. The revolving credit facility provides the Company with additional financial flexibility to support its growth plans, including its acquisition strategy. At December 31, 2019, the Company had available borrowing capacity of $1,580.5 million under its revolving credit facility, including the $500 million accordion feature.

Interest rates on outstanding borrowings under the revolving credit facility are at the applicable benchmark rate plus a negotiated spread or at the U.S. prime rate. At December 31, 2019 and 2018 the Company had $384.8 million and $260.0 million of borrowings outstanding under the revolving credit facility, respectively. The weighted average interest rate on the revolving credit facility for the years ended December 31, 2019 and 2018 was 1.13% and 1.40%, respectively. The Company had outstanding letters of credit primarily under the revolving credit facility totaling $34.9 million and $35.1 million at December 31, 2019 and 2018, respectively.

The private placements, the senior notes and the revolving credit facility are subject to certain customary covenants, including financial covenants that, among other things, require the Company to maintain certain debt-to-EBITDA and interest coverage ratios. The Company was in compliance with all provisions of the debt arrangements at December 31, 2019.

Foreign subsidiaries of the Company had available credit facilities with local foreign lenders of $52.2 million and $49.1 million at December 31, 2019 and 2018, respectively. At December 31, 2019, foreign subsidiaries had debt borrowings outstanding totaling $9.2 million, which was reported in short-term borrowings. At December 31, 2018, foreign subsidiaries had debt borrowings outstanding totaling $2.3 million, which was reported in short-term borrowings.

The weighted average interest rate on total debt borrowings outstanding at December 31, 2019 and 2018 was 3.5% and 3.7%, respectively.

11. Share-Based Compensation

Under the terms of the Company's stockholder-approved share-based plans, performance restricted stock units ("PRSUs"), incentive and non-qualified stock options and restricted stock have been, and may be, issued to the Company's officers, management-level employees and members of its Board of Directors. Stock options granted prior to 2018 generally vest at a rate of one-fourth on each of the first four anniversaries of the grant date and have a maximum contractual term of seven years. Beginning in 2018, stock options granted generally vest at a rate of one-third on each of the first three anniversaries of the grant date and have a maximum contractual term of ten years. Restricted stock granted to employees prior to 2018 generally vests four years after the grant date (cliff vesting) and is subject to accelerated vesting due to certain events, including doubling of the grant price of the Company's common stock as of the close of business during any five consecutive trading days. Beginning in 2018, restricted stock granted to employees generally vests one-third on each of the first three anniversaries of the grant date. Restricted stock granted to non-employee directors generally vests two years after the grant date (cliff vesting) and is subject to accelerated vesting due to certain events, including doubling of the grant price of the Company's common stock as of the close of business during any five consecutive trading days.

In March 2019, the Company granted PRSUs to officers and certain key management-level employees an aggregate target award of approximately 102,000 shares of its common stock. The PRSUs vest over a period up to three years from the grant date based on continuous service, with the number of shares earned (0% to 200% of the target award) depending upon the extent to which the Company achieves certain financial and market performance targets measured over the period from January 1, 2019 through December 31, 2021. Half of the PRSUs were valued in a manner similar to restricted stock as the financial targets are based on the Company's operating results. The grant date fair value of these PRSUs are recognized as compensation expense over the vesting period based on the number of awards expected to vest at each reporting date. The other half of the

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PRSUs were valued using a Monte Carlo model as the performance target is related to the Company's total shareholder return compared to a group of peer companies, which represents a market condition. The Company recognizes the grant date fair value of these awards as compensation expense ratably over the vesting period.

The Company issues previously unissued shares when stock options are exercised, and shares are issued from treasury stock upon the award of restricted stock.

Share Based Compensation Expense

The Company measures and records compensation expense related to all stock awards by recognizing the grant date fair value of the awards over their requisite service periods in the financial statements. For grants under any of the Company's plans that are subject to graded vesting based on a service condition, the Company recognizes expense on a straight-line basis over the requisite service period for the entire award.

Total share-based compensation expense was as follows for the years ended December 31:

	2019	2018	2017
		(In thousands)	
Stock option expense	**$12,810**	$11,390	$ 9,895
Restricted stock expense	**16,169**	14,400	15,196
PRSU expense	**11,415**	1,525	—
Total pre-tax expense	**$40,394**	$27,315	$25,091

Pre-tax share-based compensation expense is included in the consolidated statement of income in either Cost of sales or Selling, general and administrative expenses, depending on where the recipient's cash compensation is reported. The year ended December 31, 2017 includes a second quarter of 2017 $2.5 million pre-tax charge in corporate administrative expenses related to the accelerated vesting of restricted stock grants in association with the retirement of the Company's Executive Chairman of the Board of Directors.

Stock Options

The fair value of each stock option grant is estimated on the date of grant using aBlack-Scholes-Merton option pricing model. The following weighted average assumptions were used in the Black-Scholes-Merton model to estimate the fair values of stock options granted during the years indicated:

	2019	2018	2017
Expected volatility	**19.1%**	17.3%	18.0%
Expected term (years)	**5.0**	5.0	5.0
Risk-free interest rate	**2.25%**	2.81%	1.94%
Expected dividend yield	**0.66%**	0.76%	0.60%
Black-Scholes-Merton fair value per stock option granted	**$16.85**	$14.12	$11.05

Expected volatility is based on the historical volatility of the Company's stock over the stock options' expected term. The Company used historical exercise data to estimate the stock options' expected term, which represents the period of time that the stock options granted are expected to be outstanding. Management anticipates that the future stock option holding periods will be similar to the historical stock option holding periods. The risk-free interest rate for periods within the expected term of the stock option is based on the U.S. Treasury yield curve at the time of grant. The expected dividend yield is calculated by dividing the

Company's annual dividend, based on the most recent quarterly dividend rate, by the Company's closing common stock price on the grant date. Compensation expense recognized for all share-based awards is net of estimated forfeitures. The Company's estimated forfeiture rates are based on its historical experience.

The following is a summary of the Company's stock option activity and related information for the year ended December 31, 2019:

	Shares (In thousands)	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life (Years)	Aggregate Intrinsic Value (In millions)
Outstanding at the beginning of the year	5,629	$ 53.46		
Granted	**826**	**85.43**		
Exercised	**(1,939)**	**45.48**		
Forfeited	**(210)**	**67.96**		
Expired	**(3)**	**35.33**		
Outstanding at the end of the year	**4,303**	**$ 62.50**	**5.2**	**$ 160.2**
Exercisable at the end of the year	**2,237**	**$ 54.27**	**3.5**	**$ 101.7**

The aggregate intrinsic value of stock options exercised during 2019, 2018 and 2017 was $88.2 million, $23.9 million and $41.3 million, respectively. The total fair value of stock options vested during 2019, 2018 and 2017 was $11.8 million, $10.1 million and $12.4 million, respectively.

The following is a summary of the Company's nonvested stock option activity and related information for the year ended December 31, 2019:

	Shares (In thousands)	Weighted Average Grant Date Fair Value
Nonvested stock options outstanding at the beginning of the year	2,494	$ 11.69
Granted	**826**	**16.85**
Vested	**(1,044)**	**11.28**
Forfeited	**(210)**	**9.76**
Nonvested stock options outstanding at the end of the year	**2,066**	**$ 14.17**

As of December 31, 2019, there was approximately $19 million of expected future pre-tax compensation expense related to the 2.1 million nonvested stock options outstanding, which is expected to be recognized over a weighted average period of less than two years.

Restricted Stock

The fair value of restricted shares under the Company's restricted stock arrangement is determined by the product of the number of shares granted and the Company's closing common stock price on the grant date. Upon the grant of restricted stock, the fair value of the restricted shares (unearned compensation) at the grant date is charged as a reduction of capital in excess of par value in the Company's consolidated balance sheet and is amortized to expense on a straight-line basis over the vesting period, which is the same as the calculated derived service period as determined on the grant date.

The following is a summary of the Company's nonvested restricted stock activity and related information for the year ended December 31, 2019:

	Shares (In thousands)	Weighted Average Grant Date Fair Value
Nonvested restricted stock outstanding at the beginning of the year	891	$ 58.98
Granted	**212**	**85.81**
Vested	**(456)**	**53.82**
Forfeited	**(86)**	**64.60**
Nonvested restricted stock outstanding at the end of the year	**561**	**$ 72.46**

The total fair value of restricted stock vested during 2019, 2018 and 2017 was $25.2 million, $11.6 million and $15.8 million, respectively. The weighted average fair value of restricted stock granted per share during 2019 and 2018 was $85.81 and $73.66, respectively. As of December 31, 2019, there was approximately $25 million of expected future pre-tax compensation expense related to the 0.6 million nonvested restricted shares outstanding, which is expected to be recognized over a weighted average period of less than two years.

12. Retirement Plans and Other Postretirement Benefits

Retirement and Pension Plans

The Company sponsors several retirement and pension plans covering eligible salaried and hourly employees. The plans generally provide benefits based on participants' years of service and/or compensation. The following is a brief description of the Company's retirement and pension plans.

The Company maintains contributory and noncontributory defined benefit pension plans. Benefits for eligible salaried and hourly employees under all defined benefit plans are funded through trusts established in conjunction with the plans. The Company's funding policy with respect to its defined benefit plans is to contribute amounts that provide for benefits based on actuarial calculations and the applicable requirements of U.S. federal and local foreign laws. The Company estimates that it will make both required and discretionary cash contributions of approximately $3 million to $6 million to its worldwide defined benefit pension plans in 2020.

The Company uses a measurement date of December 31 (its fiscal year end) for its U.S. and foreign defined benefit pension plans.

The Company sponsors a 401(k) retirement and savings plan for eligible U.S. employees. Participants in the retirement and savings plan may contribute a specified portion of their compensation on a pre-tax basis, which varies by location. The Company matches employee contributions ranging from 20% to 100%, up to a maximum percentage ranging from 1% to 8% of eligible compensation or up to a maximum of $1,200 per participant in some locations.

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The Company's retirement and savings plan has a defined contribution retirement feature principally to cover U.S. salaried employees joining the Company after December 31, 1996. Under the retirement feature, the Company makes contributions for eligible employees based on a pre-established percentage of the covered employee's salary subject to pre-established vesting. Employees of certain of the Company's foreign operations participate in various local defined contribution plans.

The Company has nonqualified unfunded retirement plans for its Directors and certain retired employees. It also provides supplemental retirement benefits, through contractual arrangements and/or a Supplemental Executive Retirement Plan ("SERP") covering certain current and former executives of the Company. These supplemental benefits are designed to compensate the executive for retirement benefits that would have been provided under the Company's primary retirement plan, except for statutory limitations on compensation that must be taken into account under those plans. The projected benefit obligations of the SERP and the contracts will primarily be funded by a grant of shares of the Company's common stock upon retirement or termination of the executive. The Company is providing for these obligations by charges to earnings over the applicable periods.

The following tables set forth the changes in net projected benefit obligation and the fair value of plan assets for the funded and unfunded defined benefit plans for the years ended December 31:

U.S. Defined Benefit Pension Plans:

	2019	2018
	(In thousands)	
Change in projected benefit obligation:		
Net projected benefit obligation at the beginning of the year	$471,506	$520,376
Service cost	**3,248**	3,777
Interest cost	**20,287**	19,183
Actuarial losses (gains)	**46,269**	(43,163)
Gross benefits paid	**(30,796)**	(30,127)
Acquisition	—	1,460
Net projected benefit obligation at the end of the year	**$510,514**	$471,506
Change in plan assets:		
Fair value of plan assets at the beginning of the year	$552,187	$619,993
Actual return on plan assets	**99,573**	(39,022)
Employer contributions	**668**	541
Gross benefits paid	**(30,796)**	(30,127)
Acquisition	—	802
Fair value of plan assets at the end of the year	**$621,632**	$552,187

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Foreign Defined Benefit Pension Plans:

	2019	2018
	(In thousands)	
Change in projected benefit obligation:		
Net projected benefit obligation at the beginning of the year	$268,763	$284,178
Service cost	**3,307**	3,102
Interest cost	**6,692**	6,495
Foreign currency translation adjustments	**9,042**	(15,568)
Employee contributions	**110**	108
Actuarial losses (gains)	**35,021**	(4,674)
Expenses paid from assets	**(747)**	(572)
Gross benefits paid	**(8,421)**	(11,114)
Settlements	**(1,984)**	—
Plan amendments	**—**	6,808
Net projected benefit obligation at the end of the year	**$311,783**	$268,763
Change in plan assets:		
Fair value of plan assets at the beginning of the year	**$196,801**	$226,968
Actual return on plan assets	**25,391**	(11,171)
Employer contributions	**4,941**	4,521
Employee contributions	**110**	108
Foreign currency translation adjustments	**8,256**	(11,939)
Expenses paid from assets	**(747)**	(572)
Settlements	**(1,984)**	—
Gross benefits paid	**(8,421)**	(11,114)
Fair value of plan assets at the end of the year	**$224,347**	$196,801

The accumulated benefit obligation consisted of the following at December 31:

U.S. Defined Benefit Pension Plans:

	2019	2018
	(In thousands)	
Funded plans	**$493,756**	$456,319
Unfunded plans	**5,213**	5,453
Total	**$498,969**	$461,772

Foreign Defined Benefit Pension Plans:

	2019	2018
	(In thousands)	
Funded plans	**$264,675**	$220,842
Unfunded plans	**45,315**	39,459
Total	**$309,990**	$260,301

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Weighted average assumptions used to determine benefit obligations at December 31:

	2019	2018
U.S. Defined Benefit Pension Plans:		
Discount rate	**3.45%**	4.40%
Rate of compensation increase (where applicable)	**3.75%**	3.75%
Foreign Defined Benefit Pension Plans:		
Discount rate	**1.83%**	2.59%
Rate of compensation increase (where applicable)	**2.50%**	2.50%

The following is a summary of the fair value of plan assets for U.S. plans at December 31:

	2019			2018		
Asset Class	**Total**	**Level 1**	**Level 2**	**Total**	**Level 1**	**Level 2**
			(In thousands)			
Corporate debt instruments	**$ 3,152**	**$ —**	**$ 3,152**	$ 2,440	$ —	$ 2,440
Corporate debt instruments – Preferred	**10,781**	**—**	**10,781**	10,967	—	10,967
Corporate stocks – Common	**127,221**	**127,221**	**—**	115,013	115,013	—
Municipal bonds	**574**	**—**	**574**	488	—	488
Registered investment companies	**288,076**	**288,076**	**—**	279,006	279,006	—
U.S. Government securities	**240**	**—**	**240**	362	—	362
Total investments	**430,044**	**415,297**	**14,747**	408,276	394,019	14,257
Investments measured at net asset value	**191,588**	**—**	**—**	143,911	—	—
Total investments	**$621,632**	**$415,297**	**$14,747**	$552,187	$394,019	$14,257

U.S. equity securities and global equity securities categorized as level 1 are traded on national and international exchanges and are valued at their closing prices on the last trading day of the year. For U.S. equity securities and global equity securities not traded on an active exchange, or if the closing price is not available, the trustee obtains indicative quotes from a pricing vendor, broker or investment manager. These securities are categorized as level 2 if the custodian obtains corroborated quotes from a pricing vendor. Additionally, some U.S. equity securities and global equity securities are public investment vehicles valued using the Net Asset Value ("NAV") provided by the fund manager. The NAV is the total value of the fund divided by the number of shares outstanding.

Fixed income securities categorized as level 1 are traded on national and international exchanges and are valued at their closing prices on the last trading day of the year and categorized as level 2 if valued by the trustee using pricing models that use verifiable observable market data, bids provided by brokers or dealers or quoted prices of securities with similar characteristics.

The expected long-term rate of return on these plan assets was7.50% in 2019 and 7.50% in 2018. Equity securities included 384,788 shares of AMETEK, Inc. common stock with a market value of $38.4 million (6.2% of total plan investment assets) at December 31, 2019 and512,565 shares of AMETEK, Inc. common stock with a market value of $34.7 million (6.3% of total plan investment assets) at December 31, 2018.

The objectives of the Company's U.S. defined benefit plans' investment strategy are to maximize the plans' funded status and minimize Company contributions and plan expense. Because the goal is to optimize returns over the long term, an investment policy that favors equity holdings has been established. Since there may be periods of time where both equity and mutual fund markets provide poor returns, an allocation to alternative

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assets may be made to improve the overall portfolio's diversification and return potential. The Company periodically reviews its asset allocation, taking into consideration plan liabilities, plan benefit payment streams and the investment strategy of the pension plans. The actual asset allocation is monitored frequently relative to the established targets and ranges and is rebalanced when necessary. The target allocations for the U.S. defined benefits plans are approximately 50% equity securities, 20% fixed income securities and 30% other securities and/or cash.

The equity portfolio is diversified by market capitalization and style. The equity portfolio also includes international components.

The objective of the mutual fund portion of the pension assets is to provide interest rate sensitivity for a portion of the assets and to provide diversification. The mutual fund portfolio is diversified within certain quality and maturity guidelines to minimize the adverse effects of interest rate fluctuations.

Certain investments are prohibited and include venture capital, private placements, unregistered or restricted stock, margin trading, commodities, short selling and rights and warrants. Foreign currency futures, options and forward contracts may be used to manage foreign currency exposure.

The following is a summary of the fair value of plan assets for foreign defined benefit pension plans at December 31:

	2019		2018	
Asset Class	**Total**	**Level 3**	**Total**	**Level 3**
	(In thousands)			
Life insurance	**$ 19,298**	**$ 19,298**	$ 18,685	$18,685
Total investments	**19,298**	**19,298**	18,685	18,685
Investments measured at net asset value	**205,049**	**—**	178,116	—
Total investments	**$224,347**	**$ 19,298**	$196,801	$18,685

Life insurance assets are considered level 3 investments as their values are determined by the sponsor using unobservable market data.

Alternative investments categorized as level 3 are valued based on unobservable inputs and cannot be corroborated using verifiable observable market data. Investments in level 3 funds are redeemable, however, cash reimbursement may be delayed, or a portion held back until asset finalization.

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The following is a summary of the changes in the fair value of the foreign plans' level 3 investments (fair value determined using significant unobservable inputs):

	Life Insurance (In thousands)
Balance, December 31, 2017	$ 21,294
Actual return on assets:	
Unrealized losses relating to instruments still held at the end of the year	(2,609)
Realized gains (losses) relating to assets sold during the year	—
Purchases, sales, issuances and settlements, net	—
Balance, December 31, 2018	18,685
Actual return on assets:	
Unrealized gains (losses) relating to instruments still held at the end of the year	**613**
Realized gains (losses) relating to assets sold during the year	—
Purchases, sales, issuances and settlements, net	—
Balance, December 31, 2019	**$ 19,298**

The objective of the Company's foreign defined benefit plans' investment strategy is to maximize the long-term rate of return on plan investments, subject to a reasonable level of risk. Liability studies are also performed on a regular basis to provide guidance in setting investment goals with an objective to balance risks against the current and future needs of the plans. The trustees consider the risk associated with the different asset classes, relative to the plans' liabilities and how this can be affected by diversification, and the relative returns available on equities, mutual fund investments, real estate and cash. Also, the likely volatility of those returns and the cash flow requirements of the plans are considered. It is expected that equities will outperform mutual fund investments over the long term. However, the trustees recognize the fact that mutual fund investments may better match the liabilities for pensioners. Because of the relatively young active employee group covered by the plans and the immature nature of the plans, the trustees have chosen to adopt an asset allocation strategy more heavily weighted toward equity investments. This asset allocation strategy will be reviewed, from time to time, in view of changes in market conditions and in the plans' liability profile. The target allocations for the foreign defined benefit plans are approximately 22% equity securities, 21% fixed income securities, 51% multi-asset funds and 6% other securities, insurance or cash.

The assumption for the expected return on plan assets was developed based on a review of historical investment returns for the investment categories for the defined benefit pension assets. This review also considered current capital market conditions and projected future investment returns. The estimates of future capital market returns by asset class are lower than the actual long-term historical returns. The current low interest rate environment influences this outlook. Therefore, the assumed rate of return for U.S. plans is 7.00% and 5.97% for foreign plans in 2020.

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The projected benefit obligation, accumulated benefit obligation and fair value of plan assets for pension plans with a projected benefit obligation in excess of plan assets and pension plans with an accumulated benefit obligation in excess of plan assets were as follows at December 31:

U.S. Defined Benefit Pension Plans:

	Projected Benefit Obligation Exceeds Fair Value of Assets		Accumulated Benefit Obligation Exceeds Fair Value of Assets	
	2019	2018	2019	2018
	(In thousands)			
Benefit obligation	**$7,119**	$6,928	**$ 7,119**	$ 6,928
Fair value of plan assets	**958**	809	**958**	809

Foreign Defined Benefit Pension Plans:

	Projected Benefit Obligation Exceeds Fair Value of Assets		Accumulated Benefit Obligation Exceeds Fair Value of Assets	
	2019	2018	2019	2018
	(In thousands)			
Benefit obligation	**$311,783**	$268,763	**$309,990**	$260,301
Fair value of plan assets	**224,347**	196,801	**224,347**	196,801

The following table provides the amounts recognized in the consolidated balance sheet at December 31:

	2019	2018
	(In thousands)	
Funded status asset (liability):		
Fair value of plan assets	**$ 845,979**	$ 748,988
Projected benefit obligation	**(822,297)**	(740,269)
Funded status at the end of the year	**$ 23,682**	$ 8,719
Amounts recognized in the consolidated balance sheet consisted of:		
Noncurrent asset for pension benefits (other assets)	**$ 117,278**	$ 86,799
Current liabilities for pension benefits	**(1,954)**	(1,905)
Noncurrent liability for pension benefits	**(91,642)**	(76,175)
Net amount recognized at the end of the year	**$ 23,682**	$ 8,719

The following table provides the amounts recognized in accumulated other comprehensive income, net of taxes, at December 31:

Net amounts recognized:	2019	2018
	(In thousands)	
Net actuarial loss	**$242,696**	$244,511
Prior service costs	**4,189**	4,432
Transition asset	**6**	7
Total recognized	**$246,891**	$248,950

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The following table provides the components of net periodic pension benefit expense (income) for the years ended December 31:

	2019	2018	2017
		(In thousands)	
Defined benefit plans:			
Service cost	**$ 6,556**	$ 6,879	$ 7,138
Interest cost	**26,979**	25,678	27,424
Expected return on plan assets	**(52,402)**	(59,325)	(53,442)
Settlement	**739**	—	—
Amortization of:			
Net actuarial loss	**15,685**	12,092	14,591
Prior service costs	**484**	(49)	(47)
Transition asset	**1**	1	1
Total net periodic benefit income	**(1,958)**	(14,724)	(4,335)
Other plans:			
Defined contribution plans	**32,508**	28,829	24,280
Foreign plans and other	**9,406**	6,185	5,866
Total other plans	**41,914**	35,014	30,146
Total net pension expense	**$ 39,956**	$ 20,290	$ 25,811

The total net periodic benefit expense (income) is included in Cost of sales, General and administrative expense and Other income and expense in the consolidated statement of income. The estimated amount that will be amortized from accumulated other comprehensive income into net periodic pension benefit expense in 2020 for the net actuarial losses and prior service costs is expected to be approximately $16 million.

The following weighted average assumptions were used to determine the above net periodic pension benefit income for the years ended December 31:

	2019	2018	2017
U.S. Defined Benefit Pension Plans:			
Discount rate	**4.40%**	4.40%	4.25%
Expected return on plan assets	**7.50%**	7.50%	7.50%
Rate of compensation increase (where applicable)	**3.75%**	3.75%	3.75%
Foreign Defined Benefit Pension Plans:			
Discount rate	**2.59%**	2.59%	2.56%
Expected return on plan assets	**6.52%**	6.52%	6.79%
Rate of compensation increase (where applicable)	**2.50%**	2.50%	2.50%

Estimated Future Benefit Payments

The estimated future benefit payments for U.S. and foreign plans are as follows: 2020– $40.6 million; 2021 – $41.7 million; 2022 – $42.3 million; 2023 – $43.1 million; 2024 – $44.4 million; 2025 to 2029 - $224.3 million. Future benefit payments primarily represent amounts to be paid from pension trust assets. Amounts included that are to be paid from the Company’s assets are not significant in any individual year.

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Postretirement Plans and Postemployment Benefits

The Company provides limited postretirement benefits other than pensions for certain retirees and a small number of former employees. Benefits under these arrangements are not funded and are not significant.

The Company also provides limited postemployment benefits for certain former or inactive employees after employment but before retirement. Those benefits are not significant in amount.

The Company has a deferred compensation plan, which allows employees whose compensation exceeds the statutory IRS limit for retirement benefits to defer a portion of earned bonus compensation. The plan permits deferred amounts to be deemed invested in either, or a combination of, (a) an interest-bearing account, benefits from which are payable out of the general assets of the Company, or (b) the equivalent of a fund which invests in shares of the Company's common stock on behalf of the employee. The amount deferred under the plan, including income earned, was $19.0 million and $14.4 million at December 31, 2019 and 2018, respectively. Administrative expense for the deferred compensation plan is borne by the Company and is not significant.

13. Contingencies

Indemnifications

In conjunction with certain acquisition and divestiture transactions, the Company may agree to make payments to compensate or indemnify other parties for possible future unfavorable financial consequences resulting from specified events (e.g., breaches of contract obligations or retention of previously existing environmental, tax or employee liabilities) whose terms range in duration and often are not explicitly defined. Where appropriate, the obligation for such indemnifications is recorded as a liability. Because the amount of these types of indemnifications generally is not specifically stated, the overall maximum amount of the obligation under such indemnifications cannot be reasonably estimated. Further, the Company indemnifies its directors and officers for claims against them in connection with their positions with the Company. Historically, any such costs incurred to settle claims related to these indemnifications have been minimal for the Company. The Company believes that future payments, if any, under all existing indemnification agreements would not have a material impact on its consolidated results of operations, financial position or cash flows.

Asbestos Litigation

The Company (including its subsidiaries) has been named as a defendant in a number of asbestos-related lawsuits. Certain of these lawsuits relate to a business which was acquired by the Company and do not involve products which were manufactured or sold by the Company. In connection with these lawsuits, the seller of such business has agreed to indemnify the Company against these claims (the "Indemnified Claims"). The Indemnified Claims have been tendered to, and are being defended by, such seller. The seller has met its obligations, in all respects, and the Company does not have any reason to believe such party would fail to fulfill its obligations in the future. To date, no judgments have been rendered against the Company as a result of any asbestos-related lawsuit. The Company believes that it has good and valid defenses to each of these claims and intends to defend them vigorously.

Environmental Matters

Certain historic processes in the manufacture of products have resulted in environmentally hazardous waste by-products as defined by federal and state laws and regulations. At December 31, 2019, the Company is named a Potentially Responsible Party ("PRP") at 13 non-AMETEK-owned former waste disposal or treatment sites (the "non-owned" sites). The Company is identified as a "de minimis" party in 12 of these sites based on the low volume of waste attributed to the Company relative to the amounts attributed to other named PRPs. In eight of these sites, the Company has reached a tentative agreement on the cost of the de minimis settlement to satisfy its obligation and is awaiting executed agreements. The tentatively agreed-to settlement amounts are fully reserved. In the other four sites, the Company is continuing to investigate the accuracy of the alleged volume attributed to the Company as estimated by the parties primarily responsible for remedial activity at the sites to establish an appropriate settlement amount. At the remaining site where the Company is a non-de minimis PRP, the Company is participating in the investigation and/or related required remediation as part of a PRP Group and reserves have been established sufficient to satisfy the Company's expected obligations. The Company historically has resolved these issues within established reserve levels and reasonably expects this result will continue. In addition to these non-owned sites, the Company has an ongoing practice of providing reserves for probable remediation activities at certain of its current or previously owned manufacturing locations (the "owned" sites). For claims and proceedings against the Company with respect to other environmental matters, reserves are established once the Company has determined that a loss is probable and estimable. This estimate is refined as the Company moves through the various stages of investigation, risk assessment, feasibility study and corrective action processes. In certain instances, the Company has developed a range of estimates for such costs and has recorded a liability based on the best estimate. It is reasonably possible that the actual cost of remediation of the individual sites could vary from the current estimates and the amounts accrued in the consolidated financial statements; however, the amounts of such variances are not expected to result in a material change to the consolidated financial statements. In estimating the Company's liability for remediation, the Company also considers the likely proportionate share of the anticipated remediation expense and the ability of the other PRPs to fulfill their obligations.

Total environmental reserves at December 31, 2019 and 2018 were $28.9 million and $27.8 million, respectively, for both non-owned and owned sites. In 2019, the Company recorded $7.0 million in reserves. Additionally, in 2019 the Company spent $6.0 million on environmental matters and the reserve decreased $0.1 million due to foreign currency translation. The Company's reserves for environmental liabilities at December 31, 2019 and 2018 included reserves of $9.0 million and $9.6 million, respectively, for an owned site acquired in connection with the 2005 acquisition of HCC Industries ("HCC"). The Company is the designated performing party for the performance of remedial activities for one of several operating units making up a Superfund site in the San Gabriel Valley of California. The Company has obtained indemnifications and other financial assurances from the former owners of HCC related to the costs of the required remedial activities.

The Company has agreements with other former owners of certain of its acquired businesses, as well as new owners of previously owned businesses. Under certain of the agreements, the former or new owners retained, or assumed and agreed to indemnify the Company against, certain environmental and other liabilities under certain circumstances. The Company and some of these other parties also carry insurance coverage for some environmental matters. To date, these parties have met their obligations in all material respects.

The Company believes it has established reserves for the environmental matters described above, which are sufficient to perform all known responsibilities under existing claims and consent orders. The Company has no reason to believe that other third parties would fail to perform their obligations in the future. In the opinion of management, based on presently available information and the Company's historical experience related to such matters, an adequate provision for probable costs has been made and the ultimate cost resulting from these actions is not expected to materially affect the consolidated results of operations, financial position or cash flows of the Company.

The Company has been remediating groundwater contamination for several contaminants, including trichloroethylene ("TCE"), at a formerly owned site in El Cajon, California. Several lawsuits have been filed against the Company alleging damages resulting from the groundwater contamination, including property damages and personal injury, and seeking compensatory and punitive damages. The Company believes that it has good and valid defenses to each of these claims and intends to defend them vigorously. The Company believes it has established reserves for these lawsuits that are sufficient to satisfy its expected exposure. The Company does not expect the outcome of these matters, either individually or in the aggregate, to materially affect the consolidated results of operations, financial position or cash flows of the Company.

14. Leases and Other Commitments

Leases

The Company determines if an arrangement is a lease at inception. This determination generally depends on whether the arrangement conveys to the Company the right to control the use of an explicitly or implicitly identified fixed asset for a period of time in exchange for consideration. Control of an underlying asset is conveyed to the Company if the Company obtains the rights to direct the use of and to obtain substantially all of the economic benefits from using the underlying asset. The Company has lease agreements which include lease and non-lease components, which the Company has elected to account for as a single lease component for all classes of underlying assets. Lease expense for variable lease components are recognized when the obligation is probable.

Operating leases are included in ROU assets, accrued liabilities and other, and other long-term liabilities on our consolidated balance sheets. Operating lease ROU assets and liabilities are recognized at commencement date based on the present value of lease payments over the lease term. Operating lease payments are recognized as lease expense on a straight-line basis over the lease term. The Company has no material finance leases. The Company primarily leases buildings (real estate) and automobiles which are classified as operating leases. ASC 842 requires a lessee to discount its unpaid lease payments using the interest rate implicit in the lease or, if that rate cannot be readily determined, its incremental borrowing rate. As an implicit interest rate is not readily determinable in our leases, we use our incremental borrowing rate based on the information available at commencement date in determining the present value of lease payments.

The lease term for all of the Company's leases includes the non-cancellable period of the lease plus any additional periods covered by either a Company option to extend (or not to terminate) the lease that the Company is reasonably certain to exercise, or an option to extend (or not to terminate) the lease controlled by the lessor. Options for lease renewals have been excluded from the lease term (and lease liability) for the majority of the Company's leases as the reasonably certain threshold is not met. In a small number of the Company's leases, the options for renewals have been included in the lease term as the reasonably certain threshold is met due to the Company having significant economic incentive for extending the lease.

Lease payments included in the measurement of the lease liability are comprised of fixed payments, variable payments that depend on an index or rate and amounts probable to be payable under the exercise of the Company option to purchase the underlying asset if reasonably certain.

Variable lease payments not dependent on a rate or index associated with the Company's leases are recognized when the events, activities, or circumstances in the lease agreement on which those payments are assessed are probable. Variable lease payments are presented as operating expense in the Company's income statement in the same line item as expense arising from fixed lease payments.

The Company has commitments under operating leases for certain facilities, vehicles and equipment used in its operations. Our leases have initial lease terms ranging from 2 months to 14 years, with the exception of a single land lease with 64 years remaining. Certain lease agreements contain provisions for future rent increases.

AMETEK, Inc.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

The components of lease expense were as follows:

	2019 (In thousands)
Operating lease cost	$ 45,438
Variable lease cost	7,813
Total lease cost	$ 53,251

Rental expense was $52.5 million in 2018 and $49.7 million in 2017.

Supplemental balance sheet information related to leases was as follows:

	December 31, 2019 (In thousands)
Right of use assets, net	$ 179,679
Lease liabilities included in Accrued liabilities and other	43,025
Lease liabilities included in Other long-term liabilities	142,620
Total lease liabilities	$ 185,645

Supplemental cash flow information and other information related to leases was as follows for the year ended December 31:

	2019 (In thousands)
Cash used in operations for operating leases	$ 53,266
Right-of-use assets obtained in exchange for new operating liabilities	$ 40,793
Weighted-average remaining lease terms – operating leases (years)	5.93
Weighted-average discount rate – operating leases	3.72%

Maturities of lease liabilities as of December 31, 2019 were as follows:

Lease Liability Maturity Analysis	Operating Leases (In thousands)
2020	$ 49,432
2021	42,084
2022	34,103
2023	25,879
2024	17,543
Thereafter	38,953
Total lease payments	207,994
Less: imputed interest	22,349
	$ 185,645

AMETEK, Inc.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

The Company does not have any leases that have not yet commenced which are significant.

Other Commitments

As of December 31, 2019, and 2018, the Company had $505.2 million and $470.2 million, respectively, in purchase obligations outstanding, which primarily consisted of contractual commitments to purchase certain inventories at fixed prices.

The Company does not provide significant guarantees on a routine basis. The Company primarily issues guarantees, stand-by letters of credit and surety bonds in the ordinary course of its business to provide financial or performance assurance to third parties on behalf of its consolidated subsidiaries to support or enhance the subsidiary's stand-alone creditworthiness. The amounts subject to certain of these agreements vary depending on the covered contracts outstanding at any particular point in time. At December 31, 2019, the maximum amount of future payment obligations relative to these various guarantees was $97.9 million and the outstanding liability under certain of those guarantees was $9.2 million.

15. Reportable Segments and Geographic Areas Information

Descriptive Information about Reportable Segments

The Company has two reportable segments, EIG and EMG. The Company's operating segments are identified based on the existence of segment managers. Certain of the Company's operating segments have been aggregated for segment reporting purposes primarily on the basis of product type, production processes, distribution methods and similarity of economic characteristics.

EIG manufactures advanced instruments for the process, power and industrial, and aerospace markets. It provides process and analytical instruments for the oil and gas, petrochemical, pharmaceutical, semiconductor, automation, and food and beverage industries. EIG also provides instruments to the laboratory equipment, ultraprecision manufacturing, medical, and test and measurement markets. It makes power quality monitoring and metering devices, uninterruptible power supplies, programmable power equipment, electromagnetic compatibility test equipment and gas turbines sensors. EIG also provides dashboard instruments for heavy trucks and other vehicles, as well as instrumentation and controls for the food and beverage industries. It supplies the aerospace industry with aircraft and engine sensors, monitoring systems, power supplies, fuel and fluid measurement systems, and data acquisition systems.

EMG is a differentiated supplier of automation solutions, thermal management systems, specialty metals and electrical interconnects. It manufactures highly engineered electrical connectors and electronic packaging used to protect sensitive electronic devices. EMG also makes precision motion control products for data storage, medical devices, business equipment, automation and other applications. It supplies high-purity powdered metals, strip and foil, specialty clad metals and metal matrix composites. EMG also manufactures motors used in commercial appliances, fitness equipment, food and beverage machines, hydraulic pumps and industrial blowers. It produces motor-blower systems and heat exchangers used in thermal management and other applications on a variety of military and commercial aircraft and military ground vehicles. EMG also operates a global network of aviation maintenance, repair and overhaul facilities.

Measurement of Segment Results

Segment operating income represents net sales less all direct costs and expenses (including certain administrative and other expenses) applicable to each segment but does not include interest expense. Net sales by

AMETEK, Inc.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

segment are reported after elimination of intra- and intersegment sales and profits, which are insignificant in amount. Reported segment assets include allocations directly related to the segment's operations. Corporate assets consist primarily of investments, prepaid pensions, insurance deposits and deferred taxes.

Reportable Segment Financial Information

	2019	2018	2017
		(In thousands)	
Operating income and income before income taxes:			
Segment operating income[1]:			
Electronic Instruments	**$ 865,307**	$ 782,144	$ 671,646
Electromechanical	**387,931**	363,765	306,779
Total segment operating income	**1,253,238**	1,145,909	978,425
Corporate administrative expenses	**(75,858)**	(70,369)	(74,805)
Consolidated operating income	**1,177,380**	1,075,540	903,620
Interest and other expenses, net	**(107,632)**	(87,795)	(106,891)
Consolidated income before income taxes	**$ 1,069,748**	$ 987,745	$ 796,729
Assets:			
Electronic Instruments	**$ 6,651,920**	$ 5,625,303	
Electromechanical	**2,818,155**	2,685,674	
Total segment assets	**9,470,075**	8,310,977	
Corporate	**374,484**	351,311	
Consolidated assets	**$ 9,844,559**	$ 8,662,288	
Additions to property, plant and equipment[2]:			
Electronic Instruments	**$ 74,994**	$ 110,858	$ 54,321
Electromechanical	**42,924**	42,461	36,829
Total segment additions to property, plant and equipment	**117,918**	153,319	91,150
Corporate	**4,770**	3,496	3,002
Consolidated additions to property, plant and equipment	**$ 122,688**	$ 156,815	$ 94,152
Depreciation and amortization:			
Electronic Instruments	**$ 153,111**	$ 121,709	$ 108,053
Electromechanical	**78,664**	75,801	73,222
Total segment depreciation and amortization	**231,775**	197,510	181,275
Corporate	**2,267**	1,980	1,952
Consolidated depreciation and amortization	**$ 234,042**	$ 199,490	$ 183,227

(1) Segment operating income represents net sales less all direct costs and expenses (including certain administrative and other expenses) applicable to each segment but does not include interest expense.

(2) Includes $20.3 million in 2019, $74.6 million in 2018 and $19.1 million in 2017 from acquired businesses.

AMETEK, Inc.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

Geographic Areas

Information about the Company's operations in different geographic areas for the years ended December 31, 2019 and 2018 is shown below.

	2019	2018
	(In thousands)	
Long-lived assets from continuing operations (excluding intangible assets):		
United States	**$370,144**	$380,855
International[(1)]:		
United Kingdom	**57,675**	55,527
European Union countries	**78,500**	78,524
Asia	**12,869**	11,846
Other foreign countries	**29,720**	27,378
Total international	**178,764**	173,275
Total consolidated	**$548,908**	$554,130

(1) Represents long-lived assets of foreign-based operations only.

16. Additional Consolidated Income Statement and Cash Flow Information

Included in other expense, net are interest and other investment income of $4.6 million, $2.0 million and $2.1 million for 2019, 2018 and 2017, respectively. Income taxes paid in 2019, 2018 and 2017 were $221.6 million, $195.2 million and $176.6 million, respectively. Cash paid for interest was $84.9 million, $83.6 million and $96.1 million in 2019, 2018 and 2017, respectively.

17. Stockholders' Equity

In 2018, the Company repurchased approximately 5,079,000 shares of its common stock for $367.7 million in cash under its share repurchase authorization. At December 31, 2018, $1.0 million was available under the Company's Board of Directors authorization for future share repurchases.

On February 12, 2019, the Company's Board of Directors approved an increase of $500 million in the authorization for the repurchase of the Company's common stock. In 2019, the Company repurchased approximately 133,000 shares of its common stock for $11.9 million in cash under its share repurchase authorization. At December 31, 2019, $489.1 million was available under the Company's Board of Directors authorization for future share repurchases.

At December 31, 2019, the Company held 36,500,908 shares in its treasury at a cost of $1,574.5 million, compared with 36,534,802 shares at a cost of $1,570.2 million at December 31, 2018. The number of shares outstanding at December 31, 2019 was 229.1 million shares, compared with 227.1 million shares at December 31, 2018.

Subsequent Event

Effective February 12, 2020, the Company's Board of Directors approved a 29% increase in the quarterly cash dividend on the Company's common stock to $0.18 per common share from $0.14 per common share.

AMETEK, Inc.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)

18. Quarterly Financial Data (Unaudited)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total Year
	(In thousands, except per share amounts)				
2019					
Net sales	**$1,287,691**	**$1,289,412**	**$1,276,633**	**$1,304,821**	**$5,158,557**
Operating income	**$ 283,259**	**$ 295,410**	**$ 301,056**	**$ 297,655**	**$1,177,380**
Net income	**$ 204,268**	**$ 215,503**	**$ 220,749**	**$ 220,777**	**$ 861,297**
Basic earnings per share[2]	**$ 0.90**	**$ 0.95**	**$ 0.97**	**$ 0.97**	**$ 3.78**
Diluted earnings per share[2]	**$ 0.89**	**$ 0.94**	**$ 0.96**	**$ 0.96**	**$ 3.75**
Dividends paid per share	**$ 0.14**	**$ 0.14**	**$ 0.14**	**$ 0.14**	**$ 0.56**
2018					
Net sales	$1,172,647	$1,208,935	$1,192,962	$1,271,328	$4,845,872
Operating income	$ 258,168	$ 270,086	$ 265,266	$ 282,020	$1,075,540
Net income[1]	$ 181,340	$ 193,860	$ 191,213	$ 211,520	$ 777,933
Basic earnings per share[1][2]	$ 0.79	$ 0.84	$ 0.83	$ 0.92	$ 3.37
Diluted earnings per share[1][2]	$ 0.78	$ 0.83	$ 0.82	$ 0.91	$ 3.34
Dividends paid per share	$ 0.14	$ 0.14	$ 0.14	$ 0.14	$ 0.56

(1) During 2018, the Company recorded a net benefit of $11.8 million in the consolidated statement of income as a component of Provision for income taxes related to the Tax Act. The net benefit related to the Tax Act had the effect of increasing net income for 2018 by $11.8 million.

(2) The sum of quarterly earnings per share may not equal total year earnings per share due to rounding of earnings per share amounts, and differences in weighted average shares and equivalent shares outstanding for each of the periods presented.

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

None.

Item 9A. Controls and Procedures

Disclosure Controls and Procedures

The Company maintains a system of disclosure controls and procedures that is designed to provide reasonable assurance that information, which is required to be disclosed, is accumulated and communicated to management in a timely manner. Under the supervision and with the participation of our management, including the Company's principal executive officer and principal financial officer, we have evaluated the effectiveness of our system of disclosure controls and procedures as required by Exchange Act Rule 13a-15(b) as of December 31, 2019. Based on that evaluation, the Company's principal executive officer and principal financial officer concluded that the Company's disclosure controls and procedures are effective at the reasonable assurance level.

Such evaluation did not identify any change in the Company's internal control over financial reporting during the quarter ended December 31, 2019 that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting.

Internal Control over Financial Reporting

Management's report on the Company's internal controls over financial reporting is included in Part II, Item 8 of this Annual Report on Form 10-K. The report of the independent registered public accounting firm with respect to the effectiveness of internal control over financial reporting is included in Part II, Item 8 of this Annual Report on Form 10-K.

Item 9B. Other Information

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

a) Directors of the Registrant.

Information with respect to Directors of the Company is set forth under the heading "Election of Directors" in the Company's Proxy Statement for the 2020 Annual Meeting of Stockholders and is incorporated herein by reference.

b) Executive Officers of the Registrant.

Information with respect to executive officers of the Company is set forth under the heading "Executive Officers" in the Company's Proxy Statement for the 2020 Annual Meeting of Stockholders and is incorporated herein by reference.

c) Section 16(a) Compliance.

Information concerning compliance with Section 16(a) of the Securities Exchange Act of 1934 is set forth under the heading "Compliance with Section 16(a) of the Securities Exchange Act of 1934" in the Company's Proxy Statement for the 2020 Annual Meeting of Stockholders and is incorporated herein by reference.

d) Identification of the Audit Committee.

Information concerning the audit committee of the Company is set forth under the heading “Committees of the Board” in the Company’s Proxy Statement for the 2020 Annual Meeting of Stockholders and is incorporated herein by reference.

e) Audit Committee Financial Experts.

Information concerning the audit committee financial experts of the Company is set forth under the heading “Committees of the Board” in the Company’s Proxy Statement for the 2020 Annual Meeting of Stockholders and is incorporated herein by reference.

f) Corporate Governance/Nominating Committee.

Information concerning any material changes to the way in which security holders may recommend nominees to the Company’s Board of Directors is set forth under the heading “Corporate Governance” in the Company’s Proxy Statement for the 2020 Annual Meeting of Stockholders and is incorporated herein by reference.

g) Code of Ethics for Chief Executive Officer and Senior Financial Officers.

The Company has adopted a Code of Ethics for the principal executive officer, principal financial officer and principal accounting officer, which may be found on the Company’s website at www.ametek.com. Any amendments to the Code of Ethics or any grant of a waiver from the provisions of the Code of Ethics requiring disclosure under applicable U.S. Securities and Exchange Commission rules will be disclosed on the Company’s website.

Item 11. Executive Compensation

Information regarding executive compensation, including the “Compensation Discussion and Analysis,” the “Report of the Compensation Committee,” “Compensation Tables” and “Potential Payments Upon Termination or Change of Control” is set forth under the heading “Executive Compensation” in the Company’s Proxy Statement for the 2020 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

Information regarding security ownership of certain beneficial owners and management appearing under “Stock Ownership of Executive Officers and Directors” and “Beneficial Ownership of Principal Stockholders” in the Company’s Proxy Statement for the 2020 Annual Meeting of Stockholders is incorporated herein by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence

Information appearing under “Certain Relationships and Related Transactions” and “Independence” in the Company’s Proxy Statement for the 2020 Annual Meeting of Stockholders is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services

Information appearing under “Ratification of Appointment of Independent Registered Public Accounting Firm” in the Company’s Proxy Statement for the 2020 Annual Meeting of Stockholders is incorporated herein by reference.

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PART IV

Item 15. Exhibits and Financial Statement Schedules

(a)(1) Financial Statements:

Financial statements are shown in the Index to Financial Statements included in Part II, Item 8 of this Annual Report on Form10-K.

(a)(2) Financial Statement Schedules:

Financial statement schedules have been omitted because either they are not applicable or the required information is included in the financial statements or the notes thereto.

(a)(3) Exhibits:

Exhibit Number	Description	Incorporated Herein by Reference to
3.1	Conformed Copy of Amended and Restated Certificate of Incorporation of AMETEK, Inc. as amended to and including May 9, 2019.	Exhibit 3.1 to Form 8-K, dated May 13, 2019, SEC File No. 1-12981.
3.2	By-Laws of AMETEK, Inc. as amended to and including May 9, 2019.	Exhibit 3.2 to 2019 Form 10-K, SEC File No. 1-12981.
4.1†	AMETEK, Inc. 2007 Omnibus Incentive Compensation Plan, dated as of April 24, 2007 (the "2007 Plan").	Exhibit 4 to Form S-8 dated May 10, 2007, SEC File No. 1-12981.
4.2†	Amendment No. 1 to the 2007 Plan.	Exhibit 4.3 to 2012 Form 10-K, SEC File No. 1-12981.
4.3†	AMETEK, Inc. 2011 Omnibus Incentive Compensation Plan, dated as of May 3, 2011 (the "2011 Plan").	Exhibit 4 to Form S-8 dated May 6, 2011, SEC File No. 1-12981.
4.4†	Amendment No. 1 to the 2011 Plan.	Exhibit 4.5 to 2012 Form 10-K, SEC File No. 1-12981.
10.1†	AMETEK, Inc. Retirement Plan for Directors, amended and restated effective January 1, 2005.	Exhibit 10.4 to Form 10-Q dated September 30, 2007, SEC File No. 1-12981.
10.2†	AMETEK, Inc. Director's Deferred Compensation Plan, amended and restated as of October 1, 2018.	Exhibit 10.1 to Form 10-Q dated September 30, 2018, SEC File No. 1-12981.
10.3†	AMETEK, Inc. Deferred Compensation Plan, amended and restated as of June 15, 2018.	Exhibit 10.1 to Form 10-Q dated June 30, 2018, SEC File No. 1-12981.
10.5†	AMETEK, Inc. 2004 Executive Death Benefit Plan, amended and restated effective January 1, 2017.	Exhibit 10.5 to 2016 Form 10-K, SEC File No. 1-12981.
10.6†	AMETEK, Inc. Directors' Death Benefit Plan, effective January 1, 2005.	Exhibit 10.3 to Form 10-Q dated September 30, 2007, SEC File No. 1-12981.
10.7†	Form of Executive Change of Control Separation Agreement between AMETEK, Inc. and a named executive.	Exhibit 10.7 to Form 10-Q dated September 30, 2007, SEC File No. 1-12981.

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Exhibit Number	Description	Incorporated Herein by Reference to
10.8†	Termination and Change of Control Agreement between AMETEK, Inc. and a named executive, dated May 8, 2017.	Exhibit 10.1 to Form 10-Q dated March 31, 2017, SEC File No. 1-12981.
10.9†	AMETEK, Inc. Retirement and Savings Plan, amended and restated as of September 4, 2018.	Exhibit 10.2 to Form 10-Q dated September 30, 2018, SEC File No. 1-12981.
10.10†	AMETEK, Inc. Supplemental Executive Retirement Plan, amended and restated as of October 1, 2018.	Exhibit 10.3 to Form 10-Q dated September 30, 2018, SEC File No. 1-12981.
10.11†	Form of Performance Restricted Stock Unit Agreement for Chief Executive Officer.	Exhibit 10.1 to Form 10-Q dated March 31, 2018, SEC File No. 1-12981.
10.12†	Form of Performance Restricted Stock Unit Agreement.	Exhibit 10.2 to Form 10-Q dated March 31, 2018, SEC File No. 1-12981.
10.13†	AMETEK, Inc. 2011 Omnibus Incentive Compensation Plan, Form of Restricted Stock Agreement for non-employee Directors.	Exhibit 10.1 to Form 8-K dated May 8, 2018, SEC File No. 1-12981.
10.14†	AMETEK, Inc. 2011 Omnibus Incentive Compensation Plan, Form of Restricted Stock Agreement for Chief Executive Officer.	Exhibit 10.2 to Form 8-K dated May 8, 2018, SEC File No. 1-12981.
10.15†	AMETEK, Inc. 2011 Omnibus Incentive Compensation Plan, Form of Restricted Stock Agreement for Employees.	Exhibit 10.3 to Form 8-K dated May 8, 2018, SEC File No. 1-12981.
10.16†	AMETEK, Inc. 2011 Omnibus Incentive Compensation Plan, Form of Global Non-Qualified Stock Option Agreement for Employees.	Exhibit 10.4 to Form 8-K dated May 8, 2018, SEC File No. 1-12981.
10.17	Amended and Restated Credit Agreement as of September 22, 2011, as amended and restated as of March 10, 2016, and as further amended and restated as of October 30, 2018, among AMETEK, Inc., the Foreign Subsidiary Borrowers Party Hereto, the Lenders Party Hereto, JPMorgan Chase Bank, N.A., as Administrative Agent, Bank of America, N.A., PNC Bank, National Association, SunTrust Bank and Wells Fargo Bank, National Association, as Co-Syndication Agents, and U.S. Bank National Association, Mizuho Bank (USA), BNP Paribas, National Westminster Bank Plc and Commerzbank AG, New York Branch, as Co-Documentation Agents.	Exhibit 10.4 to Form 10-Q dated September 30, 2018, SEC File No. 1-12981.
10.18	AMETEK, Inc. Note Purchase Agreement, as of August 30, 2007.	Exhibit 10.1 to Form 8-K dated September 5, 2007, SEC File No. 1-12981.
10.19	Amendment No. 1 to Note Purchase Agreement, as of August 30, 2007.	Exhibit 10.1 to Form 10-Q dated September 30, 2014, SEC File No. 1-12981.

Exhibit Number	Description	Incorporated Herein by Reference to
10.20	Amendment No. 2 to Note Purchase Agreement, as of August 30, 2007.	Exhibit 10.2 to Form 10-Q dated September 30, 2016, SEC File No. 1-12981.
10.24	AMETEK, Inc. Note Purchase Agreement, as of September 30, 2014.	Exhibit 10.1 to Form 8-K dated October 2, 2014, SEC File No. 1-12981.
10.25	Amendment No. 1 to Note Purchase Agreement, as of September 30, 2014.	Exhibit 10.1 to Form 10-Q dated September 30, 2016, SEC File No. 1-12981.
10.26	AMETEK, Inc. Note Purchase Agreement, as of October 31, 2016.	Exhibit 10.1 to Form 8-K dated November 2, 2016, SEC File No. 1-12981.
10.27	AMETEK, Inc. 2018 Note Purchase Agreement, dated as of December 13, 2018.	Exhibit 10.1 to Form 8-K dated December 13, 2018, SEC File No. 1-12981.
21*	Subsidiaries of the Registrant.	
23*	Consent of Independent Registered Public Accounting Firm.	
31.1*	Certification of Chief Executive Officer, Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.	
31.2*	Certification of Chief Financial Officer, Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.	
32.1*	Certification of Chief Executive Officer, Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.	
32.2*	Certification of Chief Financial Officer, Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.	
101.INS*	XBRL Instance Document.	
101.SCH*	XBRL Taxonomy Extension Schema Document.	
101.CAL*	XBRL Taxonomy Extension Calculation Linkbase Document.	
101.DEF*	XBRL Taxonomy Extension Definition Linkbase Document.	
101.LAB*	XBRL Taxonomy Extension Label Linkbase Document.	
101.PRE*	XBRL Taxonomy Extension Presentation Linkbase Document.	

† Management contract or compensatory plan required to be filed pursuant to Item 601 of RegulationS-K.
* Filed electronically herewith.

Item 16. Form 10-K Summary

None.

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SIGNATURES

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

AMETEK, Inc.

By: /s/ David A. Zapico
David A. Zapico
Chief Executive Officer

Date: February 20, 2020

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/ David A. Zapico David A. Zapico	Chairman of the Board of Directors and Chief Executive Officer (Principal Executive Officer)	February 20, 2020
/s/ William J. Burke William J. Burke	Executive Vice President – Chief Financial Officer (Principal Financial Officer)	February 20, 2020
/s/ Thomas M. Montgomery Thomas M. Montgomery	Senior Vice President – Comptroller (Principal Accounting Officer)	February 20, 2020
/s/ Thomas A. Amato Thomas A. Amato	Director	February 20, 2020
/s/ TOD E. CARPENTER Tod E. Carpenter	Director	February 20, 2020
/s/ Ruby R. Chandy Ruby R. Chandy	Director	February 20, 2020
/s/ Anthony J. Conti Anthony J. Conti	Director	February 20, 2020
/s/ Steven W. Kohlhagen Steven W. Kohlhagen	Director	February 20, 2020
/s/ Gretchen W. McClain Gretchen W. McClain	Director	February 20, 2020
/s/ Elizabeth R. Varet Elizabeth R. Varet	Director	February 20, 2020
/s/ Dennis K. Williams Dennis K. Williams	Director	February 20, 2020

Exhibit 3.2

By-Laws

OF

AMETEK, Inc.

(As amended to and including May 9, 2019)

AMETEK, INC.

BY-LAWS

(As amended to and including May 9, 2019)

STOCKHOLDERS' MEETINGS

1. Time and Place of Meetings. All meetings of the stockholders for the election of Directors or for any other purpose will be held at such time and place, within or without the State of Delaware, as may be designated by the Board or, in the absence of a designation by the Board, the Chairman, the President, or the Corporate Secretary, and stated in the notice of meeting. The Board may postpone and reschedule any previously scheduled annual or special meeting of the stockholders.

2. Annual Meeting. An annual meeting of the stockholders will be held at such date and time as may be designated from time to time by the Board, at which meeting the stockholders will elect in accordance with the Certificate of Incorporation the Directors to succeed those whose terms expire at such meeting and will transact such other business as may properly be brought before the meeting in accordance with By-Law 8.

3. Special Meetings. (a) Special meetings of the stockholders may be called only (i) by the Chairman, (ii) by the Corporate Secretary within 10 calendar days after receipt of the written request of a majority of the Whole Board, and (iii) by the Corporate Secretary upon the written request to the Corporate Secretary (a "Special Meeting Request") made in accordance with these By-Laws by holders of record, who hold a "net long position" (as defined below), of not less than fifty percent (50%) of the then outstanding Voting Stock of the Company (the "Requisite Percent"). Any such request by a majority of the Whole Board must be sent to the Chairman and the Corporate Secretary and must state the purpose or purposes of the proposed meeting. Special meetings of holders of the outstanding Preferred Stock, if any, may be called in the manner and for the purposes provided in the applicable Preferred Stock Designation. At a special meeting of stockholders, only such business may be conducted or considered as (i) has been specified in the notice of the meeting (or any supplement thereto) given by or at the direction of the Chairman or the Corporate Secretary or (ii) otherwise is properly brought before the meeting by the presiding officer of the meeting (as described in By-Law 8) or by or at the direction of a majority of the Whole Board.

(b) In order for a special meeting upon stockholder request (a "Stockholder Requested Special Meeting") to be called in accordance with By-Law 3(a) above, one or more Special Meeting Requests stating the purpose or purposes of the special meeting and the matters proposed to be acted upon thereat must be signed and dated by the Requisite Percent of record holders of Common Stock (or their duly authorized agents), must be delivered to the Corporate Secretary and accompanied by the information, representations and agreements required by By-Law 8, as applicable, as to any business proposed to be conducted and any nominations proposed to be presented at such special meeting and as to the stockholder(s) requesting the special meeting (including the beneficial owners on whose behalf the request is made). Only business within the purpose or purposes described in the Special Meeting Request may be conducted at a

Stockholder Requested Special Meeting; provided, however, that nothing herein shall prohibit the Board of Directors from submitting matters to the stockholders at any Stockholder Requested Special Meeting. Upon receipt by the Corporate Secretary of the Special Meeting Request, the Board of Directors shall fix the date of the Stockholder Requested Special Meeting which shall be held at such day and hour as the Board of Directors may fix, but not more than 90 days after the receipt of the Special Meeting Request (provided that such request complies with all applicable provisions of these By-Laws), and due notice is given thereof in accordance with By-Law 4.

(c) In determining whether a special meeting of stockholders has been requested by the record holders of shares representing in the aggregate at least the Requisite Percent, multiple Special Meeting Requests delivered to the Corporate Secretary will be considered together only if each such Special Meeting Request (i) identifies substantially the same purpose or purposes of the special meeting and substantially the same matters proposed to be acted on at the special meeting, as determined in good faith by the Board of Directors, and (ii) has been dated and delivered to the Corporate Secretary within sixty (60) days of the earliest dated Special Meeting Request. Any requesting stockholder may revoke his, her or its Special Meeting Request at any time by written revocation delivered to the Corporate Secretary at the principal executive offices of the Company. Any disposition (including any reduction in “net long position”) by a requesting stockholder after the date of the Special Meeting Request of any shares of Common Stock of the Company (or of beneficial ownership of such shares by the beneficial owner on whose behalf the request was made) shall be deemed a revocation of the Special Meeting Request with respect to such shares, and each requesting stockholder and the applicable beneficial owner shall certify to the Corporate Secretary on the day prior to the Stockholder Requested Special Meeting as to whether any such disposition has occurred. If the unrevoked valid Special Meeting Requests represent in the aggregate less than the Requisite Percent, the Board of Directors, in its discretion, may cancel the Stockholder Requested Special Meeting. If none of the stockholders who submitted the Special Meeting Requests appears or sends a duly authorized agent to present the matters to be presented for consideration that were specified in the Special Meeting Request, the Company need not present such matters for vote at such meeting, notwithstanding that proxies in respect of such matter may have been received by the Company.

(d) Notwithstanding the foregoing, a Stockholder Requested Special Meeting shall not be held if: (i) the Special Meeting Request does not comply with these By-Laws; (ii) the Special Meeting Request relates to an item of business that is not a proper subject for stockholder action under applicable law; (iii) the Special Meeting Request is received by the Company during the period commencing 90 days prior to the first anniversary of the date of the immediately preceding annual meeting of stockholders and ending on the date of the next annual meeting; (iv) an identical or substantially similar item (a “Similar Item”), as determined in good faith by the Board of Directors (and for the purposes of this clause (iv), the election of directors shall be deemed a “Similar Item” with respect to all items of business involving the election or removal of directors), was presented at a meeting of stockholders held not more than 120 days before the Special Meeting Request is received by the Corporate Secretary; (v) the Chairman or the Corporate Secretary has called or calls for an annual or special meeting of stockholders to be held within 90 days after the Special Meeting Request is received by the Corporate Secretary and the business to be conducted at such meeting is a Similar Item, as determined in good faith by the Board of Directors; or (vi) such Special Meeting Request was made in a manner that involved a violation of the proxy rules of the Securities and Exchange Commission or other applicable law. The Board of Directors shall determine whether all of the requirements set forth in these By-Laws have been satisfied and such determination shall be binding upon the Company and its stockholders.

(e) “Net long position” shall be determined with respect to each stockholder requesting a special meeting and each beneficial owner who is directing a stockholder to act on such owner’s behalf (each stockholder and owner, a “party”) in accordance with the definition thereof set forth in Rule 14e-4 under the Exchange Act (as defined herein), as amended from time to time, provided that (x) for purposes of such definition, in determining such party’s “short position,” the reference in Rule 14e-4 to “the date that a tender offer is first publicly announced or otherwise made known by the bidder to holders of the security to be acquired” shall be the record date fixed to determine the stockholders entitled to deliver a written request for a special meeting, and the reference to the “highest tender offer price or stated amount of the consideration offered for the subject security” shall refer to the closing sales price of the Company’s Common Stock on the New York Stock Exchange (or such other securities exchange designated by the Board of Directors if the Common Stock is not listed for trading on the New York Stock Exchange) on such record date (or, if such date is not a trading day, the next succeeding trading day) and (y) the net long position of such party shall be reduced by the number of shares as to which the Board of Directors determines that such party does not, or will not, have the right to vote or direct the vote at the special meeting or as to which the Board of Directors determines that such party has entered into any derivative or other agreement, arrangement or understanding that hedges or transfers, in whole or in part, directly or indirectly, any of the economic consequences of ownership of such shares.

4. Notice of Meetings. Written notice of every meeting of the stockholders, stating the place, date, and hour of the meeting and, in the case of a special meeting, the purpose or purposes for which the meeting is called, will be given not less than 10 nor more than 60 calendar days before the date of the meeting to each stockholder of record entitled to notice of such meeting, except as otherwise provided herein or by law. When a meeting is adjourned to another place, date, or time, written notice need not be given of the adjourned meeting if the place, date, and time thereof are announced at the meeting at which the adjournment is taken; provided, however, that if the adjournment is for more than 30 calendar days, or if after the adjournment a new record date is fixed for determining the stockholders entitled to vote at the adjourned meeting, written notice of the place, date, and time of the adjourned meeting must be given to each stockholder entitled to vote at the adjourned meeting in conformity herewith. If, after the adjournment, the Board of Directors fixes a new record date for determining stockholders entitled to vote at the adjourned meeting, the Board of Directors shall fix a new record date for notice of such adjourned meeting in accordance with By-Law 32 and shall give notice of the adjourned meeting to each stockholder of record entitled to vote at such adjourned meeting as of the record date fixed for notice of such adjourned meeting. At any adjourned meeting, any business may be transacted which properly could have been transacted at the original meeting.

5. Inspectors. The Board may appoint one or more inspectors of election to act as judges of the voting and to determine those entitled to vote at any meeting of the stockholders, or any adjournment thereof, in advance of such meeting. The Board may designate one or more persons as alternate inspectors to replace any inspector who fails to act. If no inspector or alternate is able to act at a meeting of stockholders, the presiding officer of the meeting may appoint one or more substitute inspectors.

6. Quorum. Except as otherwise provided by law or in a Preferred Stock Designation, the holders of a majority of the stock issued and outstanding and entitled to vote thereat, present in person or represented by proxy, will constitute a quorum at all meetings of the stockholders for the transaction of business thereat. If, however, such quorum is not present or represented at any meeting of the stockholders, the stockholders entitled to vote thereat, present in person or represented by proxy, will have the power to adjourn the meeting from time to time, without notice other than announcement at the meeting, until a quorum is present or represented. Whether or not there is a quorum present, the officer presiding over the meeting will have the power to adjourn the meeting from time to time, without notice other than announcement at the meeting, and without a vote of stockholders, whether or not there is a quorum present.

7. Voting. Except as otherwise provided by law, by the Certificate of Incorporation, or in a Preferred Stock Designation, each stockholder will be entitled at every meeting of the stockholders to one vote for each share of stock having voting power standing in the name of such stockholder on the books of the Company on the record date for voting at the meeting and such votes may be cast either in person or by written proxy. Every proxy must be duly executed and filed with the Corporate Secretary. A stockholder may revoke any proxy that is not irrevocable by attending the meeting and voting in person or by filing an instrument in writing revoking the proxy or another duly executed proxy bearing a later date with the Corporate Secretary. The vote upon any question brought before a meeting of the stockholders may be by voice vote, unless otherwise required by the Certificate of Incorporation or these By-Laws or unless the Chairman or the holders of a majority of the outstanding shares of all classes of stock entitled to vote thereon present in person or by proxy at such meeting otherwise determine. Every vote taken by written ballot will be counted by the inspectors of election. When a quorum is present at any meeting, the affirmative vote of the holders of a majority of the stock present in person or represented by proxy at the meeting and entitled to vote on the subject matter and which has actually been voted will be the act of the stockholders, except in the election of Directors or as otherwise provided in these By-Laws, the Certificate of Incorporation, a Preferred Stock Designation, or by law.

8. Order of Business. (a) The Chairman, or any officer of the Company designated by a majority of the Whole Board, will call meetings of the stockholders to order and will act as presiding officer thereof. Unless otherwise determined by the Board prior to the meeting, the presiding officer of the meeting of the stockholders will also determine the order of business and have the authority in his or her sole discretion to regulate the conduct of any such meeting, including without limitation by imposing restrictions on the persons (other than stockholders of the Company or their duly appointed proxies) who may attend any such stockholders' meeting, by ascertaining whether any stockholder or his proxy may be excluded from any meeting of the stockholders based upon any determination by the presiding officer, in his or her sole discretion, that any such person has unduly disrupted or is likely to disrupt the proceedings thereat, by determining the circumstances in which any person may make a statement or ask questions at any meeting of the stockholders, and by having the power and authority to adjourn the meeting without a vote of stockholders, whether or not there is a quorum present, provided that any Stockholder Requested Special Meeting may not be adjourned for more than 30 days without the consent of the requesting stockholders.

(b) At an annual meeting of the stockholders, only such business will be conducted or considered as is properly brought before the meeting. To be properly brought before an annual meeting, business must be (i) specified in the notice of meeting (or any supplement thereto) given by or at the direction of the Board, (ii) otherwise properly brought before the meeting by the presiding officer or by or at the direction of a majority of the Whole Board, or (iii) otherwise properly brought before the meeting by a stockholder of the Company who (1) was a stockholder of record of the Company (and, with respect to any beneficial owner, if different, on whose behalf such business is proposed, only if such beneficial owner was the beneficial owner of shares of the Company) both at the time the notice provided for in paragraph (c) of this By-Law 8 is delivered to the Corporate Secretary and on the record dates for determination of stockholders entitled to notice of and to vote at the meeting, (2) is entitled to vote at the meeting upon such proposal of business, and (3) complies with the notice procedures set forth in paragraph (c) of this By-Law 8. Except for proposals to be made in accordance with Rule14a-8 of the Securities Exchange Act of 1934, as amended, and the rules and regulations thereunder (as so amended and inclusive of such rules and regulations, the "Exchange Act"), and included in the notice of meeting given by or at the direction of the Board, the foregoing clause (iii) shall be the exclusive means for a stockholder to propose business to be brought before an annual meeting of stockholders. In addition for business to be properly brought before an annual meeting by a stockholder, such business must be a proper matter for stockholder action pursuant to the Certificate of Incorporation, these By-Laws, and applicable law.

(c)(1) For business to be properly brought before an annual meeting by a stockholder pursuant to clause (iii) of paragraph (b) of thisBy-Law 8, the stockholder (A) must have given timely notice thereof in writing and in proper form to the Corporate Secretary at the principal executive offices of the Company, and (B) must provide any updates or supplements to such notice at such times and in the forms required by paragraph (f) of this By-Law 8. To be timely, a stockholder's notice relating to an annual meeting shall be delivered to, or mailed to and received by, the Corporate Secretary at the principal executive offices of the Company not later than the close of business on the ninetieth (90th) day and not earlier than the close of business on the one hundred twentieth (120th) day before the date of the one-year anniversary of the immediately preceding year's annual meeting (provided, however, that if the date of the annual meeting is more than thirty (30) days before or more than thirty (30) days after such anniversary date, notice by the stockholder must be so delivered, or mailed and received, not earlier than the close of business on the one hundred twentieth (120th) day before such annual meeting and not later than the close of business on the later of the ninetieth (90th) day before such annual meeting or the tenth (10th) day following the day on which public announcement (as defined in paragraph (e) of this By-Law 8) of the date of such meeting is first made by the Company). In no event shall the public announcement of an adjournment or postponement of an annual meeting of stockholders commence a new time period (or extend any time period) for the giving of a stockholder's notice as described above.

(c)(2) To be in proper form for purposes of thisBy-Law 8, a stockholder's notice to the Corporate Secretary must set forth:

(i) as to each Proposing Person (as defined in paragraph (e) of thisBy-Law 8), (x) the name and address of such Proposing Person (including, if applicable, the name and address that appear on the Company's books and records), and (y) the class or series and number of shares of capital stock of the Company that are, directly or indirectly, owned of record or beneficially owned (within the meaning of Rule 13d-3 under the Exchange Act) by such

Proposing Person (provided that such Proposing Person shall in all events be deemed to beneficially own any shares of any class or series and number of shares of capital stock of the Company as to which such Proposing Person has a right to acquire beneficial ownership at any time in the future);

(ii) as to each Proposing Person, all other related ownership interests, including, but not limited to, derivatives, hedged positions, synthetic and temporary ownership positions, swaps, securities loans, timed purchases, and other economic and voting interests directly or indirectly owned of record or beneficially;

(iii) (w) a reasonably brief description of the business desired to be brought before the meeting, (x) the text of the proposal or business (including the text of any resolutions proposed for consideration and if such business includes a proposal to amend the By-Laws of the Company, the language of the proposed amendment), (y) the reasons for conducting such business at the meeting, and (z) any material interest in such business of each Proposing Person;

(iv) a representation that the stockholder giving the notice is a holder of record of stock of the Company entitled to vote at such meeting and intends to appear in person or by proxy at the meeting to propose such business; and

(v) a representation whether any Proposing Person intends or is part of a group that intends (x) to deliver a proxy statement and/or form of proxy to holders of at least the percentage of the Company's outstanding capital stock required to approve or adopt the proposal or elect the nominee, and/or (y) otherwise to solicit proxies from stockholders in support of such proposal or nomination.

(c)(3) Only such business shall be conducted at an annual meeting of stockholders as shall have been brought before the meeting in accordance with the procedures set forth in this paragraph (c) of this By-Law 8. Except as otherwise provided by law, the presiding officer of an annual meeting of stockholders shall have the power and duty (x) if the facts warrant, to determine that any business proposed to be brought before the annual meeting was not proposed in accordance with the procedures set forth in this paragraph (c) of this By-Law 8, and (y) if any proposed business was not proposed in compliance with this paragraph (c) of this By-Law 8, to declare that such proposed business shall not be transacted.

(d) Only such business shall be conducted at a special meeting of stockholders as shall have been brought before the meeting (i) by or at the direction of the Whole Board or (ii) in accordance with the procedures set forth in By-Law 3.

(e) For purposes of this By-Law 8, (i) "public announcement" shall mean disclosure in a press release reported by the Dow Jones News Service, Associated Press, or comparable national news service or in a document publicly filed by the Corporation with the Securities and Exchange Commission pursuant to Section 13, 14, or 15(d) of the Exchange Act, and (ii) "Proposing Person" shall mean (A) the stockholder giving the notice required by paragraph (c) of this By-Law 8, (B) the beneficial owner or beneficial owners, if different, on whose behalf such notice is given, and (C) any affiliates or associates (each within the meaning of Rule 12b-2 under the Exchange Act for purposes of these Bylaws) of such stockholder or beneficial owner that are acting in concert with such beneficial owner with respect to the proposed business.

(f) A stockholder providing notice of business proposed to be brought before an annual meeting of stockholders shall further update and supplement such notice so that the information provided or required to be provided in such notice pursuant to this By-Law 8 shall be true and correct both as of the record date for the determination of stockholders entitled to notice of the meeting and as of the date that is ten (10) business days before the meeting or any adjournment or postponement thereof, and such updated and supplemental information shall be delivered to, or mailed and received by, the Corporate Secretary at the principal executive offices of the Company (a) in the case of information that is required to be updated and supplemented to be true and correct as of the record date for the determination of stockholders entitled to notice of the meeting, not later than the later of five (5) business days after such record date or five (5) business days after the public announcement of such record date, and (b) in the case of information that is required to be updated and supplemented to be true and correct as of ten (10) business days before the meeting or any adjournment or postponement thereof, not later than eight (8) business days before the meeting or any adjournment or postponement thereof (or if not practicable to provide such updated and supplemental information not later than eight (8) business days before any adjournment or postponement, on the first practicable date before any such adjournment or postponement).

(g) Notwithstanding the foregoing provisions of this By-Law 8, unless otherwise required by law, if the stockholder (or a qualified representative of the stockholder) does not appear at the annual or special meeting of stockholders of the Company to present proposed business, such proposed business shall not be transacted, notwithstanding that proxies in respect of such vote may have been received by the Company. For purposes of this By-Law 8, to be considered a qualified representative of the stockholder, a person must be authorized by a writing executed by such stockholder or an electronic transmission delivered by such stockholder to act for such stockholder as proxy at the meeting of stockholders and such person must produce such writing or electronic transmission, or a reliable reproduction of the writing or electronic transmission, at the meeting of stockholders.

(h) Paragraph (c) of By-Law 8 is expressly intended to apply to any business proposed to be brought before an annual meeting of stockholders other than any proposal made pursuant to Rule 14a-8 under the Exchange Act. Nothing in this By-Law 8 shall be deemed to (i) affect any rights of stockholders to request inclusion of proposals in the Company's proxy statement pursuant to Rule 14a-8 (or any successor thereto) promulgated under the Exchange Act, or (ii) confer upon any stockholder a right to have any proposed business included in the Company's proxy statement. Notwithstanding the foregoing provisions of this By-Law 8, a stockholder must comply with all applicable requirements of the Exchange Act with respect to the matters set forth in this By-Law 8.

DIRECTORS

9. Function. The business and affairs of the Company will be managed under the direction of its Board.

10. Number, Election, and Terms. Subject to the rights, if any, of any series of Preferred Stock to elect additional Directors under circumstances specified in a Preferred Stock Designation, the authorized number of Directors may be determined from time to time only by a vote of a majority of the Whole Board, but in no case will the number of Directors be other than as provided in the Certificate of Incorporation. The Directors, other than those who may be elected by the holders of any series of the Preferred Stock, will be classified with respect to the time for which they severally hold office in accordance with the Certificate of Incorporation.

11. Vacancies and Newly Created Directorships. Subject to the rights, if any, of the holders of any series of Preferred Stock to elect additional Directors under circumstances specified in a Preferred Stock Designation, newly created directorships resulting from any increase in the number of Directors and any vacancies on the Board resulting from death, resignation, disqualification, removal, or other cause will be filled solely by the affirmative vote of a majority of the remaining Directors then in office, even though less than a quorum of the Board, or by a sole remaining Director and shall not be filled by stockholders. Any Director elected in accordance with the preceding sentence will hold office for the remainder of the full term of the class of Directors in which the new directorship was created or the vacancy occurred and until such Director's successor is elected and qualified. No decrease in the number of Directors constituting the Board will shorten the term of an incumbent Director.

12. Removal. Subject to the rights, if any, of the holders of any series of Preferred Stock to elect additional Directors under circumstances specified in a Preferred Stock Designation, any Director may be removed from office by the stockholders only for cause and only in the manner provided in the Certificate of Incorporation.

13. Nominations of Directors; Election. (a) Subject to the rights, if any, of the holders of any series of Preferred Stock to elect additional Directors under circumstances specified in a Preferred Stock Designation, only persons who are nominated in accordance with the following procedures will be eligible for election as Directors of the Company.

(b) Nominations of persons for election as Directors of the Company may be made at an annual meeting of stockholders (i) by or at the direction of the Board or (ii) by any stockholder who is a stockholder of record at the time of giving of notice provided for in this By-Law 13 who (1) was a stockholder of record of the Company (and, with respect to any beneficial owner, if different, on whose behalf such business is proposed, only if such beneficial owner was the beneficial owner of shares of the Company) both at the time the notice provided for in paragraph (c) of this By-Law 13 is delivered to the Corporate Secretary and on the record date for determination of stockholders entitled to notice of and to vote at the meeting, (2) is entitled to vote at the meeting upon such election of directors, and (3) complies with the notice procedures set forth in paragraph (c) of this By-Law 13. All nominations by stockholders must be made pursuant to timely notice in proper written form to the Corporate Secretary.

(c)(1) For nominations to be properly brought before an annual meeting by a stockholder pursuant to clause (ii) of paragraph (b) of this By-Law 13, the stockholder (A) must have given timely notice thereof in writing and in proper form to the Corporate Secretary at the principal executive offices of the Company, and (B) must provide any updates or supplements to such notice at such times and in the forms required by paragraph (f) of this By-Law 13. To be timely, a stockholder's notice relating to an annual meeting shall be delivered to, or mailed to and received by, the Corporate Secretary at the principal executive offices of the Company not later than the close of business on the ninetieth (90th) day and not earlier than the close of business on the one hundred twentieth (120th) day before the date of the one-year anniversary of the immediately preceding year's annual meeting (provided, however, that if the date of the annual meeting is more than thirty (30) days before or more than thirty (30) days after such anniversary date, notice by the stockholder must be so delivered, or mailed and received, not earlier than the close of business on the one hundred twentieth (120th) day before such annual meeting and not later than the close of business on the later of the ninetieth (90th) day before such annual meeting or the tenth (10th) day following the day on which public announcement (as defined in paragraph (e) of By-Law 8) of the date of such meeting is first made by the Company). In no event shall the public announcement of an adjournment or postponement of an annual meeting of stockholders commence a new time period (or extend any time period) for the giving of a stockholder's notice as described above.

(c)(2) To be in proper written form, such stockholder's notice must set forth

(i) as to each Proposing Person (as defined in paragraph (e) ofBy-Law 8), (x) the name and address of such Proposing Person (including, if applicable, the name and address that appear on the Company's books and records), and (y) the class or series and number of shares of capital stock of the Company that are, directly or indirectly, owned of record or beneficially owned (within the meaning of Rule 13d-3 under the Exchange Act) by such Proposing Person (provided that such Proposing Person shall in all events be deemed to beneficially own any shares of any class or series and number of shares of capital stock of the Company as to which such Proposing Person has a right to acquire beneficial ownership at any time in the future);

(ii) as to each Proposing Person, all other related ownership interests, including, but not limited to, derivatives, hedged positions, synthetic and temporary ownership positions, swaps, securities loans, timed purchases, and other economic and voting interests directly or indirectly owned of record or beneficially;

(iii) (w) the name, age, business and residence address, and principal occupation or employment of each person or person nominated by the stockholder for election to the Board (each, a "nominee"), (x) all other information relating to the nominee that would be required to be disclosed about each nominee if proxies were being solicited for the election of the nominee as a director in an election contest (whether or not such proxies are or will be solicited), or that is otherwise required, in each case pursuant to and in accordance with Regulation 14A under the Exchange Act, (y) each nominee's written consent to being named in the proxy statement, if any, as a nominee and to serving as a director if elected, and (z) all information with respect to each nominee that would be required to be set forth in a stockholder's notice pursuant to this Section 13 if such nominee were a Proposing Person;

(iv) a representation that the stockholder giving the notice is a holder of record of stock of the Company entitled to vote at such meeting and intends to appear in person or by proxy at the meeting to propose such business; and

(v) a representation whether any Proposing Person intends or is part of a group that intends (x) to deliver a proxy statement and/or form of proxy to holders of at least the percentage of the Company's outstanding capital stock required to approve or adopt the proposal or elect the nominee, and/or (y) otherwise to solicit proxies from stockholders in support of such proposal or nomination.

The Company may require any proposed nominee to furnish such other information as it may reasonably require to determine (i) the eligibility of such proposed nominee to serve as a director of the Company, and (ii) whether such nominee qualifies as an “independent director” or “audit committee financial expert” under applicable law, securities exchange rule or regulation, or any publicly-disclosed corporate governance guideline or committee charter of the Company.

(c) (3) Notwithstanding anything in this paragraph (c) of this By-Law 13 to the contrary, if the number of directors to be elected to the Board at an annual meeting is increased and there is no public announcement by the Company naming all of the Board’s nominees for director or specifying the size of the increased Board at least one hundred (100) days before the first anniversary of the preceding year’s annual meeting, a stockholder’s notice required by this By-Law 13 shall also be considered timely, but only with respect to nominees for any new positions created by such increase, if it shall be delivered to, or mailed to and received by, the Corporate Secretary at the principal executive offices of the Company not later than the close of business on the tenth (10th) day following the day on which such public announcement is first made by the Company.

(c)(4) Only such persons who are nominated in accordance with the procedures set forth in this paragraph (c) of this By-Law 13 (including those persons nominated by or at the direction of the Board) shall be eligible to be elected at an annual meeting of stockholders of the Company to serve as directors. Except as otherwise provided by law, the presiding officer of an annual meeting of stockholders shall have the power and duty (x) if the facts warrant, to determine that a nomination proposed to be brought before the annual meeting was not made in accordance with the procedures set forth in this paragraph (c) of this By-Law 13, and (y) if any proposed nomination was not made in compliance with this paragraph (c) of this By-Law 13, to declare that such nomination shall be disregarded.

(d) Special Meetings of Stockholders.

(1) Nominations of persons for election to the Board may be made at a special meeting of stockholders at which directors are to be elected pursuant to the Company’s notice of meeting only (A) by or at the direction of the Board or (B) if a purpose for such meeting as stated in the Company’s notice for such meeting is the election of one or more directors, by any stockholder of the Company who (i) was a stockholder of record of the Company (and, with respect to any beneficial owner, if different, on whose behalf such nomination or nominations are made, only if such beneficial owner was the beneficial owner of shares of the Company) both at the time the notice provided for in paragraph (d) (2) of this By-Law 13 is delivered to the Corporate Secretary and on the record date for the determination of stockholders entitled to notice of and to vote at the special meeting, (ii) is entitled to vote at the meeting and upon such election, and (iii) complies with the notice procedures set forth in paragraph (d) (2) of this By-Law 13; provided, however, that a stockholder may nominate persons for election at a special meeting only to such position(s) as specified in the Company’s notice of the meeting.

(2) If a special meeting has been called in accordance with By-Law 3 for the purpose of electing one or more directors to the Board, then for nominations of persons for election to the Board to be properly brought before such special meeting by a stockholder pursuant to clause (B) of paragraph (d) (1) of this By-Law 13, the stockholder (A) must have given timely notice thereof in writing and in the proper form to the Corporate Secretary at the principal executive offices of the Company, and (B) must provide any updates or supplements to

such notice at such times and in the forms required by this By-Law 13. To be timely, a stockholder's notice relating to a special meeting shall be delivered to, or mailed to and received by, the Corporate Secretary at the principal executive offices of the Company not earlier than the close of business on the one hundred twentieth (120th) day before such special meeting and not later than the close of business on the later of the ninetieth (90th) day before such special meeting or the tenth (10th) day following the day on which public announcement is first made of the date of the special meeting and of the nominees proposed by the Board to be elected at such meeting. In no event shall the public announcement of an adjournment or postponement of a special meeting commence a new time period (or extend any time period) for the giving of a stockholder's notice as described above. To be in proper form for purposes of this paragraph (d) (2) of this By-Law 13, such notice shall set forth the information required by paragraph (c)(2) of this By-Law 13.

(3) Only such persons who are nominated in accordance with the procedures set forth in paragraph (d) of this By-Law 13 (including those persons nominated by or at the direction of the Board of Directors) shall be eligible to be elected at a special meeting of stockholders of the Company to serve as directors. Except as otherwise provided by law, the presiding officer of a special meeting of stockholders shall have the power and duty (x) if the facts warrant, to determine that a nomination proposed to be made at the special meeting was not made in accordance with the procedures set forth in this paragraph (d) of this By-Law 13, and (y) if any proposed nomination was not made in compliance with this paragraph (d) of this By-Law 13, to declare that such nomination shall be disregarded.

(e) For purposes of this By-Law 13, (i) "public announcement" shall mean disclosure in a press release reported by the Dow Jones News Service, Associated Press, or comparable national news service or in a document publicly filed by the Corporation with the Securities and Exchange Commission pursuant to Section 13, 14, or 15(d) of the Exchange Act, and (ii) "Proposing Person" shall mean (A) the stockholder giving the notice required by paragraph (c) of By-Law 13, (B) the beneficial owner or beneficial owners, if different, on whose behalf such notice is given, and (C) any affiliates or associates (each within the meaning of Rule 12b-2 under the Exchange Act for purposes of these Bylaws) of such stockholder or beneficial owner that are acting in concert with such beneficial owner with respect to the proposed nomination.

(f) A stockholder providing notice of nominations of persons for election to the Board at an annual or special meeting of stockholders to be brought before an annual meeting of stockholders shall further update and supplement such notice so that the information provided or required to be provided in such notice pursuant to this By-Law 13 shall be true and correct both as of the record date for the determination of stockholders entitled to notice of the meeting and as of the date that is ten (10) business days before the meeting or any adjournment or postponement thereof, and such updated and supplemental information shall be delivered to, or mailed and received by, the Corporate Secretary at the principal executive offices of the Company (a) in the case of information that is required to be updated and supplemented to be true and correct as of the record date for the determination of stockholders entitled to notice of the meeting, not later than the later of five (5) business days after such record date or five (5) business days after the public announcement of such record date, and (b) in the case of information that is required to be updated and supplemented to be true and correct as of ten (10) business days before the meeting or any adjournment or postponement thereof, not later than eight (8) business days before the meeting or any adjournment or postponement thereof (or if not practicable to provide such updated and supplemental information not later than eight (8) business days before any adjournment or postponement, on the first practicable date before any such adjournment or postponement).

(g) Notwithstanding the foregoing provisions of this By-Law 13, unless otherwise required by law, if the stockholder (or a qualified representative of the stockholder) does not appear at the annual or special meeting of stockholders of the Company to present a nomination, such nomination shall be disregarded, notwithstanding that proxies in respect of such nomination may have been received by the Company. For purposes of this By-Law 13, to be considered a qualified representative of the stockholder, a person must be authorized by a writing executed by such stockholder or an electronic transmission delivered by such stockholder to act for such stockholder as proxy at the meeting of stockholders and such person must produce such writing or electronic transmission, or a reliable reproduction of the writing or electronic transmission, at the meeting of stockholders.

(h) Nothing in this By-Law 13 shall be deemed to (i) confer upon any stockholder a right to have a nominee included in the Company's proxy statement, or (ii) affect any rights of the holders of any class or series of Preferred Stock to nominate and elect directors pursuant to and to the extent provided in any applicable provisions of the Certificate of Incorporation. Notwithstanding the foregoing provisions of this By-Law 13, a stockholder must comply with all applicable requirements of the Exchange Act with respect to the matters set forth in this By-Law 13.

14. Resignation. Any Director may resign at any time by giving written notice of his resignation to the Chairman or the Corporate Secretary. Any resignation will be effective upon actual receipt by any such person or, if later, as of the date and time specified in such written notice.

15. Regular Meetings. Regular meetings of the Board may be held immediately after the annual meeting of the stockholders and at such other time and place either within or without the State of Delaware as may from time to time be determined by the Board. Notice of regular meetings of the Board need not be given.

16. Special Meetings. Special meetings of the Board may be called by the Chairman or the President on one day's notice to each Director by whom such notice is not waived, given either personally or by mail, telephone, telegram, telex, facsimile, or similar medium of communication, and will be called by the Chairman or the President in like manner and on like notice on the written request of a majority of the Directors. Special meetings of the Board may be held at such time and place either within or without the State of Delaware as is determined by the Board or specified in the notice of any such meeting.

17. Quorum. At all meetings of the Board, a majority of the total number of Directors then in office will constitute a quorum for the transaction of business. Except for the designation of committees as hereinafter provided and except for actions required by these By-Laws or the Certificate of Incorporation to be taken by a majority of the Whole Board, the act of a majority of the Directors present at any meeting at which there is a quorum will be the act of the Board. If a quorum is not present at any meeting of the Board, the Directors present thereat may adjourn the meeting from time to time to another place, time, or date, without notice other than announcement at the meeting, until a quorum is present.

18. Participation in Meetings by Telephone Conference. Members of the Board or any committee designated by the Board may participate in a meeting of the Board or any such committee, as the case may be, by means of telephone conference or similar means by which all persons participating in the meeting can hear each other, and such participation in a meeting will constitute presence in person at the meeting.

19. Committees. (a) The Board, by resolution passed by a majority of the Whole Board, may designate an executive committee (the "Executive Committee") of not less than two members of the Board and that meets on an as needed basis when the Board is not in session. The Executive Committee, if one is so designated, will have and may exercise the powers of the Board, except the power to declare dividends, to amend these By-Laws, to elect officers above the office of Vice President, or to rescind or modify any prior action of the Board and except as otherwise provided by law.

(b) The Board, by resolution passed by a majority of the Whole Board, may designate one or more additional committees, each such committee to consist of one or more Directors and each to have such lawfully delegable powers and duties as the Board may confer.

(c) The Executive Committee and each other committee of the Board will serve at the pleasure of the Board or as may be specified in any resolution from time to time adopted by the Board. The Board may designate one or more Directors as alternate members of any such committee, who may replace any absent or disqualified member at any meeting of such committee. In lieu of such action by the Board, in the absence or upon the disqualification of any member of a committee of the Board, the members thereof present at any such meeting of such committee and not disqualified from voting, whether or not they constitute a quorum, may unanimously appoint another member of the Board to act at the meeting in the place of any such absent or disqualified member.

(d) Except as otherwise provided in these By-Laws or by law, any committee of the Board, to the extent provided in Paragraph (a) of this By-Law or, if applicable, in the resolution of the Board, will have and may exercise all the powers and authority of the Board in the direction of the management of the business and affairs of the Company. Any such committee designated by the Board will have such name as may be determined from time to time by resolution adopted by the Board. Unless otherwise prescribed by the Board, a majority of the members of any committee of the Board will constitute a quorum for the transaction of business, and the act of a majority of the members present at a meeting at which there is a quorum will be the act of such committee. Each committee of the Board may prescribe its own rules for calling and holding meetings and its method of procedure, subject to any rules prescribed by the Board, and will keep a written record of all actions taken by it.

20. Compensation. The Board may establish the compensation for, and reimbursement of the expenses of, Directors for membership on the Board and on committees of the Board, attendance at meetings of the Board or committees of the Board, and for other services by Directors to the Company or any of its majority-owned subsidiaries.

21. Rules. The Board may adopt rules and regulations for the conduct of their meetings and the management of the affairs of the Company.

21.1 Directors Emeritus. The Board of Directors may, from time to time, elect one or more Directors Emeritus, each of whom must be a former director of the Company. Directors Emeritus will serve at the pleasure of the Board, which may remove a Director Emeritus at any time. Directors Emeritus will serve as advisors to the Board and may be invited to attend meetings of the Board of Directors, but may not serve as advisors to, or attend meetings of, committees of the Board. Directors Emeritus may not vote on matters brought before the Board and will not be counted for the purpose of determining whether a quorum of the Board is present. Directors Emeritus will receive no fee for their services as Directors Emeritus; however, Directors Emeritus will be entitled to receive retirement and death plan benefits related to their prior service as directors or employees of the Company (provided such benefits are not contingent in any way on continued service). Directors Emeritus shall be entitled to receive reimbursement of expenses for attendance at meetings of the Board.

NOTICES

22. Generally. Except as otherwise provided by law, these By-Laws, or the Certificate of Incorporation, whenever by law or under the provisions of the Certificate of Incorporation or these By-Laws notice is required to be given to any Director or stockholder, it will not be construed to require personal notice, but such notice may be given in writing, by mail, addressed to such Director or stockholder, at the address of such Director or stockholder as it appears on the records of the Company, with postage thereon prepaid, and such notice will be deemed to be given on the business day following the day on which the same is deposited in the United States mail. Notice to Directors may also be given by telephone, telegram, telex, facsimile, or similar medium of communication or as otherwise may be permitted by these By-Laws.

23. Waivers. Whenever any notice is required to be given by law or under the provisions of the Certificate of Incorporation or theseBy-Laws, a waiver thereof in writing, signed by the person or persons entitled to such notice, whether before or after the time of the event for which notice is to be given, will be deemed equivalent to such notice. Attendance of a person at a meeting will constitute a waiver of notice of such meeting, except when the person attends a meeting for the express purpose of objecting, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened.

OFFICERS

24. Generally. The officers of the Company will be elected by the Board and will consist of a Chairman (who, unless the Board specifies otherwise, will also be the Chief Executive Officer), President, a Corporate Secretary, and a Treasurer. The Board of Directors may also choose any or all of the following: one or more Vice Presidents (who may be given particular designations with respect to authority, function, or seniority), and such other officers as the Board may from time to time determine. Notwithstanding the foregoing, by specific action the Board may authorize the Chairman to appoint any person to any office other than Chairman, President, Corporate Secretary, or Treasurer. Any number of offices may be held by the same person. Any of the offices may be left vacant from time to time as the Board may determine. In the case of the absence or disability of any officer of the Company or for any other reason deemed sufficient by a majority of the Board, the Board may delegate the absent or disabled officer's powers or duties to any other officer or to any Director.

25. Compensation. The compensation of all officers and agents of the Company who are also Directors of the Company will be fixed by the Board or by a committee of the Board. The Board may fix, or delegate the power to fix, the compensation of other officers and agents of the Company to an officer of the Company.

26. Succession. The officers of the Company will hold office at the pleasure of the Board of Directors. Any officer may be removed at any time by the affirmative vote of a majority of the Whole Board. Any vacancy occurring in any office of the Company may be filled by the Board.

27. Authority and Duties.

(a) Chairman of the Board of Directors. The Chairman of the Board of Directors, if there be one, shall preside at all meetings of the stockholders and of the Board of Directors. He shall be, unless otherwise provided by the Board of Directors, the Chief Executive Officer of the Company, and except where by law the signature of the President is required, the Chairman of the Board of Directors shall possess the same power as the President to sign all contracts, certificates and other instruments of the Company which may be authorized by the Board of Directors. During the absence or disability of the President, the Chairman of the Board of Directors shall exercise all the powers and discharge all the duties of the President. The Chairman of the Board of Directors shall also perform such other duties and may exercise such other powers as from time to time may be assigned to him by these By-Laws or by the Board of Directors.

(b) President. The President shall, subject to the control of the Board of Directors and, if there be one, the Chairman of the Board of Directors, have general supervision of the business of the Company and shall see that all orders and resolutions of the Board of Directors are carried into effect. The President shall execute all bonds, mortgages, contracts and other instruments of the Company requiring a seal, under the seal of the Company, except where required or permitted by law to be otherwise signed and executed and except that the other officers of the Company may sign and execute documents when so authorized by these By-Laws, the Board of Directors or the President. In the absence or disability of the Chairman of the Board of Directors, or if there be none, the President shall preside at all meetings of the stockholders and the Board of Directors. If there be no Chairman of the Board of Directors, the President, unless otherwise provided by the Board of Directors, shall be the Chief Executive Officer of the Company. The President shall also perform such other duties and may exercise such other powers as from time to time may be assigned to him by these By-Laws or by the Board of Directors.

(c) Vice President. At the request of the President or in his absence or in the event of his inability or refusal to act (and if there be no Chairman of the Board of Directors), the Vice President or the Vice Presidents if there is more than one (in the order designated by the Board of Directors) shall perform the duties of the President, and when so acting, shall have all the powers of and be subject to all the restrictions upon the President. Each Vice President shall perform such other duties and have such other powers as the Board of Directors from time to time may prescribe. If there be no Chairman of the Board of Directors and no Vice President, the Board of Directors shall designate the officer of the Company who, in the absence of the President or in the event of the inability or refusal of the President to act, shall perform the duties of the President, and when so acting, shall have all the powers of and be subject to all the restrictions upon the President.

(d) Corporate Secretary. The Corporate Secretary shall keep, or cause to be kept, a book of minutes in written form of the proceedings of the Board of Directors, committees of the Board and meetings of stockholders. The Corporate Secretary shall give, or cause to be given, notice of all meetings of the stockholders and special meetings of the Board of Directors, and shall perform such other duties as may be prescribed by the Board of Directors or President, under whose supervision he shall be. If the Corporate Secretary shall be unable or shall refuse to cause to be given notice of all meetings of the stockholders and special meetings of the Board of Directors, and if there be no Assistant Secretary, then either the Board of Directors or the President may choose another officer to cause such notice to be given. The Corporate Secretary shall have custody of the seal of the Company and the Corporate Secretary or any Assistant Secretary, if there be one, shall have authority to affix the same to any instrument requiring it and when so affixed, it may be attested by the signature of the Corporate Secretary or by the signature of any such Assistant Secretary. The Board of Directors may give general authority to any other officer to affix the seal of the Company and to attest the affixing by his signature. The Corporate Secretary shall see that all books, reports, statements, certificates and other documents and records required by law to be kept or filed are properly kept or filed, as the case may be.

(e) Treasurer. The Treasurer, if there be any, shall have the custody of the corporate funds and securities and shall keep full and accurate accounts of receipts and disbursements in books belonging to the Company and shall deposit all moneys and other valuable effects in the name and to the credit of the Company in such depositories as may be designated by the Board of Directors. The Treasurer shall disburse the funds of the Company as may be ordered by the Board of Directors, taking proper vouchers for such disbursements, and shall render to the President and the Board of Directors, at its regular meetings, or when the Board of Directors so requires, an account of all his or her transactions as Treasurer and of the financial condition of the Company.

(f) Comptroller. The duties of the Comptroller shall be to maintain adequate records of all assets, liabilities and transactions of the Company; to see that adequate audits thereof are currently and regularly made; and, in conjunction with other officers and department heads, to initiate and enforce measures whereby the business of this Company shall be conducted with maximum safety, efficiency and economy. He shall report to the President. The Comptroller shall be specifically charged with (i) acting as principal accounting officer in charge of all accounting records and forms of the Company; (ii) continuous auditing of all payrolls, accounts and records of the Company; (iii) general supervision of the accounting practices of the Company; (iv) obtaining from agents and from departments of the Company all reports needed to supervise the accounts of the Company and record its general operations; (v) analyzing and evaluating reports received from agents and departments of the Company; (vi) maintaining the classifications and enforcing accounting rules and regulations prescribed by regulatory bodies; (vii) compiling, preparing and filing such statements, statistics and other data as may be required by law or as may be prescribed by the President; (viii) preparing the Company’s balance sheet, income accounts and other financial statements and reports and rendering monthly and quarterly to the President a complete report covering results of the operations of the Company for the period or fiscal year to date; (ix) preparing a budget showing projected operations of the Company based on the estimates of the General Managers and other officers; (x) supervising, initiating and maintaining standard practices and procedures relating to internal control, clerical practices and office routine throughout the departments of the Company. The Comptroller shall have such other powers and duties as the Board of Directors may from time to time prescribe and as may be assigned to him by the President, but nothing herein shall restrict the right of the Comptroller to present to the Board any accounts or other material that has been presented to him by President, and the Comptroller may at any time file with each member of the Board a request for a hearing at any regular or special meeting of the Board.

(g) Assistant Secretaries. Except as may be otherwise provided in theseBy-Laws, Assistant Secretaries, if there be any, shall perform such duties and have such powers as from time to time may be assigned to them by the Board of Directors, the President, any Vice President, if there be one, or the Corporate Secretary, and in the absence of the Corporate Secretary or in the event of the Corporate Secretary's disability or refusal to act, shall perform the duties of the Corporate Secretary, and when so acting, shall have all the powers of and be subject to all the restrictions upon the Corporate Secretary.

(h) Assistant Treasurers. Assistant Treasurers, if there be any, shall perform such duties and have such powers as from time to time may be assigned to them by the Board of Directors, the President, any Vice President, if there be one, or the Treasurer, and in the absence of the Treasurer or in the event of the Treasurer's disability or refusal to act, shall perform the duties of the Treasurer, and when so acting, shall have all the powers of and be subject to all the restrictions upon the Treasurer.

(i) Assistant Comptrollers. Assistant Comptrollers, if there be any, shall perform such duties and have such powers as from time to time may be assigned to them by the Board of Directors, the President, any Vice President, if there be one, or the Comptroller, and in the absence of the Comptroller or in the event of the Comptroller's disability or refusal to act, shall perform the duties of the Comptroller, and when so acting, shall have all the powers of and be subject to all the restrictions upon the Comptroller.

(j) Other Officers. Such other officers as the Board of Directors may choose shall perform such duties and have such powers as from time to time may be assigned to them by the Board of Directors. The Board of Directors may delegate to any other officer of the Company the power to choose such other officers and to prescribe their respective duties and powers.

STOCK

28. Certificates. The shares of the Company will be represented by certificates unless the Board of Directors by resolution provides that some or all of any classes or series of stock will be uncertificated shares. Any such resolution will not apply to shares represented by a certificate until the certificate is surrendered to the Company, and any such resolution may provide that, notwithstanding the resolution's authorization of uncertificated shares, every holder of stock of the affected class or classes or series represented by certificates and upon request every holder of uncertificated shares of the affected class or classes or series will be entitled to have a certificate representing shares. Certificates representing shares of stock of the Company will be in such form as is determined by the Board, subject to applicable legal requirements. Each such certificate will be numbered and its issuance recorded in the books of the Company, and such certificate will exhibit the holder's name and the number of shares and will be signed by, or in the name of, the Company by the Chairman or Vice-Chairman or the President or Vice

President and the Corporate Secretary or an Assistant Secretary, or the Treasurer or an Assistant Treasurer, and will also be signed by, or bear the facsimile signature of, a duly authorized officer or agent of any properly designated transfer agent of the Company. Any or all of the signatures and the seal of the Company, if any, upon such certificates may be facsimiles, engraved, or printed. Such certificates may be issued and delivered notwithstanding that the person whose facsimile signature appears thereon may have ceased to be such officer at the time the certificates are issued and delivered.

29. Classes of Stock. The designations, preferences, and relative, participating, optional, or other special rights of the various classes of stock or series thereof, and the qualifications, limitations, or restrictions of such preferences and/or rights, will be set forth in full or summarized on the face or back of the certificates which the Company issues to represent its stock, or in lieu thereof, such certificates will set forth a statement that the Company will furnish such information without charge to each stockholder who requests such information. Within a reasonable time after the issuance or transfer of uncertificated stock, the Company will send to the registered owner thereof a written notice containing the information required to be set forth or stated on certificates pursuant to this section, or in lieu thereof, a statement that the Company will furnish such information without charge to each stockholder who requests such information. Except as otherwise expressly provided by law, the rights and obligations of the holders of uncertificated stock and the rights and obligations of the holders of certificates representing stock of the same class and series will be identical.

30. Transfers. Upon surrender to the Company or the transfer agent of the Company of a certificate for shares duly endorsed or accompanied by proper evidence of succession, assignment, or authority to transfer, it will be the duty of the Company to issue, or to cause its transfer agent to issue, a new certificate or, if the issuance of uncertificated shares has been duly authorized for the class or series represented by such surrendered certificate, uncertificated shares to the person entitled thereto, cancel the old certificate, and record the transaction upon its books.

31. Lost, Stolen, or Destroyed Certificates. The Corporate Secretary may direct a new certificate or certificates or, if the issuance of uncertificated shares has been duly authorized for the relevant class or series, uncertificated shares to be issued in place of any certificate theretofore issued by the Company alleged to have been lost, stolen, or destroyed, upon the making of an affidavit of that fact, satisfactory to the Corporate Secretary, by the person claiming the certificate of stock to be lost, stolen, or destroyed. As a condition precedent to the issuance of a new certificate or certificates or uncertificated shares, the Corporate Secretary may require the owners of such lost, stolen, or destroyed certificate to give the Company a bond in such sum and with such surety or sureties as the Corporate Secretary may direct as indemnity against any claims that may be made against the Company with respect to the certificate alleged to have been lost, stolen, or destroyed or the issuance of the new certificate or certificates or uncertificated shares.

32. Record Dates. (a) In order that the Company may determine the stockholders entitled to notice of any meeting of stockholders or any adjournment thereof, the Board may fix a record date, which will not be more than 60 nor less than 10 calendar days before the date of such meeting. If the Board of Directors so fixes a date, such date shall also be record date for determining the stockholders entitled to vote at such meeting, unless the Board of Directors determines that a later date on or before the date of the meeting shall be the date for making such determination. If no record date is fixed by the Board, the record date for determining stockholders entitled to notice of and to vote at a meeting of stockholders will be at the close of business on the calendar day next preceding the day on which notice is given, or, if notice is waived, at the close of business on the calendar day next preceding the day on which the meeting is held. A determination of stockholders of record entitled to notice of or to vote at a meeting of the stockholders will apply to any adjournment of the meeting; provided, however, that the Board may fix a new record date for determination of the stockholders entitled to vote at the adjourned meeting, and in such case shall also fix as the record date for stockholders entitled to notice of such adjourned meeting the same or an earlier date as that fixed for determination of stockholders entitled to vote in accordance with the foregoing provisions of this By-Law 32 at the adjourned meeting.

(b) In order that the Company may determine the stockholders entitled to receive payment of any dividend or other distribution or allotment of any rights or the stockholders entitled to exercise any rights in respect of any change, conversion, or exchange of stock, or for the purpose of any other lawful action, the Board may fix a record date, which record date will not precede the date upon which the resolution fixing the record date is adopted, and which record date will not be more than 60 calendar days prior to such action. If no record date is fixed, the record date for determining stockholders for any such purpose will be at the close of business on the calendar day on which the Board adopts the resolution relating thereto.

(c) The Company will be entitled to treat the person in whose name any share of its stock is registered as the owner thereof for all purposes, and will not be bound to recognize any equitable or other claim to, or interest in, such share on the part of any other person, whether or not the Company has notice thereof, except as expressly provided by applicable law.

INDEMNIFICATION

33. Damages and Expenses. (a) Without limiting the generality or effect of Article Ninth of the Certificate of Incorporation, the Company shall to the fullest extent permitted by applicable law as then in effect indemnify any person (an "Indemnitee") who is or was involved in any manner (including without limitation as a party or a witness) or is threatened to be made so involved in any threatened, pending, or completed investigation, claim, action, suit, or proceeding, whether civil, criminal, administrative, or investigative (including without limitation any action, suit, or proceeding by or in the right of the Company to procure a judgment in its favor) (a "Proceeding") by reason of the fact that such person is or was or had agreed to become a Director, officer, employee, or agent of the Company, or is or was serving at the request of the Board or an officer of the Company as a director, officer, employee, or agent of another corporation, partnership, joint venture, trust, or other entity, whether for profit or not for profit (including the heirs, executors, administrators, or estate of such person), or anything done or not by such person in any such capacity, against all expenses (including attorneys' fees), judgments,

fines, and amounts paid in settlement actually and reasonably incurred by such person in connection with such Proceeding. Such indemnification will be a contract right and will include the right to receive payment in advance of any expenses incurred by an Indemnitee in connection with such Proceeding, consistent with the provisions of applicable law as then in effect.

(b) The right of indemnification provided in this By-Law 33 will not be exclusive of any other rights to which any person seeking indemnification may otherwise be entitled, and will be applicable to Proceedings commenced or continuing after the adoption of this By-Law 33, whether arising from acts or omissions occurring before or after such adoption.

(c) In furtherance, but not in limitation of the foregoing provisions, the following procedures, presumptions, and remedies will apply with respect to advancement of expenses and the right to indemnification under this By-Law 33:

(i) All reasonable expenses incurred by or on behalf of an Indemnitee in connection with any Proceeding will be advanced to the Indemnitee by the Company within 30 calendar days after the receipt by the Company of a statement or statements from the Indemnitee requesting such advance or advances from time to time. Such statement or statements will reasonably evidence the expenses incurred by the Indemnitee and, if and to the extent required by law at the time of such advance, will include or be accompanied by an undertaking by or on behalf of the Indemnitee to repay such amounts advanced as to which it may ultimately be determined that the Indemnitee is not entitled. If such an undertaking is required by law at the time of an advance, no security will be required for such undertaking and such undertaking will be accepted without reference to the recipient's financial ability to make repayment.

(ii) To obtain indemnification under this By-Law 33, the Indemnitee will submit to the Corporate Secretary a written request, including such documentation supporting the claim as is reasonably available to the Indemnitee and is reasonably necessary to determine whether and to what extent the Indemnitee is entitled to indemnification (the "Supporting Documentation"). The determination of the Indemnitee's entitlement to indemnification will be made not more than 60 calendar days after receipt by the Company of the written request for indemnification together with the Supporting Documentation. The Corporate Secretary will promptly upon receipt of such a request for indemnification advise the Board in writing that the Indemnitee has requested indemnification. The Indemnitee's entitlement to indemnification under this By-Law 33 will be determined in one of the following ways: (A) by a majority vote of the Disinterested Directors (as hereinafter defined), if they constitute a quorum of the Board, or, in the case of an Indemnitee that is not a present or former director or officer of the Company, by any committee of the Board or committee of officers or agents of the Company designated for such purpose by a majority of the Whole Board; (B) by a written opinion of Independent Counsel if (1) a Change of Control has occurred and the Indemnitee so requests or (2) in the case of an Indemnitee that is a present or former director or officer of the Company, a quorum of the Board consisting of Disinterested Directors is not obtainable or, even if obtainable, a majority of such Disinterested Directors so directs; (C) by the stockholders (but only if a majority of the Disinterested Directors, if they constitute a quorum of the Board, presents the issue of entitlement to indemnification to the stockholders for their determination); or (D) as provided in subparagraph (iii) below. In the event the determination of entitlement to indemnification is to be made by Independent Counsel pursuant to clause (B) above, a majority of the Disinterested Directors will select the Independent Counsel, but only an Independent Counsel to which the Indemnitee does not reasonably object; provided, however, that if a Change of Control has occurred, the Indemnitee will select such Independent Counsel, but only an Independent Counsel to which the Board does not reasonably object.

(iii) Except as otherwise expressly provided in this By-Law 33, the Indemnitee will be presumed to be entitled to indemnification under this By-Law 33 upon submission of a request for indemnification together with the Supporting Documentation in accordance with subparagraph (c) (ii) above, and thereafter the Company will have the burden of proof to overcome that presumption in reaching a contrary determination. In any event, if the person or persons empowered under subparagraph (c) (ii) to determine entitlement to indemnification has not been appointed or has not made a determination within 60 calendar days after receipt by the Company of the request therefor together with the Supporting Documentation, the Indemnitee will be deemed to be entitled to indemnification and the Indemnitee will be entitled to such indemnification unless (A) the Indemnitee misrepresented or failed to disclose a material fact in making the request for indemnification or in the Supporting Documentation or (B) such indemnification is prohibited by law. The termination of any Proceeding described in paragraph (a) of this By-Law 33, or of any claim, issue, or matter therein, by judgment, order, settlement, or conviction, or upon a plea of nolo contendere or its equivalent, will not, of itself, adversely affect the right of the Indemnitee to indemnification or create a presumption that the Indemnitee did not act in good faith and in a manner which the Indemnitee reasonably believed to be in or not opposed to the best interests of the Company or, with respect to any criminal Proceeding, that the Indemnitee had reasonable cause to believe that his conduct was not unlawful.

(iv) (A) In the event that a determination is made pursuant to subparagraph (c) (ii) that the Indemnitee is not entitled to indemnification under this By-Law 33, (1) the Indemnitee will be entitled to seek an adjudication of his or her entitlement to such indemnification either, at the Indemnitee's sole option, in (x) an appropriate court of the State of Delaware or any other court of competent jurisdiction or (y) an arbitration to be conducted by a single arbitrator pursuant to the rules of the American Arbitration Association; (2) any such judicial proceeding or arbitration will be de novo and the Indemnitee will not be prejudiced by reason of such adverse determination; and (3) in any such judicial proceeding or arbitration the Company will have the burden of proving that the Indemnitee is not entitled to indemnification under this By-Law 33.

(B) If a determination is made or deemed to have been made, pursuant to subparagraph (c)(ii) or (iii) of thisBy-Law 33 that the Indemnitee is entitled to indemnification, the Company will be obligated to pay the amounts constituting such indemnification within five business days after such determination has been made or deemed to have been made and will be conclusively bound by such determination unless (1) the Indemnitee misrepresented or failed to disclose a material fact in making the request for indemnification or in the Supporting Documentation or (2) such indemnification is prohibited by law. In the event that advancement of expenses is not timely made pursuant to subparagraph (c)(i) of this By-Law 33 or payment of indemnification is not made within five business days after a determination of entitlement to indemnification has been made or deemed to have been made pursuant to subparagraph (c)(ii) or (iii) of this By-Law 33, the Indemnitee will be entitled to seek judicial enforcement of the Company's obligation to pay to the Indemnitee such advancement of expenses or indemnification. Notwithstanding the foregoing, the Company may bring an action, in an appropriate court in the State of Delaware or any other court of competent jurisdiction, contesting the right of the Indemnitee to receive indemnification hereunder due to the occurrence of any event described in subclause (1) or (2) of this clause (B) (a "Disqualifying Event"); provided, however, that in any such action the Company will have the burden of proving the occurrence of such Disqualifying Event.

(C) The Company will be precluded from asserting in any judicial proceeding or arbitration commenced pursuant to the provisions of this subparagraph (c)(iv) that the procedures and presumptions of this By-Law 33 are not valid, binding, and enforceable and will stipulate in any such court or before any such arbitrator that the Company is bound by all the provisions of this By-Law 33.

(D) In the event that the Indemnitee, pursuant to the provisions of this subparagraph (c)(iv), seeks a judicial adjudication of, or an award in arbitration to enforce, his rights under, or to recover damages for breach of, this By-Law 33, the Indemnitee will be entitled to recover from the Company, and will be indemnified by the Company against, any expenses actually and reasonably incurred by the Indemnitee if the Indemnitee prevails in such judicial adjudication or arbitration. If it is determined in such judicial adjudication or arbitration that the Indemnitee is entitled to receive part but not all of the indemnification or advancement of expenses sought, the expenses incurred by the Indemnitee in connection with such judicial adjudication or arbitration will be prorated accordingly.

(v) For purposes of this paragraph (c):

(A) "Change in Control" means the occurrence of any of the following events:

(1) The Company is merged, consolidated, or reorganized into or with another corporation or other legal entity, and as a result of such merger, consolidation, or reorganization less than a majority of the combined voting power of the then outstanding securities of such corporation or entity immediately after such transaction are held in the aggregate by the holders of the Voting Stock immediately prior to such transaction;

(2) The Company sells or otherwise transfers all or substantially all of its assets to another corporation or other legal entity and, as a result of such sale or transfer, less than a majority of the combined voting power of the then-outstanding securities of such other corporation or entity immediately after such sale or transfer is held in the aggregate by the holders of Voting Stock immediately prior to such sale or transfer;

(3) There is a report filed on Schedule 13D or Schedule 14D-1 (or any successor schedule, form, or report or item therein), each as promulgated pursuant to the

Securities Exchange Act of 1934, as amended (the “Exchange Act”), disclosing that any person (as the term “person” is used in Section 13(d)(3) or Section 14(d)(2) of the Exchange Act) has become the beneficial owner (as the term “beneficial owner” is defined under Rule 13d-3 or any successor rule or regulation promulgated under the Exchange Act) of securities representing 20% or more of the combined voting power of the Voting Stock;

(4) The Company files a report or proxy statement with the Securities and Exchange Commission pursuant to the Exchange Act disclosing in response to Form 8-K or Schedule 14A (or any successor schedule, form, or report or item therein) that a change in control of the Company has occurred or will occur in the future pursuant to any then-existing contract or transaction; or

(5) If, during any period of two consecutive years, individuals who at the beginning of any such period constitute the Directors cease for any reason to constitute at least a majority thereof; provided, however, that for purposes of this clause (5) each Director who is first elected, or first nominated for election by the Company’s stockholders, by a vote of at least two-thirds of the Directors (or a committee of the Board) then still in office who were Directors at the beginning of any such period will be deemed to have been a Director at the beginning of such period.

Notwithstanding the foregoing provisions of clauses (3) or (4) of this paragraph (c)(v)(A), unless otherwise determined in a specific case by majority vote of the Board, a “Change in Control” will not be deemed to have occurred for purposes of such clauses (3) or (4) solely because (x) the Company, (y) an entity in which the Company, directly or indirectly, beneficially owns 50% or more of the voting securities (a “Subsidiary”), or (z) any employee stock ownership plan or any other employee benefit plan of the Company or any Subsidiary either files or becomes obligated to file a report or a proxy statement under or in response to Schedule 13D, Schedule 14D-1, Form 8-K, or Schedule 14A (or any successor schedule, form, or report or item therein) under the Exchange Act disclosing beneficial ownership by it of shares of Voting Stock, whether in excess of 20% or otherwise, or because the Company reports that a change in control of the Company has occurred or will occur in the future by reason of such beneficial ownership.

(B) “Disinterested Director” means a Director of the Company who is not or was not a party to the Proceeding in respect of which indemnification is sought by the Indemnitee.

(C) “Independent Counsel” means a law firm or a member of a law firm that neither presently is, nor in the past five years has been, retained to represent (1) the Company or the Indemnitee in any matter material to either such party or (2) any other party to the Proceeding giving rise to a claim for indemnification under this By-Law 33. Notwithstanding the foregoing, the term “Independent Counsel” will not include any person who, under the applicable standards of professional conduct then prevailing under the law of the State of Delaware, would be precluded from representing either the Company or the Indemnitee in an action to determine the Indemnitee’s rights under this By-Law 33.

(d) If any provision or provisions of this By-Law 33 are held to be invalid, illegal, or unenforceable for any reason whatsoever: (i) the validity, legality, and enforceability of the remaining provisions of this By-Law 33 (including without limitation all portions of any paragraph of this By-Law 33 containing any such provision held to be invalid, illegal, or unenforceable, that are not themselves invalid, illegal, or unenforceable) will not in any way be affected or impaired thereby and (ii) to the fullest extent possible, the provisions of this By-Law 33 (including without limitation all portions of any paragraph of this By-Law 33 containing any such provision held to be invalid, illegal, or unenforceable, that are not themselves invalid, illegal, or unenforceable) will be construed so as to give effect to the intent manifested by the provision held invalid, illegal, or unenforceable.

34. Insurance, Contracts, and Funding. The Company may purchase and maintain insurance to protect itself and any Indemnitee against any expenses, judgments, fines, and amounts paid in settlement or incurred by any Indemnitee in connection with any Proceeding referred to in By-Law 33 or otherwise, to the fullest extent permitted by applicable law as then in effect. The Company may enter into contracts with any person entitled to indemnification under By-Law 33 or otherwise, and may create a trust fund, grant a security interest, or use other means (including without limitation a letter of credit) to ensure the payment of such amounts as may be necessary to effect indemnification as provided in By-Law 33.

GENERAL

35. Fiscal Year. The fiscal year of the Company will end on December 31 or such date as may be fixed from time to time by the Board.

36. Seal. The Board may adopt a corporate seal and use the same by causing it or a facsimile thereof to be impressed or affixed or reproduced or otherwise.

37. Reliance upon Books, Reports, and Records. Each Director, each member of a committee designated by the Board, and each officer of the Company will, in the performance of his or her duties, be fully protected in relying in good faith upon the records of the Company and upon such information, opinions, reports, or statements presented to the Company by any of the Company’s officers or employees, or committees of the Board, or by any other person or entity as to matters the Director, committee member, or officer believes are within such other person’s professional or expert competence and who has been selected with reasonable care by or on behalf of the Company.

38. Time Periods. In applying any provision of these By-Laws that requires that an act be done or not be done a specified number of days prior to an event or that an act be done during a period of a specified number of days prior to an event, calendar days will be used unless otherwise specified, the day of the doing of the act will be excluded and the day of the event will be included.

39. Amendments. Except as otherwise provided by law or by the Certificate of Incorporation, these By-Laws or any of them may be amended in any respect or repealed at any time, either (i) at any meeting of stockholders, provided that any amendment or supplement proposed to be acted upon at any such meeting has been described or referred to in the notice of such meeting, or (ii) at any meeting of the Board.

40. Certain Defined Terms. Terms used herein with initial capital letters that are defined in the Certificate of Incorporation are used herein as so defined.

EXCLUSIVE FORUM

41. Exclusive Forum for Adjudication of Disputes. Unless the Company consents in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware (or, if the Court of Chancery does not have jurisdiction, another state court located within the State of Delaware or, if no state court located within the State of Delaware has jurisdiction, the federal district court for the District of Delaware) shall be the sole and exclusive forum for (a) any derivative action or other proceeding brought on behalf of the Company, (b) any action asserting a claim of breach of a fiduciary duty owed by any director, officer or other employee of the Company to the Company or to the Company's stockholders, creditors or other constituents, (c) any action asserting a claim against the Company or any director or officer of the Company arising pursuant to any provision of the Delaware General Corporation Law or the Certificate of Incorporation or these By-Laws (as either may be amended from time to time), or (d) any action asserting a claim against the Company or any director or officer of the Company governed by the internal affairs doctrine. The Court of Chancery of the State of Delaware shall have the fullest authority allowed by law to issue an anti-suit injunction to enforce this forum selection clause and to preclude suit in any other forum. Any person or entity purchasing or otherwise acquiring any interest in shares of capital stock of the Company shall be deemed to have notice of and consented to this By-Law and to have consented to personal jurisdiction in Delaware for the purposes of any suit in the Court of Chancery (and other specified Delaware courts) in any proceeding brought to enjoin any action by that person or entity that is inconsistent with the exclusive jurisdiction referenced in this By-Law and for the purposes of enforcement of this By-Law.

Exhibit 21

SUBSIDIARIES OF AMETEK, INC.

AS OF DECEMBER 31, 2019

Name of Subsidiary and name under which it does business	State or other jurisdiction of incorporation or organization	Percentage of voting securities owned by its immediate parent*
Advanced Measurement Technology, Inc.	Delaware	100%
Sunpower, Inc.	Delaware	100%
AIP/MPM Funding, Inc.	Delaware	100%
AIP/MPM Holdings, Inc.	Delaware	100%
Micro-Poise Measurement Systems, LLC	Delaware	100%
Akron Standard Bestry (Guangzhou) Measurement Equipment Co., Ltd.	China	50%
Micro-Poise Industrial Equipment (Beijing) Ltd.	China	100%
AMETEK (Bermuda), Ltd.	Bermuda	100%
AMETEK Canada 2 ULC	Canada	100%
AMETEK Canada 3 ULC.	Delaware	99.90%
AMETEK Canada Limited Partnership	Canada	99.90%
Creaform Inc.	Canada	100%
Creaform Shanghai Ltd.	China	100%
AMETEK Thermal Systems, Inc.	Delaware	100%
AMETEK Arizona Instrument LLC	Arizona	100%
Controls Southeast, Inc.	North Carolina	100%
EDAX, LLC	Delaware	100%
EMA Corp.	Delaware	98.43%
AMETEK B.V.	Netherlands	100%
AMETEK Telular Holdings, LLC	Delaware	100%
ACP Tower Holdings, LLC	Delaware	100%
Telular Corporation	Delaware	100%
SkyBitz Tank Monitoring Corporation	Illinois	100%
SkyBitz, Inc.	Delaware	100%
SkyBitz Petroleum Logistics LLC	South Carolina	100%
Amekai (BVI) Ltd.	British Virgin Islands	50%
AMETEK Aerospace & Power Holdings, Inc.	Delaware	100%
AMETEK Advanced Industries, Inc.	Delaware	100%
AMETEK Aircraft Parts & Accessories, Inc.	Delaware	100%
AMETEK Ameron, LLC	Delaware	100%
AMETEK HSA, Inc.	Delaware	100%
AMETEK MRO Florida, Inc.	Delaware	100%
Drake Air, Inc.	Oklahoma	100%
AMETEK Programmable Power, Inc.	Delaware	100%
VTI Instruments Private Limited	India	99.999%
VTI Integrated Systems Private Limited	India	99.89%
ESP Holdco, Inc.	Delaware	100%
Electronic Systems Protection, Inc.	Delaware	100%
Forza Silicon Corporation	California	100%
Powervar, Inc	Illinois	100%
Powervar Deutschland GmbH	Germany	100%
Powervar Mexico S.A. de C.V.	Mexico	99.998%
Southern Aero Partners, Inc.	Oklahoma	100%
AMETEK CTS US, Inc.	New York	100%
AMETEK EMG Holdings, Inc.	Delaware	100%
Avicenna Technology, Inc.	Minnesota	100%
Coining, Inc.	Delaware	100%
Dunkermotoren USA Inc.	Delaware	100%
Hamilton Precision Metals, Inc.	Delaware	100%
Hamilton Precision Metals of Delaware, Inc.	Delaware	100%

SUBSIDIARIES OF AMETEK, INC.

AS OF DECEMBER 31, 2019

Name of Subsidiary and name under which it does business	State or other jurisdiction of incorporation or organization	Percentage of voting securities owned by its immediate parent*
HCC Industries, Inc.	Delaware	100%
Glasseal Products, Inc.	New Jersey	100%
Sealtron, Inc.	Delaware	100%
AMETEK Aegis, Inc.	Delaware	100%
Hermetic Seal Corporation	Delaware	100%
KBA Enterprises, Inc.	Delaware	100%
Reading Alloys, Inc.	Pennsylvania	100%
RAI Enterprises, Inc.	Delaware	100%
AMETEK SCP, Inc.	Rhode Island	100%
AMETEK SCP (Barrow) Limited	United Kingdom	100%
Technical Services for Electronics, Inc.	Minnesota	100%
AMETEK Grundbesitz GmbH	Germany	100%
AMETEK Haydon Kerk, Inc.	Delaware	100%
Tritex Corporation	Delaware	100%
Haydon Kerk Motion Solutions, Inc.	Massachusetts	100%
AMETEK Holdings B.V., also registered as AMETEK Holdings B.V. Delaware Inc.[1]	Delaware	100%
AMETEK Denmark A/S	Denmark	100%
AMETEK European Holdings GmbH	Germany	100%
AMETEK Italia S.r.l.	Italy	100%
AMETEK Holdings de Mexico, S. de R.L.	Mexico	50%
AMETEK Latin America Holding Company S.à r.l.	Luxembourg	100%
AMETEK Customer Service S. de R. L. de C.v.	Mexico	100%
AMETEK Mexico Holding Company, LLC	Delaware	100%
AMETEK Lamb Motores de Mexico, S. de R.L. de C.V.	Mexico	99.99%
AMETEK do Brasil Ltda.	Brazil	99%
AMETEK Europe L.L.C.	Delaware	100%
AMETEK (Barbados) SRL	Barbados	100%
AMETEK UK Limited Partnership	United Kingdom	96.9%
AMETEK European Holdings Limited	United Kingdom	100%
AMETEK Elektromotory, s.r.o	Czech Republic	99.97%
AMETEK Singapore Private Ltd.	Singapore	100%
Amekai Singapore Private Ltd.	Singapore	50%
Amekai Meter (Xiamen) Co., Ltd.	China	100%
Amekai Taiwan Co., Ltd.	Taiwan	50%
AMETEK Commercial Enterprise Shanghai	China	100%
AMETEK Engineered Materials Sdn. Bhd.	Malaysia	100%
AMETEK Instruments India Private Limited	India	100%
AMETEK Motors Asia Pte. Ltd.	Singapore	100%
AMETEK Industrial Technology (Shanghai) Co., Ltd.	China	100%
Haydon Linear Motors (Changzhou) Co., Ltd.	China	100%
AMETEK Global Tubes, LLC	Delaware	100%
Tubes Holdco Limited	United Kingdom	100%
Fine Tubes Limited	United Kingdom	100%
Superior Tube Company, Inc.	Pennsylvania	100%
EMA Holdings UK Limited	United Kingdom	100%
AMETEK Aerospace & Defense Group UK Ltd	United Kingdom	100%
AEM Limited	United Kingdom	100%

1 This subsidiary is also registered in The Netherlands.

SUBSIDIARIES OF AMETEK, INC.

AS OF DECEMBER 31, 2019

Name of Subsidiary and name under which it does business	State or other jurisdiction of incorporation or organization	Percentage of voting securities owned by its immediate parent*
AMETEK Airtechnology Group Limited.	United Kingdom	100%
Airtechnology Pension Trustees Limited	United Kingdom	100%
Muirhead Aerospace Limited	United Kingdom	100%
AMETEK Instruments Group UK Limited	United Kingdom	100%
AMETEK (GB) Limited	United Kingdom	100%
Powervar Limited	United Kingdom	100%
Taylor Hobson Limited	United Kingdom	100%
Taylor Hobson Trustees Limited	United Kingdom	100%
Solartron Metrology Limited	United Kingdom	100%
AMETEK Co., Ltd.	Japan	100%
AMETEK Material Analysis Holdings GmbH	Germany	100%
AMETEK Holdings SARL	France	74%
Antavia SAS	France	100%
CAMECA SAS	France	96.15%
AMETEK GmbH	Germany	31.99%
AMETEK Nordic AB	Sweden	100%
Zygo Germany GmbH	Germany	41.36%
AMETEK Germany GmbH	Germany	100%
AMETEK Korea Co., Ltd.	Korea	100%
CAMECA Instruments, Inc.	New York	100%
Direl Holding GmbH	Germany	100%
Direl GmbH	Germany	100%
Dunkermotoren GmbH	Germany	100%
AMETEK d.o.o. Subotica.	Serbia	100%
Dunkermotoren Taicang Co., Ltd.	China	100%
Motec GmbH	Germany	100%
Motec Nordic ApS	Denmark	100%
Motec Asia Limited	Hong Kong	100%
RETE Holding GmbH	Switzerland	100%
AMETEK CTS GmbH	Switzerland	100%
AMETEK CTS Europe GmbH	Germany	100%
Frameflair Limited	United Kingdom	100%
Milmega Limited	United Kingdom	100%
SPECTRO Analytical Instruments GmbH	Germany	100%
AMETEK Hong Kong Private Limited	Hong Kong	100%
SPECTRO Analytical Instruments, Inc.	Delaware	100%
SPECTRO Analytical Instruments (Pty) Ltd	South Africa	100%
OOO “AMETEK”	Russia	99%
AMETEK S.A.S.	France	76.7%
AMETEK S.r.l.	Italy	70%
EMA Finance 1 LLC	Delaware	100%
EMA Finance 2 LLC	Delaware	100%
Land Instruments International Ltd.	United Kingdom	100%
Nu Instruments Limited	United Kingdom	100%
Nu Instruments Asia Ltd.	Hong Kong	100%
Nu Instruments (Beijing) Co. Ltd.	China	100%
Taylor Hobson Inc.	Delaware	100%
EMA MX, LLC	Delaware	100%
AMETEK Finland Oy	Finland	100%
AMETEK PIP Holdings, Inc.	Delaware	100%

SUBSIDIARIES OF AMETEK, INC.

AS OF DECEMBER 31, 2019

Name of Subsidiary and name under which it does business	State or other jurisdiction of incorporation or organization	Percentage of voting securities owned by its immediate parent*
AMETEK Land, Inc.	Delaware	100%
AMETEK Precitech, Inc.	Delaware	100%
AMETEK (Thailand) Co., Ltd.	Thailand	99.999%
Creaform U.S.A. Inc.	Delaware	100%
Crystal Engineering Corporation	California	100%
NewAge Testing Instruments, Inc.	Pennsylvania	100%
Patriot Sensors & Controls Corporation	Delaware	100%
Reichert, Inc.	Delaware	100%
SSH Non-Destructive Testing, Inc.	Delaware	100%
Amptek, Inc.	Delaware	100%
Technical Manufacturing Corporation	Delaware	100%
Atlas Material Holdings Corporation	Delaware	100%
Atlas Material Testing Technology L.L.C.	Delaware	100%
Atlas Netherlands AcquisitionCo Coöperatief U.A.	Netherlands	99.99%
Atlas Material Testing Technology GmbH	Germany	100%
Atlas Material Testing Technology BV	Netherlands	100%
Atlas Material Testing Technology (India) Private Limited	India	100%
Chandler Instruments Company L.L.C.	Texas	100%
Grabner Instruments Messtechnik Gesellschaft m.b.H.	Austria	56%
Petrolab, L.L.C.	Delaware	100%
EMA Holdings, LLC	Delaware	100%
MCG Acquisition Corporation	Minnesota	100%
TPM Russia, Inc.	Delaware	100%
Zygo Corporation	Delaware	100%
AMETEK Taiwan Co. Ltd.	Taiwan	50.5%
Six Brookside Drive Corporation.	Connecticut	100%
Zemetrics, Inc.	Delaware	100%
Zygo Pte Ltd.	Singapore	100%
ZygoLamda Metrology Instrument (Shanghai) Co., Ltd.	China	100%
Zygo Richmond Corporation	Delaware	100%
FMH Intermediate LLC	Delaware	100%
FMH Holdings Corp.	Delaware	100%
FMH Aerospace Corp.	California	100%
Gatan Inc.	Pennsylvania	100%
Gatan Service Corporation	Pennsylvania	100%
MOCON, Inc	Minnesota	100%
MOCON Europe Sàrl	Luxembourg	100%
MOCON Europe A/S	Denmark	100%
AMETEK Instrumentos, S.L.	Spain	100%
MOCON (Shanghai) Trading Co., Ltd.	China	100%
OBCORP LLC.	Missouri	100%
Universal Analyzers Inc.	Nevada	100%
Pacific Design Technologies, Inc.	California	100%
Rauland-Borg Corporation	Illinois	100%
Modern Field Holdings, Inc.	British Virgin Islands	7.6%
Rauland-Borg Corporation of Florida	Delaware	100%
Responder Systems Corporation	California	100%
Rotron Incorporated	New York	100%
AMETEK Technical & Industrial Products, Inc.	Minnesota	51.9%
Seiko EG&G Co. Ltd.	Japan	49%
Solidstate Controls, LLC	Delaware	100%

SUBSIDIARIES OF AMETEK, INC.

AS OF DECEMBER 31, 2019

Name of Subsidiary and name under which it does business	State or other jurisdiction of incorporation or organization	Percentage of voting securities owned by its immediate parent*
HDR Power Systems, LLC	Delaware	100%
Solidstate Controls, Inc. de Argentina S.R.L.	Argentina	90%
Solidstate Controls Mexico, S.A. de C.V.	Mexico	99.998%
Sound Com Corporation	Ohio	100%
Spectro International Holdings, Inc.	Delaware	100%
Spectro Holdings, Inc.	Delaware	100%
Spectro Scientific (Beijing), Inc.	China	100%
Spectro Scientific, Inc.	Massachusetts	100%
Spectro, Inc.	Massachusetts	100%
Vision Research, Inc.	Delaware	100%
Vision Research Europe B.V.	Netherlands	100%
Vision Research srl	Romania	100%

* Exclusive of directors' qualifying shares and shares held by nominees as required by the laws of the jurisdiction of incorporation.

Exhibit 23

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in the following Registration Statements:

(1) Registration Statement (Form S-8 No. 333-142824) pertaining to the AMETEK, Inc. 2007 Omnibus Incentive Compensation Plan,

(2) Registration Statement (Form S-8 No. 333-173988) pertaining to the AMETEK, Inc. 2011 Omnibus Incentive Compensation Plan,

(3) Registration Statement (Form S-8 No. 333-87491) pertaining to the AMETEK Retirement and Savings Plan,

(4) Registration Statement (Form S-8 No. 333-91507) pertaining to the AMETEK, Inc. Deferred Compensation Plan,

(5) Registration Statement (Form S-8 No. 333-176068) pertaining to the Hamilton Precision Metals 401(k) Employee Savings Plan and Solidstate Controls, Inc. Hourly Employees' (CWA) Retirement Plan,

(6) Registration Statement (Form S-8 No. 333-214847) pertaining to the Superior Tube Company, Inc. Union 401(k) Plan, and

(7) Registration Statement (Form S-3 No. 333-75892) of AMETEK, Inc.

of our reports dated February 20, 2020, with respect to the consolidated financial statements of AMETEK, Inc. and the effectiveness of internal control over financial reporting of AMETEK, Inc., included in this Annual Report (Form 10-K) of AMETEK, Inc. for the year ended December 31, 2019.

Philadelphia, Pennsylvania
February 20, 2020

Exhibit 31.1

CERTIFICATIONS

I, David A. Zapico, certify that:

1. I have reviewed this Annual Report on Form 10-K of AMETEK, Inc. (the “registrant”);

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant’s other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of registrant’s board of directors (or persons performing the equivalent functions):

   a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

   b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: February 20, 2020

/s/ DAVID A. ZAPICO
David A. Zapico
Chairman of the Board and Chief Executive Officer

Exhibit 31.2

CERTIFICATIONS

I, William J. Burke, certify that:

1. I have reviewed this Annual Report on Form 10-K of AMETEK, Inc. (the "registrant");

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of registrant's board of directors (or persons performing the equivalent functions):

   a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 20, 2020

/s/ WILLIAM J. BURKE
William J. Burke
Executive Vice President – Chief Financial Officer

Exhibit 32.1

AMETEK, Inc.

Certification Pursuant to
18 U.S.C. Section 1350,
as Adopted Pursuant to
Section 906 of the Sarbanes-Oxley Act of 2002

In connection with the Annual Report of AMETEK, Inc. (the "Company") onForm 10-K for the year ended December 31, 2019 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, David A. Zapico, Chairman of the Board and Chief Executive Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(a) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(b) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ DAVID A. ZAPICO
David A. Zapico
Chairman of the Board and Chief Executive Officer

Date: February 20, 2020

A signed original of this written statement required by Section 906 has been provided to AMETEK, Inc. and will be retained by AMETEK, Inc. and furnished to the Securities and Exchange Commission or its staff upon request.

Exhibit 32.2

AMETEK, Inc.

Certification Pursuant to
18 U.S.C. Section 1350,
as Adopted Pursuant to
Section 906 of the Sarbanes-Oxley Act of 2002

In connection with the Annual Report of AMETEK, Inc. (the “Company”) onForm 10-K for the year ended December 31, 2019 as filed with the Securities and Exchange Commission on the date hereof (the “Report”), I, William J. Burke, Executive Vice President – Chief Financial Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(a) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(b) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ WILLIAM J. BURKE
William J. Burke
Executive Vice President – Chief Financial Officer

Date: February 20, 2020

A signed original of this written statement required by Section 906 has been provided to AMETEK, Inc. and will be retained by AMETEK, Inc. and furnished to the Securities and Exchange Commission or its staff upon request.