UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

Form 10-K

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

For the fiscal year ended December 31, 2018

or

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

Commission File Number: 01-14010

Waters Corporation

(Exact name of registrant as specified in its charter)

Delaware	**13-3668640**
(State or other jurisdiction of incorporation or organization)	*(I.R.S. Employer Identification No.)*

34 Maple Street
Milford, Massachusetts 01757
(Address, including zip code, of principal executive offices)

(508) 478-2000
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:	Common Stock, par value $0.01 per share
Name of each exchange on which registered:	New York Stock Exchange, Inc.
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 if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☑

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

Large accelerated filer ☑	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 ☑

State the aggregate market value of the registrant's common stock held by non-affiliates of the registrant as of June 30, 2018: $14,912,684,699.

Indicate the number of shares outstanding of the registrant's common stock as of February 22, 2019: 71,512,391

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive proxy statement that will be filed for the 2019 Annual Meeting of Stockholders are incorporated by reference in Part III.

WATERS CORPORATION AND SUBSIDIARIES

ANNUAL REPORT ON FORM 10-K

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PART I

Item 1: *Business*

General

Waters Corporation (the "Company," "we," "our," or "us") is a specialty measurement company that operates with a fundamental underlying purpose to advance the science that enables our customers to enhance human health and well-being. The Company has pioneered analytical workflow solutions involving liquid chromatography, mass spectrometry and thermal analysis innovations serving the life, materials and food sciences for more than 60 years. The Company primarily designs, manufactures, sells and services high performance liquid chromatography ("HPLC"), ultra performance liquid chromatography ("UPLC™" and together with HPLC, referred to as "LC") and mass spectrometry ("MS") technology systems and support products, including chromatography columns, other consumable products and comprehensive post-warranty service plans. These systems are complementary products that are frequently employed together ("LC-MS") and sold as integrated instrument systems using common software platforms. In addition, the Company designs, manufactures, sells and services thermal analysis, rheometry and calorimetry instruments through its TA™ product line. The Company is also a developer and supplier of advanced software-based products that interface with the Company's instruments, as well as other manufacturers' instruments.

The Company's products are used by pharmaceutical, biochemical, industrial, nutritional safety, environmental, academic and governmental customers working in research and development, quality assurance and other laboratory applications. LC is a standard technique and is utilized in a broad range of industries to detect, identify, monitor and measure the chemical, physical and biological composition of materials, and to purify a full range of compounds. MS technology, principally in conjunction with chromatography, is employed in drug discovery and development, including clinical trial testing, the analysis of proteins in disease processes (known as "proteomics"), nutritional safety analysis and environmental testing. LC-MS instruments combine a liquid phase sample introduction and separation system with mass spectrometric compound identification and quantification. The Company's thermal analysis, rheometry and calorimetry instruments are used in predicting the suitability and stability of fine chemicals, pharmaceuticals, water, polymers, metals and viscous liquids for various industrial, consumer goods and healthcare products, as well as for life science research.

Waters Corporation, organized as a Delaware corporation in 1991, is a holding company that owns all of the outstanding common stock of Waters Technologies Corporation, its operating subsidiary. Waters Corporation became a publicly-traded company with its initial public offering ("IPO") in November 1995. Since the IPO, the Company has added two significant and complementary technologies to its range of products with the acquisitions of TA Instruments in May 1996 and Micromass Limited in September 1997.

Business Segments

The Company's business activities, for which discrete financial information is available, are regularly reviewed and evaluated by the chief operating decision maker. As a result of this evaluation, the Company determined that it has two operating segments: Waters™ and TA™. The Waters operating segment is primarily in the business of designing, manufacturing, selling and servicing LC and MS instrument systems, columns and other precision chemistry consumables that can be integrated and used along with other analytical instruments. The TA operating segment is primarily in the business of designing, manufacturing, selling and servicing thermal analysis, rheometry and calorimetry instruments. The Company's two operating segments have similar economic characteristics; product processes; products and services; types and classes of customers; methods of distribution; and regulatory environments. Because of these similarities, the two segments have been aggregated into one reporting segment for financial statement purposes.

Information concerning revenues and long-lived assets attributable to each of the Company's products, services and geographic areas is set forth in Note 17 in the Notes to the Consolidated Financial Statements, which is incorporated herein by reference.

Waters Products and Markets

High Performance and Ultra Performance Liquid Chromatography

HPLC is a standard technique used to identify and analyze the constituent components of a variety of chemicals and other materials. The Company believes that HPLC's performance capabilities enable it to separate, identify and quantify a high proportion of all known chemicals. As a result, HPLC is used to analyze substances in a wide variety of industries for research and development purposes, quality control and process engineering applications.

The most significant end-use markets for HPLC are those served by the pharmaceutical and life science industries. In these markets, HPLC is used extensively to understand diseases, identify new drugs, develop manufacturing methods and assure the potency and purity of new pharmaceuticals. HPLC is also used in a variety of other applications, such as analyses of foods and beverages for nutritional labeling and compliance with safety regulations and the testing of water and air purity within the environmental testing industry, as well as applications in other industries, such as chemical and consumer products. HPLC is also used by universities, research institutions and governmental agencies, such as the United States Food and Drug Administration ("FDA") and the United States Environmental Protection Agency ("EPA") and their foreign counterparts that mandate safety and efficacy testing.

In 2004, Waters introduced a novel technology that the Company describes as ultra performance liquid chromatography that utilizes a packing material with small, uniform diameter particles and a specialized instrument, the ACQUITY UPLC™, to accommodate the increased pressure and narrower chromatographic bands that are generated by these small and tightly packed particles. By using the ACQUITY UPLC, researchers and analysts are able to achieve more comprehensive chemical separations and faster analysis times in comparison with many analyses previously performed by HPLC. In addition, in using the ACQUITY UPLC, researchers have the potential to extend the range of applications beyond that of HPLC, enabling them to uncover more levels of scientific information. While offering significant performance advantages, the ACQUITY UPLC is also compatible with the Company's software products and the general operating protocols of HPLC. For these reasons, the Company's customers and field sales and support organizations are well positioned to utilize this new technology and instrument. In 2018, the Company introduced the ACQUITY™ ARC™ Bio System, a versatile, iron-free, bio-inert, quaternary liquid chromatograph specifically engineered to improve bioseparation analytical methods. The Company also introduced the ACQUITY™ UPLC™ PLUS series in 2018, consisting of the H-Class PLUS, H-Class PLUS Bio and I-Class PLUS systems, which incorporate foundational enhancements into the legacy systems.

Waters manufactures LC instruments that are offered in configurations that allow for varying degrees of automation, from component configured systems for academic teaching and research applications to fully automated systems for regulated and high sample throughput testing, and that have a variety of detection technologies, from optical-based ultra-violet ("UV") absorbance, refractive index and fluorescence detectors to a suite of MS-based detectors, optimized for certain analyses.

The primary consumable products for LC are chromatography columns. These columns are packed with separation media used in the LC testing process and are typically replaced at regular intervals. The chromatography column contains one of several types of packing material, typically stationary phase particles made from silica or polymeric resins. As a pressurized sample is introduced to the column inlet and permeates through the packed column, it is separated into its constituent components.

Waters HPLC columns can be used on Waters-branded and competitors' LC systems. The Company believes that it is one of a few suppliers in the world that processes silica and polymeric resins, packs columns and distributes its own products. In doing so, the Company believes it can better ensure product consistency, a key attribute for its customers in quality control laboratories, and can react quickly to new customer requirements. The Company believes that its ACQUITY UPLC lines of columns are used primarily on its

ACQUITY UPLC instrument systems and, furthermore, that its ACQUITY UPLC instruments primarily use ACQUITY UPLC columns. In 2016, the Company continued to expand its column chemistry capabilities through the introduction of CORTECS™ C_8, CORTECS™ Phenyl, CORTECS™ T3 and CORTECS™ Shield RP18. In 2018, the Company introduced the BioResolve™ RP mAb Polyphenyl columns, which improve the consistency and reliability of the overly complex separations of monoclonal antibodies and antibody-drug conjugates.

The Company's precision chemistry consumable products also include environmental and nutritional safety testing products, including Certified Reference Materials ("CRM"s) and Proficiency Testing ("PT") products. Laboratories around the world and across multiple industries use these products for quality control and proficiency testing and also purchase product support services required to help with their federal and state mandated accreditation requirements or with quality control over critical pharmaceutical analysis. In 2018, the Company introduced the VICAM™ BPATest™, which provides a sensitive, precise determination of Bisphenol A in as little as ten minutes. VICAM also introduced a user-friendly lateral flow zearalenone strip test, the Zearala-V AQUA™ in 2018.

Mass Spectrometry and Liquid Chromatography-Mass Spectrometry

MS is a powerful analytical technology that is used to identify unknown compounds, to quantify known materials and to elucidate the structural and chemical properties of molecules by measuring the masses of molecules that have been converted into ions.

The Company is a technology and market leader in the development, manufacture, sale and service of MS instruments and components. These instruments are typically integrated and used along with other complementary analytical instruments and systems, such as LC, chemical electrophoresis and gas chromatography. A wide variety of instrumental designs fall within the overall category of MS instrumentation, including devices that incorporate quadrupole, ion trap, time-of-flight ("Tof"), magnetic sector and ion mobility technologies. Furthermore, these technologies are often used in tandem (MS-MS) to maximize the speed and/or efficacy of certain experiments.

Currently, the Company offers a wide range of MS instrument systems utilizing various combinations of quadrupole, Tof and ion mobility designs. These instrument systems are used in drug discovery and development, as well as for environmental, clinical and nutritional safety testing. The overwhelming majority of mass spectrometers sold by the Company are designed to utilize an LC system and a liquid compatible interface (such as an electrospray ionization source) as the sample introduction device. These products supply a diverse market with a strong emphasis on the pharmaceutical, biomedical, clinical, food and beverage and environmental market segments worldwide.

MS is an increasingly important detection technology for LC. The Company's smaller-sized mass spectrometers, such as the single quadrupole detector ("SQD") and the tandem quadrupole detector ("TQD"), are often referred to as LC "detectors" and are typically sold as part of an LC system or as an LC system upgrade. Larger quadrupole systems, such as the Xevo™ TQ and Xevo™ TQ-S instruments, are used primarily for experiments performed for late-stage drug development, including clinical trial testing. Quadrupole time-of-flight ("Q-Tof™") instruments, such as the Company's SYNAPT™ G2-S, are often used to analyze the role of proteins in disease processes, an application sometimes referred to as "proteomics". In 2016, the Company introduced the Xevo™ TQ-XS mass spectrometry system enabled by the newly designed StepWave™ SX ion guide, which features a unique combination of ion optics, detection and ionization technologies resulting in levels of sensitivity not previously seen. The Company also introduced SONAR in 2016, which is a new data acquisition technology for use with the Xevo G2-XS that allows for the quantification and identification of lipids, metabolites and proteins in complex samples in a more efficient manner. In 2018, the Company introduced the DART QDa™ system with LiveID™, a direct-from-sample analytical system that verifies sample authenticity or adulteration, specifically for food applications. The Company also introduced the Xevo™ TQ-GC mass spectrometer in 2018, which allows laboratories to meet and exceed low part-per-billion limits of detection when quantifying pesticide residues and other contaminants in food using GC-MS/MS methods set forth by worldwide regulatory agencies/authorities. In addition, the Company introduced the RenataDX™ screening system, a flow-injection tandem mass spectrometry system for rapid high-throughput analysis of extracted dried blood spots and other human biological matrices.

LC and MS are typically embodied within an analytical system tailored for either a dedicated class of analyses or as a general purpose analytical device. An increasing percentage of the Company's customers are purchasing LC and MS components simultaneously and it has become common for LC and MS instrumentation to be used within the same laboratory and operated by the same user. The descriptions of LC and MS above reflect the historical segmentation of these analytical technologies and the historical categorization of their respective practitioners. Increasingly in today's instrument market, this segmentation and categorization is becoming obsolete as a high percentage of instruments used in the laboratory embody both LC and MS technologies as part of a single device. In response to this development and to further promote the high utilization of these hybrid instruments, the Company has organized its Waters operating segment to develop, manufacture, sell and service integrated LC-MS systems.

Based upon reports from independent marketing research firms and publicly-disclosed sales figures from competitors, the Company believes that it is one of the world's largest manufacturers and distributors of LC and LC-MS instrument systems, chromatography columns and other consumables and related services.

The Company has been a developer and supplier of software-based products that interface with the Company's instruments, as well as other suppliers' instruments. The Company's newest software technology, UNIFI™, is a scientific information system that is the culmination of a multi-year effort to substantially bring all of Waters' preexisting, distinct software systems under one operating system. UNIFI joins Waters' suite of informatics products – Empower™ Chromatography Data Software, MassLynx™ Mass Spectrometry Software and NuGenesis™ Scientific Data Management System, each of which is used to support innovations within world-leading institutions. UNIFI is the industry's first comprehensive software that seamlessly integrates UPLC chromatography, mass spectrometry and informatics data workflows. In 2016, the Company announced two reference libraries available within UNIFI, the Metabolic Profiling CCS Library and the *Rapi*Fluor-MS™ Glycan GU Scientific Library. The Company also introduced Symphony Data Pipeline software in 2016, which is a client-server application that automates the movement and transformation of large amounts of LC-MS data to speed up analytical workflows and liberate scientists from mundane yet necessary tasks associated with managing data files. In 2018, the Company announced new analysis capabilities across a variety of molecules by integrating UNIFI acquired data from the Company's Vion™ IMS QTof™ or Xevo GS XS mass spectrometers with Molecular Discovery's Mass-MetaSite and WebMetabase processing software.

Waters Service

Services provided by Waters enable customers to maximize technology productivity, support customer compliance activities and provide transparency into enterprise resource management efficiencies. The customer benefits from improved budget control, data-driven technology adoption and accelerated workflow at a site or on a global perspective. The Company considers its service offerings to be highly differentiated from our competition, as evidenced by a consistent increase in annual service revenues. The Company's principal competitors in the service market include PerkinElmer, Inc., Agilent Technologies, Inc., Thermo Fisher Scientific Inc. and General Electric Company. These competitors can provide certain services on Waters instruments to varying degrees and always present competitive risk.

The servicing and support of instruments, software and accessories is an important source of revenue and represents over 30% of sales for Waters. These revenues are derived primarily through the sale of support plans, demand services, spare parts, customer performance validation services and customer training. Support plans typically involve scheduled instrument maintenance and an agreement to promptly repair a non-functioning instrument in return for a fee described in a contract that is priced according to the configuration of the instrument.

TA Products and Markets

Thermal Analysis, Rheometry and Calorimetry

Thermal analysis measures the physical or thermodynamic characteristics of materials as a function of temperature. Changes in temperature affect several characteristics of materials, such as their heat flow characteristics, physical state, weight, dimension and mechanical and electrical properties, which may be measured by one or more thermal analysis techniques, including calorimetry. Consequently, thermal analysis techniques are widely used in the development, production and characterization of materials in various industries, such as plastics, chemicals, automobiles, pharmaceuticals and electronics.

Rheometry instruments often complement thermal analyzers in characterizing materials. Rheometry characterizes the flow properties of materials and measures their viscosity, elasticity and deformation under different types of “loading” or other conditions. The information obtained under such conditions provides insight into a material’s behavior during processing, packaging, transport, usage and storage.

Thermal analysis, rheometry and calorimetry instruments are heavily used in material testing laboratories and, in many cases, provide information useful in predicting the suitability and stability of industrial polymers, fine chemicals, pharmaceuticals, water, metals and viscous liquids in various industrial, consumer goods and healthcare products, as well as for life science research. As with systems offered by Waters, a range of instrument configurations is available with increasing levels of sample handling and information processing automation. In addition, systems and accompanying software packages can be tailored for specific applications

In 2016, TA introduced a new line of differential scanning calorimeters and thermogravimetric analyzers. These new Discovery DSC systems feature enhanced sensing technologies resulting in unprecedented performance in baseline flatness, sensitivity, resolution and reproducibility. In addition, TA introduced the ACS-2 Air Chiller System, ElectroForce 3310 test instrument and DuraPulse™ Stent Graft test instrument in 2016.

In 2017, TA introduced the TAM Air microcalorimeter. Although designed to characterize the curing of cement, this instrument is an ideal platform for imaginative experimental design in a wide range of applications, including cement and concrete, material science, food, pharmaceuticals and environmental analysis. TA also introduced three new dilatometer product lines in its 800 platform, which are high precision systems designed to measure dimensional changes of a specimen brought about by dynamic thermal events in a wide range of applications, including material science, ceramics and metals. In 2017, TA introduced the Discovery SDT 650, which provides a true simultaneous measurement of weight change and differential heat flow using advanced technologies, such as dual sample TGA, modulated DSC and modulated and hi-resolution TGA. In addition, TA introduced the Discovery HP-TGA750, a benchtop high pressure TGA that utilizes a patented ultra-high resolution magnetic suspension balance and new high precision temperature control system. Late in 2017, TA introduced the Discovery DMA 850, which measures the viscoelastic mechanical properties of material under controlled conditions of temperature, environment and mechanical stimulus (stress or strain). The DMA 850 features frictionless air bearing supports and a linear optical encoder, which ensures stable, accurate, high-resolution displacement measurement across the full travel range and enables displacement control of 5 nm. In 2017, TA introduced the WinTestTM 8.0 software package, which will be standard on all new ElectroForce™ products. In addition, TA introduced the ElectroForce DMA 3200 in 2017, which combines fatigue and dynamic mechanical analysis into a single mechanical test platform.

In September 2016, the Company acquired all of the outstanding stock of Rubotherm GmbH (“Rubotherm”), a manufacturer of gravimetric analysis systems, for approximately $6 million in cash, $5 million of which was paid at closing and an additional $1 million paid after closing to settle certain liabilities. Rubotherm develops and manufactures analytical test instruments for thermogravimetric and sorption measurements that are used in both industrial and academic research laboratories in disciplines that include chemistry, material science and engineering. The Rubotherm acquisition has helped support and further expand product offerings within TA’s thermal analysis business.

TA Service

Similar to Waters, the servicing and support of TA's instruments is an important source of revenue and represents more than 25% of sales for TA. TA operates independently from the Waters operating segment, though many of its overseas offices are situated in Waters' facilities to achieve operational efficiencies. TA has dedicated field sales and service operations. Service sales are primarily derived from the sale of support plans, replacement parts and billed labor fees associated with the repair, maintenance and upgrade of installed systems.

Global Customers

The Company typically has a broad and diversified customer base that includes pharmaceutical accounts, other industrial accounts, universities and governmental agencies. Purchase of the Company's instrument systems is often dependent on its customers' capital spending, or funding as in the cases of governmental, academic and research institutions, which often fluctuate from year to year. The pharmaceutical segment represents the Company's largest sector and includes multinational pharmaceutical companies, generic drug manufacturers, contract research organizations ("CRO"s) and biotechnology companies. The Company's other industrial customers include chemical manufacturers, polymer manufacturers, food and beverage companies and environmental testing laboratories. The Company also sells to universities and governmental agencies worldwide. The Company's technical sales and support staff members work closely with its customers in developing and implementing applications that meet their full range of analytical requirements. During 2018, 56% of the Company's net sales were to pharmaceutical accounts, 31% to other industrial accounts and 13% to governmental agencies and academic institutions.

The Company typically experiences an increase in sales in the fourth quarter, as a result of purchasing habits for capital goods of many customers who tend to exhaust their spending budgets by calendar year end. The Company does not rely on any single customer for a material portion of its sales. During fiscal years 2018, 2017 and 2016, no single customer accounted for more than 2% of the Company's net sales.

Sales and Service

The Company has one of the largest direct sales and service organizations focused exclusively on the analytical workflows offered by the Company. Across these product technologies, using respective specialized sales and service workforces, the Company serves its customer base with 87 sales offices throughout the world as of December 31, 2018 and approximately 3,900, 3,800 and 3,600 field representatives in 2018, 2017 and 2016, respectively. This investment in sales and service personnel serves to maintain and expand the Company's installed base of instruments. The Company's sales representatives have direct responsibility for account relationships, while service representatives work in the field to install instruments, train customers and minimize instrument downtime. In-house and field-based technical support representatives work directly with customers, providing them assistance with applications and procedures on Company products. The Company provides customers with comprehensive information through various corporate and regional internet websites and product literature, and also makes consumable products available through electronic ordering facilities and a dedicated catalog.

Manufacturing and Distribution

The Company provides high product quality by overseeing each stage of the production of its instruments, columns and chemical reagents.

The Company currently assembles a portion of its LC instruments at its facility in Milford, Massachusetts, where it performs machining, assembly and testing. The Milford facility maintains quality management and environmental management systems in accordance with the requirements of ISO 9001:2015, ISO 13485:2016 and ISO 14001:2015, and adheres to applicable regulatory requirements (including the FDA Quality System

Regulation and the European In-Vitro Diagnostic Directive). The Company outsources manufacturing of certain electronic components, such as computers, monitors and circuit boards, to outside vendors that meet the Company's quality requirements. In addition, the Company outsources the manufacturing of certain LC instrument systems and components to well-established contract manufacturing firms in Singapore. The Company's Singapore entity is ISO 9001:2015 certified and manages all Asian outsourced manufacturing as well as the distribution of all products from Asia. The Company may pursue outsourcing opportunities as they arise but believes it maintains adequate supply chain and manufacturing capabilities in the event of disruption or natural disasters.

The Company manufactures specialty Supercritical Fluid Chromatography ("SFC") and Supercritical Fluid Extraction ("SFE") products in its facility in Sharpsburg, Pennsylvania. The Sharpsburg facility is aligned with the policies and procedures for product manufacturing and distribution as adhered to in the Milford, Massachusetts facility and is under the same structural leadership organization.

The Company primarily manufactures and distributes its LC columns at its facilities in Taunton, Massachusetts and Wexford, Ireland. In February 2018, the Company's Board of Directors approved expanding its Taunton location and anticipates spending an estimated $215 million to build and equip this new state-of-the-art manufacturing facility. The Company has spent $11 million on this facility through the end of 2018. The Taunton facility processes, sizes and treats silica and polymeric media that are packed into columns, solid phase extraction cartridges and bulk shipping containers in both Taunton and Wexford. The Wexford facility also manufactures and distributes certain data, instruments and software components for the Company's LC, MS and TA product lines. The Company's Taunton facility is certified to ISO 9001:2015. The Wexford facility is certified to ISO 9001:2015 and ISO 13485:2016/EN ISO 13485:2016. VICAM™ manufactures antibody-linked resins and magnetic beads that are packed into columns and kits in Milford, Massachusetts and Nixa, Missouri. The Company manufactures and distributes its Analytical Standards and Reagents and Environmental Resource Associates ("ERA") product lines at its facility in Golden, Colorado, which is certified to ISO 9001:2015 and accredited to ISO/IEC 17025:2017, ISO/IEC 17034:16 and ISO Guide 34. Some ERA products are also manufactured in the Wexford, Ireland facility, which is also accredited to ISO/IEC 17025:2005, ISO/IEC 17034:2016.

The Company manufactures and distributes its MS products at its facilities in Wilmslow, England and Wexford, Ireland. Certain components or modules of the Company's MS instruments are manufactured at its facility in Solihull, England and by long-standing outside contractors. Each stage of this supply chain is closely monitored by the Company to maintain high quality and performance standards. The instruments, components or modules are then returned to the Company's facilities, where its engineers perform final assembly, calibrations to customer specifications and quality control procedures. The Company's MS facilities are certified to ISO 9001:2015 and ISO 13485:2016/EN ISO 13485:2016 and adhere to applicable regulatory requirements (including the FDA Quality System Regulation and the European In-Vitro Diagnostic Directive).

TA's thermal analysis, rheometry and calorimetry products are manufactured and distributed at the Company's New Castle, Delaware, Wakefield, Massachusetts, Eden Prairie, Minnesota, Lindon, Utah and Huellhorst, Germany facilities. Similar to MS, elements of TA's products are manufactured by outside contractors and are then returned to the Company's facilities for final assembly, calibration and quality control. The Company's New Castle facility is certified to ISO 9001:2015 and ISO 17025:2005 standards and the Eden Prairie facility is certified to both ISO 9001:2015 and ISO/IEC 17025:2017 standards.

Raw Materials

The Company purchases a variety of raw materials, primarily consisting of high temperature alloy sheet metal and castings, forgings, pre-plated metals and electrical components from various vendors. The materials used by the Company's operations are generally available from a number of sources and in sufficient quantities to meet current requirements subject to normal lead times.

The Company is subject to rules of the Securities and Exchange Commission ("SEC") under the Dodd-Frank Wall Street Reform and Consumer Protection Act, requiring disclosure as to whether certain materials (tantalum, tin, gold and tungsten), known as conflict minerals, which may be contained in the Company's products, are mined from the Democratic Republic of the Congo and adjoining countries. In 2017, the Company was not able to determine with certainty the country of origin of some of the conflict minerals in its manufactured products. However, the Company does not have knowledge that any of its conflict minerals originated from the Democratic Republic of the Congo or adjoining countries. The Company is in the process of evaluating its 2018 supply chain, and the Company plans to file its 2018 Form SD with the SEC in May 2019. The results of this and future evaluations may impose additional costs and may introduce new risks related to the Company's ability to verify the origin of any conflict minerals contained in its products.

In addition, the Company continues to monitor environmental health and safety regulations in countries in which it operates throughout the world, in particular, European Union and China Restrictions on the use of certain Hazardous Substances in electrical and electronic equipment (RoHS) and European Union Waste Electrical and Electronic Equipment directives. Further information regarding these regulations is available on the Company's website, www.waters.com, under the caption "About Waters / Environmental Health & Safety".

Research and Development

The Company maintains an active research and development program focused on the development and commercialization of products that extend, complement and update its existing product offering. The Company's research and development expenditures for 2018, 2017 and 2016 were $143 million, $133 million and $125 million, respectively. In addition, in 2017, the Company incurred a $5 million charge for acquired in-process research and development related to milestone payments associated with a licensing arrangement for certain intellectual property relating to mass spectrometry technologies yet to be commercialized and for which there was no future alternative use as of the acquisition date. This licensing arrangement is significantly related to new, biologically-focused applications, as well as other applications, and require the Company to make additional future payments of up to $7 million if certain milestones are achieved, as well as royalties on future net sales.

Nearly all of the Company's LC products have been developed at the Company's main research and development center located in Milford, Massachusetts, with input and feedback from the Company's extensive field organizations and customers. The majority of the Company's MS products are developed at facilities in England and most of the Company's current materials characterization products are developed at the Company's research and development center in New Castle, Delaware. At December 31, 2018, 2017 and 2016, there were 1,011, 1,004 and 971 employees, respectively, involved in the Company's research and development efforts. The Company has increased research and development expenses from its continued commitment to invest significantly in new product development and existing product enhancements, and as a result of acquisitions. Despite the Company's active research and development programs, there can be no assurance that the Company's product development and commercialization efforts will be successful or that the products developed by the Company will be accepted by the marketplace.

Employees

The Company employed approximately 7,200 employees at both December 31, 2018 and 2017 and 6,900 at December 31, 2016, with approximately 39% of the Company's employees located in the United States. The Company believes its employee relations are generally good. The Company's employees are not unionized or affiliated with any internal or external labor organizations. The Company firmly believes that its future success largely depends upon its continued ability to attract and retain highly skilled employees.

Competition

The analytical instrument systems, supplies and services market is highly competitive. The Company encounters competition from several worldwide suppliers and other companies in both domestic and foreign markets for each of its three primary technologies. The Company competes in its markets primarily on the basis of product performance, reliability, service and, to a lesser extent, price. Competitors continuously introduce new products and have instrument businesses that are generally more diversified than the Company's business. Some competitors have greater financial resources and broader distribution than the Company's.

In the markets served by Waters, the Company's principal competitors include: Agilent Technologies, Inc., Shimadzu Corporation, Bruker Corporation, Danaher Corporation and Thermo Fisher Scientific Inc. In the markets served by TA, the Company's principal competitors include: PerkinElmer, Inc., Mettler-Toledo International Inc., NETZSCH-Geraetebau GmbH, Thermo Fisher Scientific Inc., Malvern PANalytical Ltd., a subsidiary of Spectris plc and Anton-Paar GmbH.

The market for consumable LC products, including separation columns, is highly competitive and generally more fragmented than the analytical instruments market. The Company encounters competition in the consumable columns market from chemical companies that produce column sorbents and small specialized companies that primarily pack purchased sorbents into columns and subsequently package and distribute columns. The Company believes that it is one of the few suppliers that processes silica and polymeric resins, packs columns and distributes its own products. The Company competes in this market on the basis of performance, reproducibility, reputation and, to a lesser extent, price. In recent years, the Company's principal competitors for consumable products have included: Danaher Corporation; Merck KGaA; Agilent Technologies, Inc.; General Electric Company and Thermo Fisher Scientific Inc. The ACQUITY UPLC instrument is designed to offer a predictable level of performance when used with ACQUITY UPLC columns and the Company believes that the expansion of the ACQUITY UPLC instrument base will enhance its chromatographic column business because of the high level of synergy between ACQUITY UPLC columns and the ACQUITY UPLC instruments.

Patents, Trademarks and Licenses

The Company owns a number of United States and foreign patents and has patent applications pending in the United States and abroad. Certain technology and software has been acquired or is licensed from third parties. The Company also owns a number of trademarks. The Company's patents, trademarks and licenses are viewed as valuable assets to its operations. However, the Company believes that no one patent or group of patents, trademark or license is, in and of itself, essential to the Company such that its loss would materially affect the Company's business as a whole.

Environmental Matters and Climate Change

The Company is subject to foreign and U.S. federal, state and local laws, regulations and ordinances that (i) govern activities or operations that may have adverse environmental effects, such as discharges to air and water as well as handling and disposal practices for solid and hazardous wastes, and (ii) impose liability for the costs of cleaning up and certain damages resulting from sites of past spills, disposals or other releases of hazardous substances. The Company believes that it currently conducts its operations and has operated its business in the past in substantial compliance with applicable environmental laws. From time to time, Company operations have resulted or may result in noncompliance with environmental laws or liability for cleanup pursuant to environmental laws. The Company does not currently anticipate any material adverse effect on its operations, financial condition or competitive position as a result of its efforts to comply with environmental laws.

The Company is sensitive to the growing global debate with respect to climate change. An internal sustainability working group develops increasingly robust data with respect to the Company's utilization of carbon producing substances in an effort to continuously reduce the Company's carbon footprint. In 2018, the Company published a sustainability report identifying the various actions and behaviors the Company has adopted from 2014 to 2017 concerning its commitment to both the environment and the broader topic of social responsibility. See Item 1A, Risk Factors – *The effects of climate change could harm the Company's business*, for more information on the potential significance of climate change legislation. See also Note 17 in the Notes to the Consolidated Financial Statements for financial information about geographic areas.

Available Information

The Company files or furnishes all required reports with the SEC. The Company is an electronic filer and the SEC maintains a website that contains reports, proxy and information statements and other information regarding issuers that file electronically with the SEC. The address of the SEC electronic filing website is http://www.sec.gov. The Company also makes available, free of charge on its website, its annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and any amendments to those reports as soon as reasonably practicable after such material is electronically filed with or furnished to the SEC. The website address for Waters Corporation is http://www.waters.com and SEC filings can be found under the caption “Investors”.

Forward-Looking Statements

Certain of the statements in this Form 10-K and the documents incorporated herein, may contain forward-looking statements with respect to future results and events, including any statements regarding, among other items, anticipated trends or growth in the Company’s business, including, but not limited to, the impact of new or proposed tariff or trade regulations; the impact of foreign currency translation on financial results; development of products by acquired businesses; the growth rate of sales and research and development expenses; the impact of costs associated with developing new technologies and bringing these new technologies to market; the impact of new product launches and the associated costs, such as the amortization expense related to software platforms; geographic sales mix of business; development of products by acquired businesses and the amount of contingent payments to the sellers of an acquired business; anticipated expenses, including interest expense, capitalized software costs and effective tax rates; the impact of the Tax Cuts and Jobs Act (the “2017 Tax Act”) in the U.S.; the impact and outcome of the Company’s various ongoing tax audit examinations; the achievement of contractual milestones to preserve foreign tax rates; the impact and outcome of litigation matters; the impact of the loss of intellectual property protection; the impact of new accounting standards and pronouncements; the adequacy of the Company’s supply chain and manufacturing capabilities and facilities; the impact of regulatory compliance; the Company’s expected cash flow, borrowing capacity, debt repayment and refinancing; the Company’s ability to fund working capital, capital expenditures, service debt, repay outstanding lines of credit, make authorized share repurchases, fund potential acquisitions and pay any adverse litigation or tax audit liabilities, particularly in the U.S.; future impairment charges; the Company’s contributions to defined benefit plans; the Company’s expectations regarding changes to its financial position; compliance with applicable environmental laws; and the impact of recent acquisitions on sales and earnings.

Many of these statements appear, in particular, in Part II, Item 7, Management’s Discussion and Analysis of Financial Condition and Results of Operations of this Form 10-K. Statements that are not statements of historical fact may be deemed forward-looking statements. You can identify these forward-looking statements by the use of the words “feels”, “believes”, “anticipates”, “plans”, “expects”, “may”, “will”, “would”, “intends”, “suggests”, “appears”, “estimates”, “projects”, “should” and similar expressions, whether in the negative or affirmative. These statements are subject to various risks and uncertainties, many of which are outside the control of the Company, including, and without limitation:

- Foreign currency exchange rate fluctuations that could adversely affect translation of the Company’s future sales, financial operating results and the condition of its non-U.S. operations, especially when a currency weakens against the U.S. dollar.
- Current global economic, sovereign and political conditions and uncertainties, particularly regarding the effect of new or proposed tariff or trade regulations; the U.K. voting to exit the European Union as well as the Chinese government’s ongoing tightening of restrictions on procurement by government-funded customers; the Company’s ability to access capital and maintain liquidity in volatile market conditions;

changes in timing and demand for the Company's products among the Company's customers and various market sectors, particularly if they should reduce capital expenditures or are unable to obtain funding, as in the cases of governmental, academic and research institutions; the effect of mergers and acquisitions on customer demand for the Company's products; and the Company's ability to sustain and enhance service.

- Negative industry trends; changes in the competitive landscape as a result of changes in ownership, mergers and continued consolidation among the Company's competitors; introduction of competing products by other companies and loss of market share; pressures on prices from customers or resulting from competition; regulatory, economic and competitive obstacles to new product introductions; lack of acceptance of new products; expansion of our business in developing markets; spending by certain end-markets; ability to obtain alternative sources for components and modules; and the possibility that future sales of new products related to acquisitions, which trigger contingent purchase payments, may exceed the Company's expectations.
- Increased regulatory burdens as the Company's business evolves, especially with respect to the FDA and EPA, among others, as well as regulatory, environmental and logistical obstacles affecting the distribution of the Company's products, completion of purchase order documentation by our customers and ability of customers to obtain letters of credit or other financing alternatives.
- Risks associated with lawsuits, particularly involving claims for infringement of patents and other intellectual property rights.
- The impact and costs incurred from changes in accounting principles and practices; the impact and costs of changes in statutory or contractual tax rates in jurisdictions in which the Company operates, specifically as it relates to the 2017 Tax Act in the U.S.; shifts in taxable income among jurisdictions with different effective tax rates; and the outcome of and costs associated with ongoing and future tax audit examinations or changes in respective country legislation affecting the Company's effective rates.

Certain of these and other factors are further described below in Item 1A, Risk Factors, of this Form 10-K. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements, whether because of these factors or for other reasons. All forward-looking statements speak only as of the date of this annual report on Form 10-K and are expressly qualified in their entirety by the cautionary statements included in this report. Except as required by law, the Company does not assume any obligation to update any forward-looking statements.

Item 1A: ***Risk Factors***

The Company is subject to risks and uncertainties, including, but not limited to, the following:

The Company's international operations may be negatively affected by political events, wars or terrorism and regulatory changes, related to either a specific country or a larger region. These potential political, currency and economic disruptions, as well as foreign currency exchange rate fluctuations, could have a material adverse effect on the Company's results of operations or financial condition.

Approximately 72% and 71% of the Company's net sales in 2018 and 2017, respectively, were outside of the United States and were primarily denominated in foreign currencies. In addition, the Company has considerable manufacturing operations in Ireland and the United Kingdom, as well as significant subcontractors located in Singapore. As a result, a significant portion of the Company's sales and operations are subject to certain risks, including adverse developments in the political, regulatory and economic environment, in particular, uncertainty regarding possible changes to foreign and domestic trade policy; the effect of the U.K. voting to exit the European Union as well as the financial difficulties and debt burden experienced by a number of European countries; the instability and potential impact of war or terrorism; the instability and possible dissolution of the Euro as a single currency; sudden movements in a country's foreign exchange rates due to a change in a country's sovereign risk profile or foreign exchange regulatory practices; tariffs and other trade barriers; difficulties in staffing and managing foreign operations; and associated adverse operational, contractual and tax consequences.

Additionally, the U.S. dollar value of the Company's net sales, cost of sales, operating expenses, interest, taxes and net income varies with foreign currency exchange rate fluctuations. Significant increases or decreases in the value of the U.S. dollar relative to certain foreign currencies, particularly the Euro, Japanese yen and British pound, could have a material adverse effect or benefit on the Company's results of operations or financial condition.

Global economic conditions may decrease demand for the Company's products and harm the Company's financial results.
The Company is a global business that may be adversely affected by changes in global economic conditions. These changes in global economic conditions, both inside and outside the U.S., may affect the demand for the Company's products and services. This may result in a decline in sales in the future, increased rate of order cancellations or delays, increased risk of excess or obsolete inventories, longer sales cycles and potential difficulty in collecting sales proceeds. There can be no assurance regarding demand for the Company's products and services in the future.

The Company's financial results are subject to changes in customer demand, which may decrease for a number of reasons, many beyond the Company's control.
The demand for the Company's products is dependent upon the size of the markets for its LC, LC-MS, thermal analysis, rheometry and calorimetry products; the timing and level of capital spending and expenditures of the Company's customers; changes in governmental regulations, particularly affecting drug, food and drinking water testing; funding available to governmental, academic and research institutions; general economic conditions and the rate of economic growth in the Company's major markets; and competitive considerations. The Company typically experiences an increase in sales in its fourth quarter as a result of purchasing habits for capital goods by customers that tend to exhaust their spending budgets by calendar year end. However, there can be no assurance that the Company will effectively forecast customer demand and appropriately allocated research and development expenditures to products with high growth and high margin prospects. Additionally, there can be no assurance that the Company's results of operations or financial condition will not be adversely impacted by a change in any of the factors listed above or the continuation of uncertain global economic conditions.

Additionally, the analytical instrument market may, from time to time, experience low sales growth. Approximately 56% of the Company's net sales in both 2018 and 2017 were to worldwide pharmaceutical and biotechnology companies, which may be periodically subject to unfavorable market conditions and consolidations. Unfavorable industry conditions could have a material adverse effect on the Company's results of operations or financial condition.

Disruption in worldwide financial markets could adversely impact the Company's access to capital and financial condition.
Financial markets in the U.S., Europe and Asia have experienced times of extreme disruption, including, among other things, sharp increases in the cost of new capital, credit rating downgrades and bailouts, severely diminished capital availability and severely reduced liquidity in money markets. Financial and banking institutions have also experienced disruptions, resulting in large asset write-downs, higher costs of capital, rating downgrades and reduced desire to lend money. There can be no assurance that there will not be future deterioration or prolonged disruption in financial markets or financial institutions. Any future deterioration or prolonged disruption in financial markets or financial institutions in which the Company participates may impair the Company's ability to access its existing cash, utilize its existing syndicated bank credit facility funded by such financial institutions, and impair its ability to access sources of new capital. The cost to the Company of any new capital raised and interest expense would increase if this were to occur.

Competitors may introduce more effective or less expensive products than the Company's, which could result in decreased sales. The competitive landscape may transform as a result of potential changes in ownership, mergers and continued consolidations among the Company's competitors, which could harm the Company's business.

The analytical instrument market and, in particular, the portion related to the Company's HPLC, UPLC, LC-MS, thermal analysis, rheometry and calorimetry product lines, is highly competitive and subject to rapid changes in technology. The Company encounters competition from several international instrument suppliers and other companies in both domestic and foreign markets. Some competitors have instrument businesses that are generally more diversified than the Company's business, but are typically less focused on the Company's chosen markets. Over the years, some competitors have merged with other competitors for various reasons, including increasing product line offerings, improving market share and reducing costs. There can be no assurance that the Company's competitors will not introduce more effective and less costly products than those of the Company or that the Company will be able to increase its sales and profitability from new product introductions. There can be no assurance that the Company's sales and marketing forces will compete successfully against the Company's competitors in the future.

Strategies for organic growth require developing new technologies and bringing these new technologies to market, which could negatively impact the Company's financial results.

The Company's corporate strategy is fundamentally based on winning through organic innovation and deep application expertise. The Company is in the process of developing new products with recently acquired technologies. The future development of these new products will require a significant amount of spending over the next few years before significant, robust sales will be realized. Furthermore, these new products will be sold into both the non-clinical and clinical markets, and any new products requiring FDA clearance may take longer to bring to market. There can be no assurance given as to the timing of these new product launches and the ultimate realization of sales and profitability in the future.

The Company's software or hardware may contain coding or manufacturing errors that could impact their function, performance and security, and result in other negative consequences.

Despite testing prior to the release and throughout the lifecycle of a product or service, the detection and correction of any errors in released software or hardware can be time consuming and costly. This could delay the development or release of new products or services, or new versions of products or services, create security vulnerabilities in the Company's products or services, and adversely affect market acceptance of products or services. If the Company experiences errors or delays in releasing its software or hardware, or new versions thereof, its sales could be affected and revenues could decline. Errors in software or hardware could expose the Company to product liability, performance and warranty claims as well as harm to brand and reputation, which could impact future sales.

The loss of key members of management and the risks inherent in succession planning could adversely affect the Company's results of operations or financial condition.

The operation of the Company requires managerial and operational expertise. None of the Company's key management employees, with the exception of the Chairman and Chief Executive Officer and the Senior Vice President and Chief Financial Officer, have an employment contract with the Company and there can be no assurance that such individuals will remain with the Company. If, for any reason, other such key personnel do not continue to be active in management, the Company's results of operations or financial condition could be adversely affected.

Disruption of operations at the Company's manufacturing facilities could harm the Company's financial condition.

The Company manufactures LC instruments at facilities in Milford, Massachusetts and through a subcontractor in Singapore; precision chemistry separation columns at its facilities in Taunton, Massachusetts and Wexford, Ireland; MS products at its facilities in Wilmslow, England, Solihull, England and Wexford, Ireland; thermal analysis and rheometry products at its facilities in New Castle, Delaware and other instruments and consumables at various other locations as a result of the Company's acquisitions. Any prolonged disruption to the operations at any of these facilities, whether due to labor difficulties, destruction of or damage to any facility or other reasons, could have a material adverse effect on the Company's results of operations or financial condition.

Failure to adequately protect intellectual property could have materially adverse effects on the Company's results of operations or financial condition.
There can be no assurance that any patents held by the Company will not be challenged, invalidated or circumvented or that the rights granted thereunder will provide competitive advantages to the Company. Additionally, there could be successful claims against the Company by third-party patent holders with respect to certain Company products that may infringe the intellectual property rights of such third parties. The Company's patents, including those licensed from others, expire on various dates. If the Company is unable to protect its intellectual property rights, it could have an adverse and material effect on the Company's results of operations or financial condition.

The Company's business would suffer if the Company were unable to acquire adequate sources of supply.
Most of the raw materials, components and supplies purchased by the Company are available from a number of different suppliers; however, a number of items are purchased from limited or single sources of supply and disruption of these sources could have, at a minimum, a temporary adverse effect on shipments and the financial results of the Company. A prolonged inability to obtain certain materials or components could have an adverse effect on the Company's financial condition or results of operations and could result in damage to its relationships with its customers and, accordingly, adversely affect the Company's business.

The Company's sales would deteriorate if the Company's outside contractors fail to provide necessary components or modules.
Certain components or modules of the Company's LC and MS instruments are manufactured by outside contractors, including the manufacturing of LC instrument systems and related components by contract manufacturing firms in Singapore. Disruptions of service by these outside contractors could have an adverse effect on the supply chain and the financial results of the Company. A prolonged inability to obtain these components or modules could have an adverse effect on the Company's financial condition or results of operations.

The Company's business could be harmed by actions of distributors and other third parties that sell our products.
The Company sells some products through third parties, including distributors and value-added resellers. This exposes us to various risks, including competitive pressure, concentration of sales volumes, credit risks and compliance risks. We may rely on one or a few key distributors for a product or market and the loss of these distributors could reduce our revenue or net earnings. Distributors may also face financial difficulties, including bankruptcy, which could harm our collection of accounts receivable. Violations of the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.K. Bribery Act or similar anti-bribery laws by distributors or other third-party intermediaries could materially impact our business. Risks related to our use of distributors may reduce sales, increase expenses and weaken our competitive position.

The Company may be harmed by improper conduct of any of our employees, agents or business partners.
We cannot provide assurance that our internal controls and compliance systems will always protect the Company from acts committed by employees, agents or business partners that would violate domestic and international laws, including 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 FCPA, the U.K. Bribery Act and similar anti-bribery laws 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, the government may seek to hold us liable as a successor for violations committed by companies in which we invest or that we acquire. We also rely on our suppliers to adhere to our supplier standards of conduct and material violations of such standards of conduct could occur that could have a material effect on our business, reputation and financial statements.

The effects of climate change could harm the Company's business.
The Company's manufacturing processes for certain of its products involve the use of chemicals and other substances that are regulated under various international, federal, state and local laws governing the environment. In the event that any future climate change legislation would require that stricter standards be imposed by domestic or international environmental regulatory authorities with respect to the use and/or levels of possible emissions from such chemicals and/or other substances, the Company may be required to make certain changes and adaptations to its manufacturing processes. Any such changes could have a material adverse effect on the financial statements of the Company.

Another potential effect of climate change is an increase in the severity of global weather conditions. The Company's manufacturing facilities are located in the United States, United Kingdom, Ireland and Germany. In addition, the Company manufactures a growing percentage of its HPLC, UPLC and MS products in both Singapore and Ireland. Severe weather and geological conditions or events, including earthquakes, hurricanes and/or tsunamis, could potentially cause significant damage to the Company's manufacturing facilities in each of these countries. The effects of such damage and the resulting disruption of manufacturing operations and the impact of lost sales could have a material adverse impact on the financial results of the Company.

The Company's financial results are subject to unexpected shifts in pre-tax income between tax jurisdictions, changing application of tax law and tax audit examinations.
The Company is subject to rates of income tax that range from 0% up to 35% in various jurisdictions in which it conducts business. In addition, the Company typically generates a substantial portion of its income in the fourth quarter of each fiscal year. Geographical shifts in income from previous quarters' projections caused by factors including, but not limited to, changes in volume and product mix and fluctuations in foreign currency translation rates, could therefore have potentially significant favorable or unfavorable effects on the Company's income tax expense, effective tax rate and results of operations.

Governments in the jurisdictions in which the Company operates implement changes to tax laws and regulations from time to time. Any changes in corporate income tax rates or regulations regarding transfer pricing or repatriation of dividends or capital, as well as changes in the interpretation of existing tax laws and regulations, in the jurisdictions in which the Company operates could adversely affect the Company's cash flow and lead to increases in its overall tax burden, which would negatively affect the Company's profitability.

On December 22, 2017, the U.S. enacted the 2017 Tax Act. The 2017 Tax Act changed the U.S. tax system to a territorial tax system, including base broadening measures on non-U.S. earnings, whereby historical unremitted, earnings of foreign subsidiaries are deemed to have been repatriated to the U.S. in 2017 regardless of when the assets are actually remitted to the U.S., as well as reducing or eliminating certain domestic deductions and credits and limiting the deductibility of interest expense and executive compensation. Earnings deemed to have been distributed to the U.S. in accordance with the aforementioned 2017 Tax Act deemed distribution rules are subject to a transition tax, which is a one-time, mandatory deemed repatriation tax on the accumulated foreign earnings that have not been previously taxed. To the extent those earnings are deemed to have been invested in cash and cash equivalents, they will be taxed at a rate of 15.5%; the remainder of those earnings will be taxed at a rate of 8.0%. As a result, the Company's historical unremitted foreign earnings were deemed repatriated in 2017 and the Company incurred a $550 million estimated tax provision, which primarily consisted of an estimated transition tax, as well as estimated income tax provisions for state and withholding taxes and a provision associated with the remeasurement of the Company's deferred tax assets and liabilities from 35% to the new U.S. corporate income tax rate of 21%. The transition tax will be paid over an eight-year period, which started in 2018, and will not accrue interest. During 2018, the Internal Revenue Service issued proposed regulations with respect to the transition tax and other new areas of the Tax Reform law that impact the 2018 tax provision. The Company anticipates additional proposed regulations, and the final versions of the currently proposed regulations could clarify or change the interpretation of the new laws. As permitted by the SEC Staff Accounting Bulletin No. 118, the Company completed its analysis and calculation of the 2017 Tax Act federal and state transition tax liability during 2018, which remained significantly unchanged.

The Company has a contractual tax rate in Singapore of 0% through March 2021, based upon the achievement and continued satisfaction of certain operational and financial milestones, which the Company expects to continue to meet. Currently, the Company has determined that it is more likely than not to realize the contractual tax rate in Singapore of 0% and has not recognized any uncertain tax position in its balance sheet related to the achievement of the contractual milestones in Singapore. In the event that it appears that the milestone targets will not be met, the Company will no longer be entitled to a 0% contractual tax rate benefit on income earned in Singapore dating back to the start date of the agreement (April 1, 2016), at which time all tax benefits previously recorded would be reversed and an income tax charge equal to the statutory tax of 17% on income earned during that period would be recorded.

As a global business, the Company is subject to tax audit examinations in various jurisdictions throughout the world. The Company must manage the cost and disruption of responding to governmental audits, investigation and proceedings. In addition, the impact of the settlement of pending or future tax audit examination could have an unfavorable effect on the Company's income tax expense, effective tax rate and results of operations.

The Company's financial condition and results of operations could be adversely affected if the Company is unable to maintain a sufficient level of cash flow.

The Company had $1,148 million in debt and $1,735 million in cash, cash equivalents and investments as of December 31, 2018. As of December 31, 2018, the Company also had the ability to borrow an additional $1,208 million from its existing, committed credit facility. All but a small portion of the Company's debt was in the U.S. There is a substantial cash requirement in the U.S. to fund operations and capital expenditures, service debt interest obligations, finance potential U.S. acquisitions and continue authorized stock repurchase programs.

The Company has conducted a post-tax reform evaluation of its capital allocation strategy and is currently planning to use its existing cash, cash equivalents and investments, cash flow from operations and available debt capacity to repurchase up to $4 billion of the Company's common stock over the next two years. As a result, the Company's financial condition and results of operations could be adversely impacted if the Company is unable to generate and maintain a sufficient level of cash flow to address these requirements through (1) cash from operations, (2) the Company's ability to access its existing cash and revolving credit facility, (3) the ability to expand the Company's borrowing capacity and (4) other sources of capital obtained at an acceptable cost.

Debt covenants, and the Company's failure to comply with them, could negatively impact the Company's capital and financial results.

The Company's debt is subject to restrictive debt covenants that limit the Company's ability to engage in certain activities that could otherwise benefit the Company. These debt covenants include restrictions on the Company's ability to enter into certain contracts or agreements, which may limit the Company's ability to make dividend or other payments, secure other indebtedness, enter into transactions with affiliates and consolidate, merge or transfer all or substantially all of the Company's assets. The Company is also required to meet specified financial ratios under the terms of the Company's debt agreements. The Company's ability to comply with these financial restrictions and all other covenants is dependent on the Company's future performance, which is subject to, but not limited to, prevailing economic conditions and other factors, including factors that are beyond the Company's control, such as foreign exchange rates, interest rates, changes in technology and changes in the level of competition. As of December 31, 2018, the Company was in compliance with all debt covenants.

Disruption, cyber attack or unforeseen problems with the security, maintenance or upgrade of the Company's information and web-based systems could have an adverse effect on the Company's operations and financial condition.
The Company relies on its technology infrastructure and that of its software and banking partners, among other functions, to interact with suppliers, sell products and services, fulfill contract obligations, ship products, collect and make electronic wire and check based payments and otherwise conduct business. The Company's technology infrastructure may be vulnerable to damage or interruption from, but not limited to, natural disasters, power loss, telecommunication failures, terrorist attacks, computer viruses, unauthorized access to customer or employee data, unauthorized access to and funds transfers from Company bank accounts and other attempts to harm the Company's systems. Any prolonged disruption to the Company's technology infrastructure, at any of its facilities, could have a material adverse effect on the Company's results of operations or financial condition.

If the Company's security measures are compromised or fail to adequately protect its technology infrastructure, research and development efforts or manufacturing operations, the Company's products and services may be perceived as vulnerable or unreliable, the information the Company's controls and processes may be subject to unauthorized access, acquisition or modification, the Company's brand and reputation could be damaged, the services that the Company provides to its customers could be disrupted, and customers may stop using the Company's products and services, all of which could reduce the Company's revenue and earnings, increase its expenses and expose the Company to legal claims and regulatory actions.
The Company is in the business of designing, manufacturing, selling and servicing analytical instruments to life science, pharmaceutical, biochemical, industrial, nutritional safety, and environmental, academic and governmental customers working in research and development, quality assurance and other laboratory applications, and the Company is also a developer and supplier of software-based products that support instrument systems. Many of the Company's customers are in highly regulated industries. While the Company has invested time and resources implementing measures designed to protect the integrity and security of its technology infrastructure, research and development processes, manufacturing operations, products and services, and the internal and external data managed by the Company, there is a risk these measures will be defeated or compromised or that they are otherwise insufficient to protect against existing or emerging threats. The Company also has acquired companies, products, services and technologies over time and may face inherit risk when integrating these acquisitions into the Company. In addition, at times, the Company faces attempts by third parties to defeat its security measures or exploit vulnerabilities in its systems. These risks will increase as the Company continues to grow and expand geographically, and its systems, products and services become increasingly digital and sensor- and web-based.

The Company could suffer significant damage to its brand and reputation if a security incident resulted in unauthorized access to, acquisition of, or modification to the Company's technology infrastructure, research and development processes, manufacturing operations, its products and services as well as the internal and external data managed by the Company. Such an incident could disrupt the Company's operations and customers could lose confidence in the Company's ability to deliver quality and reliable products or services. This could negatively impact sales and could increase costs related to fixing and addressing these incidents and any vulnerabilities exposed by them, as well as to lawsuits, regulatory investigations, claims or legal liability including contractual liability, costs and expenses owed to customers and business partners.

Compliance failures could harm the Company's business.
The Company is subject to regulation by various federal, state and foreign governments and agencies in areas including, among others, health and safety, import/export, privacy and data protection, FCPA and environmental laws and regulations. A portion of the Company's operations are subject to regulation by the FDA and similar foreign regulatory agencies. These regulations are complex and govern an array of product activities, including design, development, labeling, manufacturing, promotion, sales and distribution. Any failure by the Company to comply with applicable governmental regulations could result in product recalls, the imposition of fines, restrictions on the Company's ability to conduct or expand its operations or the cessation of all or a portion of its operations.

Regulators globally are increasingly imposing greater fines and penalties for privacy and data protection violations, and the European Union has enacted a broad data protection regulation with fines based on a percentage of global revenues. Changes in laws or regulations associated with enhanced protection of certain sensitive types of personal information, such as information related to health, could greatly increase the cost of compliance and the cost of providing the Company's products or services. Any failure, or perceived failure, by the Company to comply with laws and regulations on privacy, data security or consumer protection, or other policies, public perception, standards, self-regulatory requirements or legal obligations, could result in lost or restricted business, proceedings, actions or fines brought against the Company or levied by governmental entities or others, or could otherwise adversely affect the business and harm the Company's reputation.

Some of the Company's operations are subject to domestic and international laws and regulations with respect to the manufacturing, handling, use or sale of toxic or hazardous substances. This requires the Company to devote substantial resources to maintain compliance with those applicable laws and regulations. If the Company fails to comply with such requirements in the manufacturing or distribution of its products, it could face civil and/or criminal penalties and potentially be prohibited from distributing or selling such products until they are compliant.

Some of the Company's products are also subject to the rules of certain industrial standards bodies, such as the International Standards Organization. The Company must comply with these rules, as well as those of other agencies, such as the United States Occupational Safety and Health Administration. Failure to comply with such rules could result in the loss of certification and/or the imposition of fines and penalties, which could have a material adverse effect on the Company's operations.

As a publicly-traded company, the Company is subject to the rules of the SEC and the New York Stock Exchange. In addition, the Company must comply with the Sarbanes-Oxley regulations, which require the Company to establish and maintain adequate internal control over financial reporting. The Company's efforts to comply with such laws and regulations are time consuming and costly. While we continue to enhance our controls, we cannot be certain that we will be able to prevent future significant deficiencies or material weaknesses. Failure to comply with such regulations or having inadequate internal controls could have a material adverse effect on the Company's financial condition and operations, which could cause investors to lose confidence in our reported financial information and could have a negative effect on the trading price of our stock and our access to capital.

The Company is subject to the rules of the SEC under the Dodd-Frank Wall Street Reform and Consumer Protection Act, requiring disclosure as to whether certain materials (tantalum, tin, gold and tungsten), known as conflict minerals, which may be contained in the Company's products, are mined from the Democratic Republic of the Congo and adjoining countries. In 2017, the Company was not able to determine with certainty the country of origin of some of the conflict minerals in its manufactured products. However, the Company does not have knowledge that any of its conflict minerals originated from the Democratic Republic of the Congo or adjoining countries. The Company is in the process of evaluating its 2018 supply chain, and the Company plans to file its 2018 Form SD with the SEC in May 2019. The results of this and future evaluations may impose additional costs and may introduce new risks related to the Company's ability to verify the origin of any conflict minerals contained in its products.

The Company's financial condition and results of operations could be adversely affected by changes to the Company's retirement plans or retirement plan assets.

In December 2018, the Company settled a frozen U.S. defined benefit pension plan by making lump-sum cash payments and purchasing annuity contracts for participants to permanently extinguish the pension plan's obligations. This plan was the Company's largest defined benefit pension plan. The Company still sponsors various retirement plans, both inside and outside the U.S. Any changes in regulations made by governments in countries in which the Company sponsors retirement plans could adversely impact the Company's cash flows or results of operations. In connection with these retirement plans, the Company is exposed to market risks associated with changes in the various capital markets. For example, changes in long-term interest rates affect the discount rate that is used to measure the Company's retirement plan obligations and related expense. In addition, changes in the market value of investments held by the retirement plans could materially impact the funded status of the retirement plans, and affect the related pension expense and level and timing of contributions required under applicable laws.

Estimates and assumptions made in accounting for the Company's results from operations are dependent on future results, which involve significant judgments and may be imprecise and may differ materially from actual results.

The preparation of consolidated financial statements in conformity with generally accepted accounting principles requires the Company to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses, and related disclosure of contingent liabilities at the dates of the financial statements. These estimates and assumptions must be made due to certain information used in preparation of our financial statements which is dependent on future events, cannot be calculated with a high degree of precision from data available or is not capable of being readily calculated based on generally accepted methodologies. The Company believes that the accounting related to revenue recognition, product returns and allowances, bad debts, inventory valuation, goodwill and intangible assets, income taxes, warranty and installation provisions, litigation, retirement plan obligations, stock-based compensation, equity investments, business combinations and asset acquisitions, uncertain tax positions and contingencies involves significant judgments and estimates. Actual results for all estimates could differ materially from the estimates and assumptions used, which could have a material adverse effect on our financial condition and results of operations.

Item 1B: ***Unresolved Staff Comments***

None.

Item 2: ***Properties***

Waters Corporation operates 22 United States facilities and 72 international facilities, including field offices. The Company believes its facilities are suitable and adequate for its current production level and for reasonable growth over the next several years. The Company's primary facilities are summarized in the table below.

Primary Facility Locations

Location	Function (1)	Owned/Leased
Golden, CO	M, R, S, D, A	Leased
New Castle, DE	M, R, S, D, A	Owned
Franklin, MA	D	Leased
Milford, MA	M, R, S, A	Owned
Taunton, MA	M, R	Owned
Wakefield, MA	M, R, S, D, A	Leased
Eden Prairie, MN	M, R, S, D, A	Leased
Nixa, MO	M, S, D, A	Leased
Sharpsburg, PA	M, R, S, D, A	Leased
Lindon, UT	M, R, S, D, A	Leased
Newcastle, England	R, S, D, A	Leased
Solihull, England	M,A	Owned
Wilmslow, England	M, R, S, D, A	Owned
St. Quentin, France	S, A	Leased
Bochum, Germany	R, S, A	Leased
Huellhorst, Germany	M, R, S, D, A	Owned
Budapest, Hungary	R	Leased
Wexford, Ireland	M, R, D, A	Owned
Etten-Leur, Netherlands	S, D, A	Owned
Brasov, Romania	R, A	Leased
Singapore	R, S, D, A	Leased

(1) M = Manufacturing; R = Research; S = Sales and Service; D = Distribution; A = Administration

The Company operates and maintains 11 field offices in the United States and 61 field offices abroad in addition to sales offices in the primary facilities listed above. The Company's field office locations are listed below.

Field Office Locations (2)

United States	International		
Costa Mesa, CA	Australia	India	Portugal
Pleasanton, CA	Austria	Ireland	Poland
Wood Dale, IL	Belgium	Israel	Puerto Rico
Carmel, IN	Brazil	Italy	Spain
Columbia, MD	Canada	Japan	Sweden
Beverly, MA	Czech Republic	Korea	Switzerland
Durham, NC	Denmark	Malaysia	Taiwan
Morrisville, NC	Finland	Mexico	United Kingdom
Parsippany, NJ	France	Netherlands	
Plymouth Meeting, PA	Germany	Norway	
Bellaire, TX	Hungary	People's Republic of China	

(2) The Company operates more than one field office within certain states and foreign countries.

Item 3: ***Legal Proceedings***

From time to time, the Company and its subsidiaries are involved in various litigation matters arising in the ordinary course of business. The Company believes it has meritorious arguments in its current litigation matters and believes any outcome, either individually or in the aggregate, will not be material to the Company's financial position or results of operations.

Item 4: ***Mine Safety Disclosures***

Not applicable.

EXECUTIVE OFFICERS OF THE REGISTRANT

Officers of the Company are elected annually by the Board of Directors and hold office at the discretion of the Board of Directors. The following persons serve as executive officers of the Company:

Christopher J. O'Connell, 52, has served as a Director of the Company since September 2015, when he assumed the position of President and Chief Executive Officer of the Company. In December 2017, Mr. O'Connell was appointed as the Chairman of the Board of Directors of the Company. Mr. O'Connell served as Executive Vice President and President of Restorative Therapies Group of Medtronic plc from August 2009 to August 2015. From 1994 to August 2009, Mr. O'Connell served in the following positions at Medtronic plc: Senior Vice President and President of Medtronic Diabetes, President of Medtronic Physio-Control, Vice President of Sales and Marketing for the Cardiac Rhythm Management business, Vice President/General Manager of the Patient Management Business, Vice President of Corporate Strategy, Director of Investor Relations and Corporate Development Associate.

Mark T. Beaudouin, 64, was appointed Senior Vice President, General Counsel and Secretary in February 2016 and was Vice President, General Counsel and Secretary of the Company since April 2003. Prior to joining Waters Corporation, he served as Senior Vice President, General Counsel and Secretary of PAREXEL International Corporation, a bio/pharmaceutical services company, from January 2000 to April 2003. Previously, from May 1985 to January 2000, Mr. Beaudouin served in several senior legal management positions, including Vice President, General Counsel and Secretary of BC International, Inc., a development stage biotechnology company, First Senior Vice President, General Counsel and Secretary of J. Baker, Inc., a diversified retail company, and General Counsel and Secretary of GenRad, Inc., a high technology test equipment manufacturer.

Sherry L. Buck, 55, was appointed Senior Vice President and Chief Financial Officer in January 2017. Previously, Ms. Buck served as the Vice President, Chief Financial Officer of Libbey Inc. since August 2012. From 1993 to 2012, Ms. Buck held several positions at Whirlpool Corporation, including Vice President, Finance/Chief Financial Officer, Global Product and Enterprise Cost Leadership; Vice President, Finance—US; Vice President, Cost Leadership; Vice President, Finance—International; and Vice President, Business Performance Management.

Robert G. Carson, 45, was appointed Senior Vice President, Corporate Development in February 2018. Prior to joining Waters Corporation, he held several positions during his 16 years at Medtronic plc, including Vice President and General Manager, Pacemaker Business from January 2017 to January 2018. In addition, Mr. Carson spent nearly 12 years in Medtronic's spinal implants and biologics business, serving as Vice President and General Manager from July 2016 to January 2017, Vice President of Global Marketing & Strategy from April 2015 to July 2016 and Vice President & Therapy Segment Leader from October 2012 to April 2015. Mr. Carson began his career with Banc of America Securities.

Dr. Michael C. Harrington, 58, was appointed Senior Vice President, Global Markets in February 2016. Dr. Harrington joined Waters Corporation in 1987 and has held several senior positions with Waters Corporation, including Vice President, Europe and Asia Pacific Operations, Senior Director of US Sales Operations, Director of US Chemistry Sales and General Manager of Phase Separations. Prior to joining Waters Corporation, Dr. Harrington held senior sales positions at Celsis, Inc.

Terrance P. Kelly, 56, was appointed Senior Vice President and President, TA Instruments in February 2016. Mr. Kelly has served as President, TA instruments since February 2005. Mr. Kelly started his career in finance and accounting at ICI in 1985. He joined DuPont in 1988. He held various sales and marketing positions with DuPont, and later TA Instruments. Mr. Kelly joined Waters Corporation in 1996, when TA Instruments was acquired.

Francis Kim, 52, was appointed Senior Vice President, Global Operations in February 2018. Mr. Kim previously served as Vice President of Global Quality Assurance since November 2016. Prior to joining Waters Corporation, he held several positions during his 20 years at Medtronic plc, including Vice President of Quality, Restorative Therapies Group from May 2015 to November 2016 and Vice President of Quality, Regulatory and Clinical Affairs, Surgical Technologies Division from January 2011 to May 2015.

Ian S. King, 62, was appointed Senior Vice President, Global Products in July 2017. Mr. King joined Waters in 1982 and previously served as Senior Vice President, Instrument Technology; Vice President, Separations Technologies; and Vice President and General Manager of Consumable Division, as well as a variety of scientific and management positions in Waters Corporation's international subsidiaries. Prior to joining Waters Corporation, Mr. King worked at Edinburgh University as a research scientist.

Elizabeth B. Rae, 61, was appointed Senior Vice President, Global Human Resources in February 2016 and was Vice President of Human Resources since October 2005 and Vice President of Worldwide Compensation and Benefits since January 2002. Ms. Rae joined Waters Corporation in January 1996 as Director of Worldwide Compensation. Prior to joining Waters Corporation, she held senior human resources positions in retail, healthcare and financial services companies.

PART II

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

The Company's common stock is registered under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and is listed on the New York Stock Exchange under the symbol "WAT". As of February 21, 2019, the Company had 86 common stockholders of record. The Company has not declared or paid any dividends on its common stock in its past three fiscal years and does not intend to pay cash dividends in the foreseeable future. Any future determination to pay cash dividends will be made at the discretion of the Board of Directors and will depend on restrictions and other factors the Board of Directors may deem relevant. The Company has not made any sales of unregistered equity securities in the years ended December 31, 2018, 2017 or 2016.

Securities Authorized for Issuance under Equity Compensation Plans

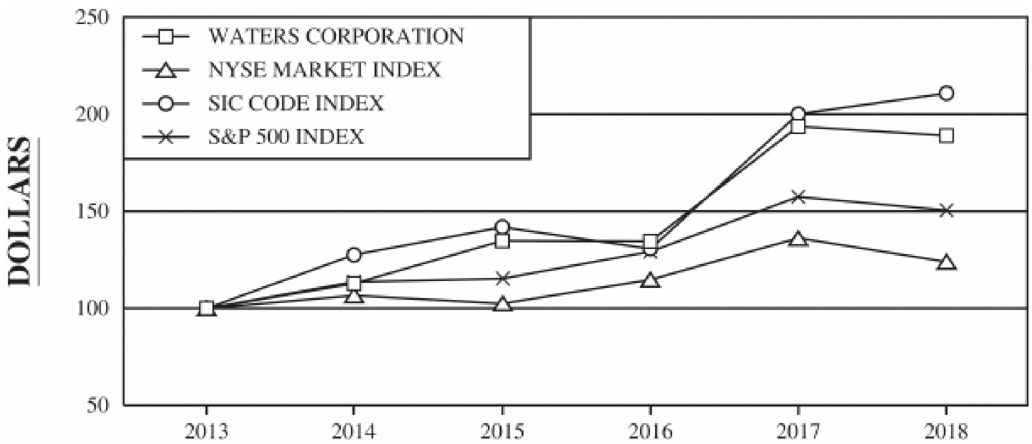
Equity compensation plan information is incorporated by reference from Part III, Item 12, Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters, of this document and should be considered an integral part of this Item 5.

Stock Price Performance Graph

The following performance graph and related information shall not be deemed to be "soliciting material" or to be "filed" with the SEC, nor shall such information be incorporated by reference into any future filing under the Securities Act of 1933, as amended, or the Exchange Act, except to the extent that the Company specifically incorporates it by reference into such filing.

The following graph compares the cumulative total return on $100 invested as of December 31, 2013 (the last day of public trading of the Company's common stock in fiscal year 2013) through December 31, 2018 (the last day of public trading of the common stock in fiscal year 2018) in the Company's common stock, the NYSE Market Index, the SIC Code 3826 Index and the S&P 500 Index. The return of the indices is calculated assuming reinvestment of dividends during the period presented. The Company has not paid any dividends since its IPO. The stock price performance shown on the graph below is not necessarily indicative of future price performance.

COMPARISON OF CUMULATIVE TOTAL RETURN SINCE DECEMBER 31, 2013
AMONG WATERS CORPORATION, NYSE MARKET INDEX, SIC CODE 3826 INDEX – LABORATORY ANALYTICAL INSTRUMENTS AND S&P 500 INDEX



	2013	2014	2015	2016	2017	2018
WATERS CORPORATION	$ 100.00	$ 112.72	$ 134.58	$ 134.39	$ 193.19	$ 188.65
NYSE MARKET INDEX	$ 100.00	$ 106.75	$ 102.38	$ 114.61	$ 136.07	$ 123.89
SIC CODE INDEX	$ 100.00	$ 127.50	$ 141.59	$ 130.44	$ 199.51	$ 210.24
S&P 500 INDEX	$ 100.00	$ 113.69	$ 115.26	$ 129.05	$ 157.22	$ 150.33

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Purchases of Equity Securities by the Issuer

The following table provides information about purchases by the Company during the three months ended December 31, 2018 of equity securities registered by the Company under the Exchange Act (in thousands, except per share data):

Period	Total Number of Shares Purchased (1)	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Programs (2)	Maximum Dollar Value of Shares that May Yet Be Purchased Under the Programs (2)
September 30 to October 27, 2018	128	$182.79	128	$ 2,968,685
October 28 to November 24, 2018	1,126	$195.56	1,126	$ 2,748,484
November 25 to December 31, 2018	1,466	$189.54	1,460	$ 2,471,785
Total	2,720	$191.71	2,714	$ 2,471,785

(1) The Company repurchased 6 thousand shares of common stock at a cost of less than $1 million related to the vesting of restricted stock units during the three months ended December 31, 2018.

(2) In April 2018, the Company's Board of Directors authorized the repurchase of up to $3.5 billion of its outstanding common stock in open market or private transactions over a three-year period. In January 2019, the Company's Board of Directors authorized the Company to repurchase up to $4 billion of its outstanding common stock in open market or private transactions over a two-year period. This new program replaced the remaining amounts available under the April 2018 authorization.

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Item 6: Selected Financial Data

The following table sets forth selected historical consolidated financial and operating data for the periods indicated. The statement of operations and balance sheet data is derived from financial statements for the years 2018, 2017, 2016, 2015 and 2014. The Company's financial statements as of December 31, 2018 and 2017, and for each of the three years in the period ended December 31, 2018 are included in Part II, Item 8, Financial Statements and Supplementary Data, of this Form 10-K.

In thousands, except per share and employees data	2018	2017	2016	2015	2014
STATEMENT OF OPERATIONS DATA:					
Net sales	$2,419,929	$2,309,078	$2,167,423	$2,042,332	$1,989,344
Income from operations before income taxes	$ 682,146	$ 641,097	$ 600,114	$ 541,918	$ 490,740
Net income*	$ 593,794	$ 20,311	$ 521,503	$ 469,275	$ 431,620
Net income per basic common share*	$ 7.71	$ 0.25	$ 6.46	$ 5.70	$ 5.12
Weighted-average number of basic common shares	76,992	79,793	80,786	82,336	84,358
Net income per diluted common share*	$ 7.65	$ 0.25	$ 6.41	$ 5.65	$ 5.07
Weighted-average number of diluted common shares and equivalents	77,618	80,604	81,417	83,087	85,151
BALANCE SHEET AND OTHER DATA:					
Cash, cash equivalents and investments	$1,735,224	$3,393,701	$2,813,032	$2,399,263	$2,055,388
Working capital, including current maturities of debt**	$2,214,232	$3,663,977	$3,115,124	$2,649,457	$2,236,558
Total assets**	$3,727,426	$5,324,354	$4,662,059	$4,268,677	$3,874,690
Long-term debt**	$1,148,172	$1,897,501	$1,701,966	$1,493,027	$1,237,463
Stockholders' equity***	$1,567,258	$2,233,788	$2,301,949	$2,058,851	$1,894,666
Employees	7,246	7,020	6,899	6,594	6,161

* The provision for income taxes for 2017 includes a $550 million estimate for the impact of the enactment of the 2017 Tax Act, which was signed into law on December 22, 2017. The $550 million income tax provision reduced net income per share by $6.82. The $550 million income tax provision primarily consists of an estimated transition tax, as well as estimated income tax provisions for state and withholding taxes and a provision associated with the remeasurement of the Company's deferred tax assets and liabilities from 35% to the new U.S. corporate income tax rate of 21%.

The Company adopted new accounting guidance related to stock-based compensation in 2017. The new accounting guidance requires the excess tax benefits or deficiencies related to stock-based compensation to be reflected in the consolidated statements of operations as a component of the provision for income taxes, whereas they were previously recognized in equity. This aspect of the new accounting guidance was required to be adopted on a prospective basis for the statement of operations and retroactive restatement is not permitted. In 2018 and 2017, the Company recognized an excess tax benefit, which decreased income tax expense by $9 million and $20 million, respectively, and added $0.11 and $0.24, respectively, to net income per diluted share.

In addition, in December 2018, the Company settled a pension plan obligation by making lump-sum cash payments and purchasing annuity contracts for participants to permanently extinguish the pension plan's obligations. As a result, the Company recorded a $46 million charge, which consisted of a $6 million cash contribution to the plan and a $40 million non-cash charge related to the reversal of unrecognized actuarial losses recorded in accumulated other comprehensive income in the stockholders' equity. The $46 million pre-tax charge reduced net income per diluted share by $0.39.

** In 2015, the Company adopted new accounting guidance related to the presentation of debt issuance costs and deferred income taxes, both standards have been applied above retrospectively. Certain debt issuance costs have been reclassified from intangible assets and are presented as a direct deduction from the carrying value of the associated debt. Current deferred tax assets and liabilities have been reclassified as non-current deferred tax assets and liabilities.

*** In 2018, the Company adopted new accounting guidance which eliminates the deferral of tax effects on intra-entity transfers other than inventory and requires an entity to recognize the income tax consequences when the transfer occurs. The Company adopted this standard as of January 1, 2018 with a $4 million charge to beginning retained earnings in the consolidated balance sheet.

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

Business and Financial Overview

The Company has two operating segments: Waters™ and TA™. Waters products and services primarily consist of high performance liquid chromatography ("HPLC"), ultra performance liquid chromatography ("UPLC™" and together with HPLC, referred to as "LC"), mass spectrometry ("MS") and precision chemistry consumable products and related services. TA products and services primarily consist of thermal analysis, rheometry and calorimetry instrument systems and service sales. The Company's products are used by pharmaceutical, biochemical, industrial, nutritional safety, environmental, academic and governmental customers. These customers use the Company's products to detect, identify, monitor and measure the chemical, physical and biological composition of materials and to predict the suitability and stability of fine chemicals, pharmaceuticals, water, polymers, metals and viscous liquids in various industrial, consumer goods and healthcare products.

The Company's operating results are as follows for the years ended December 31, 2018, 2017 and 2016 (dollars in thousands, except per share data):

	Year Ended December 31,			*% change*	
	2018	2017	2016	*2018 vs. 2017*	*2017 vs. 2016*
Revenues:					
Product sales	$1,604,993	$1,552,349	$1,460,296	*3%*	*6%*
Service sales	814,936	756,729	707,127	*8%*	*7%*
Total net sales	2,419,929	2,309,078	2,167,423	*5%*	*7%*
Costs and operating expenses:					
Cost of sales	992,564	947,067	891,453	*5%*	*6%*
Selling and administrative expenses	536,902	544,363	512,331	*(1%)*	*6%*
Research and development expenses	143,403	132,593	125,187	*8%*	*6%*
Purchased intangibles amortization	7,712	6,743	9,889	*14%*	*(32%)*
Litigation (settlement) provision	(426)	11,114	3,524	*(104%)*	*215%*
Acquired in-process research and development	—	5,000	—	*(100%)*	—
Operating income	739,774	662,198	625,039	*12%*	*6%*
Operating income as a % of sales	*30.6%*	*28.7%*	*28.8%*		
Other expense	(47,794)	(340)	(700)	**	*51%*
Interest expense, net	(9,834)	(20,761)	(24,225)	*(53%)*	*(14%)*
Income before income taxes	682,146	641,097	600,114	*6%*	*7%*
Provision for income taxes	88,352	620,786	78,611	*(86%)*	*690%*
Net income	$ 593,794	$ 20,311	$ 521,503	**	*(96%)*
Net income per diluted common share	$ 7.65	$ 0.25	$ 6.41	**	*(96%)*

** Percentage not meaningful

The Company's net sales increased 5% in 2018 as compared to 2017, and 7% in 2017 as compared to 2016. Foreign currency translation increased sales growth by 1% in both 2018 and 2017. Recent acquisitions did not have an impact on sales growth. Unless otherwise noted, sales growth or decline percentages are presented as compared with the same period in the prior year.

Instrument system sales increased 2% and 6% in 2018 and 2017, respectively. In 2018, the increase in instrument system sales was primarily driven by an increase in demand for LC and TA's instrument systems. During 2018, the demand for our LC-MS instrument systems was somewhat unfavorably impacted by the timing of new product introductions, as many of the Company's new products were not launched until the second half of 2018 or early in 2019. In 2017, the demand for instrument system sales was balanced across our LC-MS and TA instrument systems. Recurring revenues (combined sales of precision chemistry consumables and services) increased 8% and 7% in 2018 and 2017, respectively, as a result of a larger installed base of customers and higher billing demand for service sales.

Geographically, the Company's sales growth in both 2018 and 2017 was primarily driven by the 7% and 10% sales growth in Asia, respectively, with double-digit sales growth in China for both years. Europe's sales grew 4% and 10% in 2018 and 2017, respectively, and benefited from the effect of foreign currency translation, which added 3% and 2% to sales growth, respectively. The Company's 2018 sales were impacted by lower sales growth in India and Europe, resulting from lower customer demand for our instrument systems. Sales in the Americas grew 3% in 2018 and were flat in 2017. The Americas' sales growth in 2017 was negatively impacted by natural disasters in the U.S., Mexico and Puerto Rico, as well as weaker customer sentiment in the first half of 2017.

Sales to pharmaceutical customers grew 5% and 7% in 2018 and 2017, respectively. These increases were driven by the increasing need for global access to prescription drugs and the testing of newer and more complex biologic drugs. Combined sales to industrial customers, which include materials characterization, food, environmental and fine chemical markets, grew 2% and 4% in 2018 and 2017, respectively. The growth in both 2018 and 2017 was driven by recent product introductions and rising global regulatory standards in both food and materials markets. Combined sales to governmental and academic customers increased 8% in both 2018 and 2017. Sales to governmental and academic customers are highly dependent on when institutions receive funding to purchase our instrument systems and, as such, sales growth rates can vary significantly from period to period.

Operating income was $740 million in 2018, an increase of 12% as compared to 2017. This increase was primarily a result of the effect of higher sales volume achieved in 2018, as well as the effect of approximately $33 million of facility closure, litigation and intellectual property payment charges from 2017 that did not recur in 2018.

Operating income increased 6% in 2017 as compared to 2016. This increase was primarily a result of the effect of higher sales volume achieved in 2017, which was somewhat offset by the impact of $13 million of severance costs primarily associated with the closure of a facility in Germany and costs associated with providing U.S. employees with an early retirement transition incentive; an $11 million litigation settlement provision and related costs and a $5 million charge relating to a milestone payment for the licensing of certain intellectual property relating to mass spectrometry technologies yet to be commercialized. The change in operating income in 2017 as compared with 2016 was also impacted by $4 million of expense in 2017 related to the acceleration of certain stock awards as compared to $7 million of similar expense in 2016.

The Company's effective tax rates were 13.0%, 96.8% and 13.1% for 2018, 2017 and 2016, respectively. Net income per diluted share was $7.65, $0.25 and $6.41 in 2018, 2017 and 2016, respectively. The Company's effective tax and net income per diluted share were impacted by the following items:

- In December 2018, the Company settled a pension plan obligation by making lump-sum cash payments and purchasing annuity contracts for participants to permanently extinguish the pension plan's obligations. As a result, the Company recorded a $46 million charge, which consisted of a $6 million cash contribution to the plan and a $40 million non-cash charge related to the reversal of unrecognized actuarial losses recorded in accumulated other comprehensive income in the stockholders' equity. The $46 million pre-tax charge reduced net income per diluted share by $0.39.

- The significant increase in the provision for income taxes for 2017 was a result of the $550 million estimate for the impact of the enactment of the legislation informally referred to as the Tax Cuts and Jobs Act (the "2017 Tax Act"). The 2017 Tax Act changed the U.S. tax system to a territorial system, including broadening measures requiring the taxation of the Company's historical unremitted foreign earnings through a deemed repatriation. This provision reduced net income per diluted share by $6.82 in 2017, and the Company's effective tax rate was 11.0% excluding this $550 million provision. As permitted by the U.S. Securities and Exchange Commission ("SEC") Staff Accounting Bulletin No. 118, the Company completed its analysis and calculation of the 2017 Tax Act federal and state transition tax liability during 2018, which remained significantly unchanged.

The Company generated $604 million, $698 million and $643 million of net cash flows from operations in 2018, 2017 and 2016, respectively. The decrease in operating cash flow in 2018 was primarily a result of $103 million of income tax payments made in the U.S. relating to the Company's estimated 2017 transition tax liability and 2018 estimated tax payments, a $15 million litigation settlement payment and $11 million of contributions to certain defined benefit pension plans. Over the next four years, the Company is required to make annual U.S. federal tax payments of approximately $38 million to tax authorities in connection with the Company's estimated transition tax liabilities of $433 million under the 2017 Tax Act. The remaining 60% of the total liability is required to be paid over a three-year period beginning in 2023. The increase in operating cash flow in 2017 was primarily a result of the increase in sales and operating income.

Cash flows used in investing activities included capital expenditures related to property, plant, equipment and software capitalization of $96 million, $85 million and $95 million in 2018, 2017 and 2016, respectively. In February 2018, the Company's Board of Directors approved expanding its precision chemistry consumable manufacturing operations in the U.S. The Company anticipates spending an estimated $215 million to build and equip this new state-of-the-art manufacturing facility, which will be paid for with existing cash, investments and available debt capacity. The Company has spent $11 million on this facility through the end of 2018.

During the past three years, the Company has acquired technology to expand its future sales. In July 2018, the Company acquired the sole intellectual property rights to the Desorption Electrospray Ionization ("DESI") imaging technology for $30 million in cash and a future contractual obligation to pay a minimum royalty of $3 million over the remaining life of the patent. DESI is a mass spectrometry imaging technique that is used to develop medical therapies. During 2018, the Company made $8 million of investments in unaffiliated companies. In 2017, the Company made a $7 million payment for an investment in a developer of analytical system solutions used to make measurements, predict stability and accelerate product discovery in the routine analytic, process monitoring and quality control release processes for life science and biopharmaceutical markets. In addition, the Company made a milestone payment of $5 million in 2017 to acquire and license intellectual property. In September 2016, the Company acquired Rubotherm GmbH for approximately $6 million in cash.

During 2018, the Company had net proceeds from the maturity of short-term investments of $1.8 billion. Most of these proceeds were repatriated into the U.S. in 2018, and were taxed at lower income tax rates as a result of the 2017 Tax Act, and used to reduce the Company's debt by $850 million and fund $1,315 million of share repurchases.

The Company has conducted a post-tax reform evaluation of its capital allocation strategy and the Company is currently planning to use its existing cash, cash equivalents and investments, cash flow from operations and its available debt capacity to repurchase up to $4 billion of the Company's common stock over the next two years. The Company is currently planning to increase its outstanding debt balances to approximately 2.5 times the

Company's net debt-to-earnings before interest, taxes, depreciation and amortization ratio to fund a significant portion of these share repurchases.

In January 2019, the Company's Board of Directors authorized the Company to repurchase up to $4 billion of its outstanding common stock over a two-year period. This new program replaced the remaining amounts available under the April 2018 authorization of $3 billion. During 2018, 2017 and 2016, the Company repurchased $1,306 million, $323 million and $318 million of the Company's outstanding common stock, respectively, under authorized share repurchase programs. The Company believes that it has the financial flexibility to fund these share repurchases given current cash and investment levels and debt borrowing capacity, as well as to invest in research, technology and business acquisitions to further grow the Company's sales and profits.

During 2018, the Company entered into $300 million of U.S.-to-Euro interest rate cross-currency swap agreements that hedge the Company's net investment in its Euro denominated net assets. As a result of entering into these agreements, the Company lowered its net interest expense by $3 million during 2018. The Company anticipates that these swap agreements will lower net interest expense by approximately $9 million annually in 2019 and 2020, and less in 2021 as the three year term of the agreements expire.

In January 2019, the Company made organizational changes to better align our resources with our growth and innovation strategies, resulting in a worldwide workforce reduction, impacting 1% of the Company's employees. The Company currently estimates that it will incur approximately $15 million of severance and related costs during 2019.

Results of Operations

Sales by Geography

Geographic sales information is presented below for the years ended December 31, 2018, 2017 and 2016 (dollars in thousands):

	Year Ended December 31,			% change	
	2018	**2017**	**2016**	*2018 vs. 2017*	*2017 vs. 2016*
Net Sales:					
Asia:					
China	$ 443,321	$ 387,059	$ 331,354	*15%*	*17%*
Japan	173,357	167,258	167,977	*4%*	—
Asia Other	305,613	308,300	283,653	*(1%)*	*9%*
Total Asia	922,291	862,617	782,984	*7%*	*10%*
Americas:					
United States	683,596	669,274	665,280	*2%*	*1%*
Americas Other	151,581	140,715	141,902	*8%*	*(1%)*
Total Americas	835,177	809,989	807,182	*3%*	—
Europe	662,461	636,472	577,257	*4%*	*10%*
Total net sales	$2,419,929	$2,309,078	$2,167,423	*5%*	*7%*

In 2018, sales in China increased across all product lines and were driven by double-digit increases in sales to pharmaceutical, governmental and academic customers. The effect of foreign currency translation increased sales in Japan by 2% in 2018 and sales growth was also driven by increased sales to pharmaceutical and industrial customers. The sales decline in the rest of Asia in 2018 was a result of lower customer demand in India and weaker sales to environmental customers in the first quarter of 2018. In 2018, sales growth in Europe was driven by TA's products and services and recurring revenues to pharmaceutical and industrial customers. In addition, the effect of foreign currency translation increased sales in Europe by 3% in 2018. Sales growth in the U.S. in 2018 was driven by recurring revenues and TA instruments. Sales in the rest of the Americas had double-digit sales growth for instrument systems and double-digit sales growth for pharmaceutical customers, which was offset by a decline in sales to industrial customers.

In 2017, the sales growth in Asia was driven by double-digit increases in China's sales across all product and customer classes. The increase in Asia Other in 2017 was driven by strong sales in India across all product and customer classes. Japan's sales in 2017 were flat as the effect of foreign currency decreased sales by 3%. Japan's sales in 2017 were driven by recurring revenue sales to governmental and academic customers. Europe's sales in 2017 were balanced across all product lines and driven by sales to pharmaceutical, governmental and academic customers. Sales growth in the U.S. in 2017 was driven by TA instrument system sales and recurring revenues. In 2017, sales to the rest of the world were impacted by a decrease in demand from industrial customers resulting from recent natural disasters.

Net sales by customer class are presented below for the years ended December 31, 2018, 2017 and 2016 (dollars in thousands):

	Year Ended December 31,			% change	
	2018	2017	2016	2018 vs. 2017	2017 vs. 2016
Pharmaceutical	$1,365,731	$1,294,668	$1,206,316	5%	7%
Industrial	737,144	721,088	690,119	2%	4%
Governmental and academic	317,054	293,322	270,988	8%	8%
Total net sales	$2,419,929	$2,309,078	$2,167,423	5%	7%

In 2018, sales to pharmaceutical customers were driven by recurring revenues, with double-digit growth in China, Canada and Latin America. Sales growth for the industrial market in 2018 was driven by TA products and services, and mid-single-digit sales growth in Europe, Japan and India. The increase in sales to governmental and academic customers in 2018 was broad-based across all product classes and geographies, with double-digit growth in China, India and Canada.

In 2017, the growth within our pharmaceutical market was driven by double-digit growth in China, India and Europe. Sales growth to the industrial market in 2017 was highest in China and India, with modest growth in other regions offset by flat sales in the Americas. The increase in sales to governmental and academic customers in 2017 was broad-based across all geographies, with double-digit growth in Europe and the Americas.

Waters Products and Services Net Sales

Net sales for Waters products and services are as follows for the years ended December 31, 2018, 2017 and 2016 (dollars in thousands):

	Year Ended December 31,						% change	
	2018	% of Total	2017	% of Total	2016	% of Total	2018 vs. 2017	2017 vs. 2016
Waters instrument systems	$1,000,625	47%	$ 988,750	48%	$ 943,218	49%	1%	5%
Chemistry consumables	400,287	18%	372,157	18%	345,413	18%	8%	8%
Total Waters product sales	1,400,912	65%	1,360,907	66%	1,288,631	67%	3%	6%
Waters service	738,433	35%	686,656	34%	639,432	33%	8%	7%
Total Waters net sales	$2,139,345	100%	$2,047,563	100%	$1,928,063	100%	4%	6%

Precision chemistry consumables sales increased in both 2018 and 2017 on the uptake in columns and application-specific testing kits. Waters service sales in both 2018 and 2017 benefited from increased sales of service plans and higher service demand billings to a higher installed base of customers. The increase in Waters instrument system sales (LC and MS technology-based) in 2018 is primarily attributable to sales of LC systems, while sales growth in 2017 was driven by higher sales of LC-MS systems that incorporate the Company's tandem quadrupole technologies. The effect of foreign currency translation had a minimal impact on Waters sales in both 2018 and 2017.

In 2018, Waters sales increased 7% in Asia, 4% in Europe and 2% in the Americas. Waters sales increased 15% in China in 2018 and were broad-based across all product classes, with double-digit increases in sales to pharmaceutical, governmental and academic customers. Waters sales in Japan in 2018 increased 5%, with the effect of foreign currency translation increasing sales 2%. Sales in the rest of Asia declined 2% in 2018, primarily due to lower customer demand in India and a negative 2% impact of foreign currency translation. In the Americas, U.S. sales increased 1% in 2018.

In 2017, Waters sales increased 10% in both Europe and Asia and were flat in the Americas. Waters sales increased 16% in China and were broad-based across all product and customer classes. Waters sales in Japan decreased 1%, primarily due to foreign currency translation, which decreased sales by 3%. Waters sales in the rest of Asia increased 8% and were driven by recurring revenues across all customer classes.

TA Product and Services Net Sales

Net sales for TA products and services are as follows for the years ended December 31, 2018 and December 31, 2017 (dollars in thousands):

	Year Ended December 31,						*% change*	
	2018	% of Total	2017	% of Total	2016	% of Total	*2018 vs. 2017*	*2017 vs. 2016*
TA instrument systems	$204,081	*73%*	$191,442	*73%*	$171,665	*72%*	*7%*	*12%*
TA service	76,503	*27%*	70,073	*27%*	67,695	*28%*	*9%*	*4%*
Total TA net sales	$280,584	*100%*	$261,515	*100%*	$239,360	*100%*	*7%*	*9%*

TA's instrument system sales were broad-based across all product classes in 2018, while 2017 instrument system sales grew primarily from the Discovery product line of thermal instrument systems. In addition, TA's rheology instrument systems saw strong performance across the entire range of products in the portfolio in 2017, driven by the Discovery Hybrid Rheometer and Rubber Rheometer instrument systems. TA service sales increased in both 2018 and 2017 due to sales of service plans and billings to a higher installed base of customers. The effect of foreign currency translation and recent acquisitions had a minimal impact on TA's sales in both 2018 and 2017.

In 2018, TA sales increased 9% in the Americas, 8% in Europe and 5% in Asia. TA sales in the U.S. increased 9% in 2018, while sales in the rest of the Americas increased 8%. TA's sales in Asia were driven by double-digit sales growth in India and 8% sales growth in China, which was offset by declines in Japan.

In 2017, TA sales increased 14% in Asia, 11% in Europe and 5% in the Americas. TA achieved double-digit sales growth in Asia, with the exception of Japan, where a 5% sales growth included a 2% negative impact of foreign currency translation. TA sales in the U.S. in 2017 increased 8%, while sales in the rest of the Americas declined after strong sales in the prior year.

Cost of Sales

The increases in cost of sales for both 2018 and 2017 were consistent with the increase in sales volumes. The effect of foreign currency translation had a minimal impact on cost of sales in both 2018 and 2017.

Cost of sales is affected by many factors, including, but not limited to, foreign currency translation, product mix, product costs of instrument systems and amortization of software platforms. At current foreign currency exchange rates, the Company expects that the impact of foreign currency translation may decrease sales and gross profit during 2019.

Selling and Administrative Expenses
Selling and administrative expenses decreased 1% in 2018 and increased 6% in 2017. The decrease in 2018 was primarily due to the impact of $13 million of severance costs incurred in 2017 in connection with the closure of a facility in Germany and an early retirement transition incentive program. The effect of foreign currency translation increased selling and administrative expenses by 3% in 2017 and had a minimal impact in 2018. In addition, selling and administrative expenses in both 2018 and 2017 were impacted by headcount additions and higher merit compensation costs, as well as $1 million and $4 million, respectively, of stock compensation expense related to the modification of certain stock awards upon the retirement of senior executives.

As a percentage of net sales, selling and administrative expenses were 22.2%, 23.6% and 23.6% for 2018, 2017 and 2016, respectively.

Research and Development Expenses
Research and development expenses increased 8% and 6% in 2018 and 2017, respectively. Research and development expenses in both 2018 and 2017 were impacted by additional headcount, merit compensation and costs associated with new products and the development of new technology initiatives. In addition, the effect of foreign currency translation reduced research and development expenses by 4% in 2017, primarily due to the weakening of the British pound on the Company's U.K.-based research and development expenses. Foreign currency translation had a minimal impact on research and development costs in 2018.

Litigation Settlement
In the second quarter of 2017, the Company incurred an $11 million litigation provision related to the issuance of a verdict in a patent litigation case. In the first quarter of 2018, the Company resolved the case with a final settlement that resulted in a gain of $2 million.

Acquired In-Process Research and Development
During 2017, the Company incurred charges of $5 million for acquired in-process research and development related to milestone payments associated with a licensing arrangement for certain intellectual property relating to mass spectrometry technologies yet to be commercialized and for which there was no future alternative use as of the acquisition date. These licensing arrangements are significantly related to new, biologically-focused applications, as well as other applications, and require the Company to make additional future payments of up to $7 million if certain milestones are achieved, as well as royalties on future net sales. These future payments may be significant and occur over multiple years.

Interest Expense, Net
The decrease in net interest expense in 2018 was primarily attributable to the Company using cash, cash equivalents and investment balances recently repatriated into the U.S. to reduce its debt by $850 million during the 2018, as well as higher yields on investments. The Company is currently planning to increase its outstanding debt balances in the future and, as a result, the Company is expecting its net interest expense to increase by an estimated $25 million in 2019 at current interest rates.

In 2018, the Company entered into three-year U.S.-to-Euro interest rate cross-currency swap agreements with a notional value of $300 million that hedges the Company's net investment in its Euro denominated net assets. The difference between the interest rate received and paid under the interest rate cross-currency swap agreement is recorded as interest income. During 2018, the Company recorded $3 million of interest income related to these agreements. This interest rate cross-currency swap agreement is estimated to generate $9 million of interest income annually over a three-year period.

Provision for Income Taxes
The four principal jurisdictions in which the Company manufactures are the U.S., Ireland, the U.K. and Singapore, where the statutory tax rates were 21%, 12.5%, 19% and 17%, respectively, as of December 31, 2018. The Company has a contractual tax rate in Singapore of 0% on qualifying activities in Singapore through March 2021, based upon the achievement of certain contractual milestones, which the Company expects to continue to meet. The effect of applying the contractual tax rate rather than the statutory tax rate to income from qualifying activities in Singapore increased the Company's net income in 2018, 2017 and 2016 by $28 million, $25 million and $23 million, respectively, and increased the Company's net income per diluted share by $0.36, $0.31 and $0.29, respectively.

The Company's effective tax rates were 13.0%, 96.8% and 13.1% in 2018, 2017 and 2016, respectively, and were impacted by the following:

- In December 2017, the U.S. enacted legislation informally referred to as the Tax Cuts and Jobs Act (the "2017 Tax Act"). For the year ended December 31, 2017 the Company accrued a $550 million tax provision related to the 2017 Tax Act. The $550 million expense consisted of $490 million related to the federal transition tax, $40 million for state income taxes and foreign withholding taxes and $20 million for the revaluation of the Company's deferred tax assets and liabilities at the new federal tax rate of 21%. This provision reduced net income per diluted share by $6.82 in 2017, and the Company's effective tax rate was 11.0% excluding this $550 million provision.
- During 2018, the Internal Revenue Service issued proposed regulations on the federal transition tax and various other aspects of the Tax Reform law. The Company finalized its analysis of the transition tax and related liabilities, including uncertain tax positions, in the fourth quarter of 2018 pursuant to U.S. Securities and Exchange Commission ("SEC") Staff Accounting Bulletin No. 118. As a result of the new guidance issued and additional work to complete the calculation of its federal transition tax, the Company reduced its provisional accrual for federal, state and foreign taxes by net $24 million during 2018. In addition, the Company also assessed its uncertain tax positions related to these taxes and accrued income tax reserves of $18 million during 2018. The net favorable impact to the 2018 provision for income taxes is $6 million.
- The provision for income taxes for 2018 includes a $7 million expense related to the 2017 Tax Act. This additional tax results from the change in foreign currency exchange rates on the earnings taxed on December 31, 2017 under 2017 Tax Act as compared with the foreign currency exchange rates on the date of distribution of assets into the U.S. We do not expect this expense to recur in future periods.
- The 2018 effective income tax rate of 13.0% was impacted by the reduction in the U.S. federal income tax rate from 35% to 21% as a result of the 2017 Tax Act, which decreased the Company's effective tax rate by 2.0 percentage points as compared to 2017. The 2017 Tax act also added a new Global Intangible Low-Taxed Income (GILTI) tax, which increased the Company's 2018 effective tax rate by approximately 2.0 percentage points.
- After the completion of the Company's review of its capital allocation strategy in the fourth quarter of 2018, the Company determined that it will provide income taxes on all future foreign earnings from 2018 forward. As a result, this change added 0.6 percentage points to the 2018 effective tax rate as compared to 2017.
- In addition, the reduction in the U.S. federal income tax rate from 35% to 21% as a result of the 2017 Tax Act also reduced the 2018 tax benefit on stock compensation. The Company recorded a tax benefit on stock-based compensation in 2018 and 2017 that decreased income tax expense by $9 million and $20 million, respectively, and added $0.11 and $0.24 to net income per diluted share, respectively.
- The difference between the 2017 and 2016 effective tax rates can be attributed primarily to the 2016 provision for income taxes including a $3 million tax benefit (0.7 percentage points) related to the release of a valuation allowance on certain net operating loss carryforwards.

The remaining differences between effective tax rates can primarily be attributed to differences in the proportionate amounts of pre-tax income recognized in jurisdictions with different effective tax rates.

The Company's effective tax rate is influenced by many significant factors, including, but not limited to, the wide range of income tax rates in jurisdictions in which the Company operates; sales volumes and profit levels in each tax jurisdiction; changes in tax laws, tax rates and policies; the outcome of various ongoing tax audit examinations; and the impact of foreign currency transactions and translation. In addition, upon completion of the Company's review of its capital allocation strategy in the fourth quarter of 2018, the Company has determined that it will provide income taxes on all future foreign earnings. The Company estimates that this will increase the Company's effective income tax rate by approximately one percentage point in the future. However, the Company will continue to be permanently reinvested in relation to the cumulative historical outside basis difference that is not related to earnings. As a result of variability in these factors, the Company's effective tax rates in the future may not be similar to the effective tax rates for the current or prior years, or for previously forecasted periods.

Liquidity and Capital Resources

Condensed Consolidated Statements of Cash Flows (in thousands):

	Year Ended December 31,		
	2018	2017	2016
Net income	$ 593,794	$ 20,311	$ 521,503
Depreciation and amortization	108,408	106,002	96,449
Stock-based compensation	37,541	39,436	40,998
Deferred income taxes	2,405	45,510	1,204
Excess tax benefit related to stock option plans	—	—	13,844
Gain on sale of assets	—	—	(1,500)
In-process research and development and other non-cash charges	—	5,000	—
Change in accounts receivable	(47,921)	(24,013)	(31,721)
Change in inventories	(25,396)	731	(20,147)
Change in accounts payable and other current liabilities	(81,663)	3,175	6,842
Change in deferred revenue and customer advances	2,721	10,386	9,974
Effect of the 2017 Tax Act	(6,059)	530,383	—
Other changes	20,616	(39,281)	5,474
Net cash provided by operating activities	604,446	697,640	642,920
Net cash provided by (used in) investing activities	1,683,302	(535,752)	(487,918)
Net cash used in financing activities	(2,119,522)	(63,869)	(115,701)
Effect of exchange rate changes on cash and cash equivalents	(14,265)	38,669	(21,335)
Increase in cash and cash equivalents	$ 153,961	$ 136,688	$ 17,966

Cash Flow from Operating Activities

Net cash provided by operating activities was $604 million, $698 million and $643 million in 2018, 2017 and 2016, respectively. The changes within net cash provided by operating activities include the following significant changes in the sources and uses of net cash provided by operating activities, aside from the changes in net income:

- The changes in accounts receivable were primarily attributable to timing of payments made by customers and timing of sales. Days sales outstanding was 74 days at December 31, 2018 and 71 days at both December 31, 2017 and 2016.

- The changes in inventory were primarily attributable to anticipated annual increases in sales volumes, as well as new product launches.
- The changes in accounts payable and other current liabilities were the result of timing of payments to vendors. In addition, the change in 2018 included $103 million of income tax payments made in the U.S. relating to the Company's estimated 2017 tax reform liability and 2018 estimated income tax payments and a $15 million litigation settlement payment.
- Net cash provided from deferred revenue and customer advances results from annual increases in new service contracts as a higher installed base of customers renew annual service contracts.
- Other changes were attributable to variation in the timing of various provisions, expenditures, prepaid income taxes and accruals in other current assets, other assets, other liabilities, and income tax expenses related to the 2017 Tax Act. In addition, the Company made $11 million of contributions to certain defined benefit pension plans.

In addition, as a result of the adoption of a new accounting standard related to stock-based compensation, the Company reclassified $14 million of excess tax benefits related to stock-based compensation in 2016 from cash flows from financing activities to cash flows from operating activities.

Cash Provided By (Used in) Investing Activities

Net cash provided by investing activities totaled $1,683 million in 2018, while net cash used in investing activities totaled $536 million and $488 million in 2017 and 2016, respectively. Additions to fixed assets and capitalized software were $96 million, $85 million and $95 million in 2018, 2017 and 2016, respectively. In February 2018, the Company's Board of Directors approved expanding its chemistry synthesis operations in the U.S. The Company anticipates spending an estimated $215 million to build and equip this new state-of-the-art manufacturing facility, which will be paid for with existing cash, investments and debt capacity.

During 2018, 2017 and 2016, the Company purchased $1.0 billion, $3.0 billion and $2.4 billion of investments, respectively, while $2.8 billion, $2.5 billion and $2.0 billion of investments matured, respectively. Most of the proceeds received in 2018 were repatriated into the U.S. at lower income tax rates as a result of the 2017 Tax Act and used to reduce the Company's debt by $850 million and fund the Company's share repurchase program.

Asset and business acquisitions, net of cash acquired, were $31 million and $6 million during 2018 and 2016, respectively. There were no business acquisitions in 2017. During 2018, the Company made $8 million of investments in unaffiliated companies. During 2017, the Company made a $7 million payment for an investment in a developer of analytical system solutions used to make measurements, predict stability and accelerate product discovery in the routine analytic, process monitoring and quality control release processes for life science and biopharmaceutical markets. During 2017, the Company made payments of $5 million to acquire and license intellectual property relating to mass spectrometry technologies yet to be commercialized. In 2016, the Company sold an equity investment for $4 million.

Cash Used in Financing Activities

In November 2017, the Company entered into a credit agreement (the "2017 Credit Agreement"), which provides for a $1.5 billion revolving facility and a $300 million term loan. The revolving facility and term loan both mature on November 30, 2022 and require no scheduled prepayments before that date.

The interest rates applicable to the 2017 Credit Agreement are, at the Company's option, equal to either the alternate base rate (which is a rate per annum equal to the greatest of (a) the prime rate in effect on such day, (b) the Federal Reserve Bank of New York Rate on such day plus 1/2 of 1% per annum and (c) the adjusted

LIBO rate on such day (or if such day is not a business day, the immediately preceding business day) for a deposit in U.S. dollars with a maturity of one month plus 1% per annum) or the applicable 1, 2, 3 or 6 month adjusted LIBO rate or EURIBO rate for Euro-denominated loans, in each case, plus an interest rate margin based upon the Company's leverage ratio, which can range between 0 and 12.5 basis points for alternate base rate loans and between 80 and 112.5 basis points for LIBO rate or EURIBO rate loans. The facility fee on the 2017 Credit Agreement ranges between 7.5 and 25 basis points per annum, based on the leverage ratio, of the amount of the revolving facility commitments and the outstanding term loan. The 2017 Credit Agreement requires that the Company comply with an interest coverage ratio test of not less than 3.50:1 as of the end of any fiscal quarter for any period of four consecutive fiscal quarters and a leverage ratio test of not more than 3.50:1 as of the end of any fiscal quarter. In addition, the 2017 Credit Agreement includes negative covenants, affirmative covenants, representations and warranties and events of default that are customary for investment grade credit facilities.

Interest on the Company's fixed rate senior unsecured notes is payable semi-annually each year. Interest on the floating rate senior unsecured notes is payable quarterly. The Company may prepay all or some of the senior unsecured notes at any time in an amount not less than 10% of the aggregate principal amount outstanding, plus the applicable make-whole amount or prepayment premium for Series H and J senior unsecured notes. In the event of a change in control of the Company (as defined in the note purchase agreement), the Company may be required to prepay the senior unsecured notes at a price equal to 100% of the principal amount thereof, plus accrued and unpaid interest. These senior unsecured notes require that the Company comply with an interest coverage ratio test of not less than 3.50:1 for any period of four consecutive fiscal quarters and a leverage ratio test of not more than 3.50:1 as of the end of any fiscal quarter. In addition, these senior unsecured notes include customary negative covenants, affirmative covenants, representations and warranties and events of default.

During 2018, the Company's net debt borrowings decreased by $850 million, using cash repatriated under the 2017 Tax Act. During 2017 and 2016, the Company's net debt borrowings increased $170 million and $160 million, respectively. As of December 31, 2018, the Company had a total of $1.1 billion in outstanding debt, which consisted of $560 million in outstanding senior unsecured notes, $300 million borrowed under a term loan and $290 million borrowed under a revolving credit facility, with both the term loan and revolving credit facilities under the 2017 Credit Agreement. As of December 31, 2018, the Company had a total amount available to borrow under the 2017 Credit Agreement of $1,208 million after outstanding letters of credit. As of December 31, 2018, the Company was in compliance with all debt covenants.

During 2018, the Company entered into $300 million of U.S.-to-Euro interest rate cross-currency swap agreements that hedge the Company's net investment in its Euro denominated net assets. As a result of entering into these agreements, the Company anticipates lowering net interest expense by approximately $9 million annually over the three-year term of the agreements.

In January 2019, the Company's Board of Directors authorized the Company to repurchase up to $4 billion of its outstanding common stock over a two-year period. This new program replaced the remaining amounts available under the April 2018 authorization of $3 billion. During 2018, 2017 and 2016, the Company repurchased 6.8 million, 1.8 million and 2.3 million shares of the Company's outstanding common stock at a cost of $1,306 million, $323 million and $318 million, respectively, under the April 2018 authorization and other previously announced programs. In addition, the Company repurchased $10 million, $10 million and $8 million of common stock related to the vesting of restricted stock units during the years ended December 31, 2018, 2017 and 2016, respectively.

The Company received $52 million, $98 million and $62 million of proceeds from the exercise of stock options and the purchase of shares pursuant to the Company's employee stock purchase plan in 2018, 2017 and 2016, respectively.

The Company had cash, cash equivalents and investments of $1,735 million as of December 31, 2018. The majority of the Company's cash, cash equivalents and investments are generated from foreign operations, with

$471 million held by foreign subsidiaries at December 31, 2018, of which $251 million was held in currencies other than U.S. dollars. The Company believes it has sufficient levels of cash flow and access to its existing cash, cash equivalents and investments to fund operations and capital expenditures, service debt interest, finance potential acquisitions and continue the authorized stock repurchase program in the U.S. These cash requirements are managed by the Company's cash flow from operations, its existing cash, cash equivalents and investments, and the use of the Company's revolving credit facility.

Management believes, as of the date of this report, that the Company's financial position, along with expected future cash flows from earnings based on historical trends and the ability to raise funds from external sources and the borrowing capacity from existing, committed credit facilities, will be sufficient to service debt and fund working capital and capital spending requirements, authorized share repurchase amounts and potential acquisitions for at least the next twelve months. The Company has conducted a post-tax reform evaluation of its capital allocation strategy and the Company is currently planning to use its existing cash, cash equivalents and investments, cash flow from operations and its available debt capacity to repurchase up to $4 billion of the Company's common stock over the next two years. The Company is currently planning to increase its outstanding debt balances to approximately 2.5 times the Company's net debt-to-earnings before interest, taxes, depreciation and amortization ratio to fund a significant portion of these share repurchases. In addition, as of December 31, 2018, the Company has determined that it will provide income taxes on all future foreign earnings and reverse its historical assertion that its foreign earnings were permanently invested. However, the Company will continue to be permanently reinvested in relation to the cumulative historical outside basis difference that is not related to the unremitted earnings. There have been no other significant changes to the Company's financial position.

Contractual Obligations and Commercial Commitments

The following is a summary of the Company's known contractual obligations as of December 31, 2018 (in thousands):

	Payments Due by Year (1)							
	Total	2019	2020	2021	2022	2023	2024	After 2024
Notes payable and debt	$ 178	$ 178	$ —	$ —	$ —	$ —	$ —	$ —
Interest on senior unsecured notes	86,418	21,214	16,630	12,942	10,829	9,851	7,384	7,568
Long-term debt (2)	1,150,000	—	100,000	150,000	590,000	50,000	100,000	160,000
2017 Tax Act liability	432,877	29,109	38,454	38,454	38,454	72,101	96,135	120,170
Operating leases	102,958	28,417	23,424	16,032	11,816	6,601	5,285	11,383
Total	$1,772,431	$78,918	$178,508	$217,428	$651,099	$138,553	$208,804	$299,121

(1) Does not include normal purchases made in the ordinary course of business and uncertain tax positions discussed below.

2) The interest rates applicable to the 2017 Credit Agreement are, at the Company's option, equal to either the alternate base rate (which is a rate per annum equal to the greatest of (a) the prime rate in effect on such day, (b) the Federal Reserve Bank of New York Rate on such day plus 1/2 of 1% per annum and (c) the adjusted LIBO rate on such day (or if such day is not a business day, the immediately preceding business day) for a deposit in U.S. dollars with a maturity of one month plus 1% per annum) or the applicable 1, 2, 3 or 6 month adjusted LIBO rate or EURIBO rate for Euro-denominated loans, in each case, plus an interest rate margin based upon the Company's leverage ratio, which can range between 0 and 12.5 basis points for alternate base rate loans and between 80 and 112.5 basis points for LIBO rate or EURIBO rate loans. The facility fee on the 2017 Credit Agreement ranges between 7.5 and 25 basis points per annum, based on the leverage ratio, of the amount of the revolving facility commitments and the outstanding term loan. The 2017 Credit Agreement requires that the Company comply with an interest coverage ratio test of not less than 3.50:1 as

of the end of any fiscal quarter for any period of four consecutive fiscal quarters and a leverage ratio test of not more than 3.50:1 as of the end of any fiscal quarter. In addition, the 2017 Credit Agreement includes negative covenants, affirmative covenants, representations and warranties and events of default that are customary for investment grade credit facilities. As of December 31, 2018, the Company was in compliance with all such covenants.

The following is a summary of the Company's known commercial commitments as of December 31, 2018 (in thousands):

	Amount of Commitments Expiration Per Period							
	Total	2019	2020	2021	2022	2023	2024	After 2024
Letters of credit	$1,572	$1,572	$—	$—	$—	$—	$—	$ —

From time to time, the Company and its subsidiaries are involved in various litigation matters arising in the ordinary course of business. The Company believes it has meritorious arguments in its current litigation matters and believes any outcome, either individually or in the aggregate, will not be material to the Company's financial position or results of operations.

The Company has long-term liabilities for deferred employee compensation, including pension and supplemental executive retirement plans. The payments related to the supplemental retirement plan are not included above since they are dependent upon when the employee retires or leaves the Company and whether the employee elects lump-sum or annuity payments. During fiscal year 2019, the Company expects to contribute approximately $3 million to $6 million to the Company's defined benefit plans.

The Company has contingent consideration for an earnout pertaining to its July 2014 acquisition of the net assets of Medimass Research, Development and Service Kft. ("Medimass"). The earnout payments are not included above since they are dependent upon many factors that cannot be predicted with any certainty. The estimated fair value of the contingent consideration as of December 31, 2018 is $2 million.

The Company licenses certain technology and software from third parties. Future minimum license fees payable under existing license agreements as of December 31, 2018 are immaterial. The Company enters into licensing arrangements with third parties that require future milestone or royalty payments contingent upon future events. Upon the achievement of certain milestones in existing agreements, the Company could make additional future payments of up to $7 million, as well as royalties on future net sales. It is not possible to predict with reasonable certainty whether these milestones will be achieved or the timing for achievement. As a result, these potential payments are not included in the table above.

The Company accounts for its uncertain tax positions in accordance with the accounting standards for income taxes, which require financial statement reporting of the expected future tax consequences of uncertain tax positions on the presumption that all concerned tax authorities possess full knowledge of those tax positions, as well as all of the pertinent facts and circumstances, but prohibit any discounting of unrecognized tax benefits associated with those positions for the time value of money. The Company classified interest and penalties related to unrecognized tax benefits as a component of the provision for income taxes. If all of the Company's unrecognized tax benefits accrued as of December 31, 2018 were to become recognizable in the future, the Company would record a total reduction of approximately $26 million in its income tax provision.

With limited exceptions, the Company is no longer subject to tax audit examinations in significant jurisdictions for the years ended on or before December 31, 2013. However, carryforward tax attributes that were generated in years beginning on or before January 1, 2014 may still be adjusted upon examination by tax authorities if the attributes are utilized. The Company continuously monitors the lapsing of statutes of limitations on potential tax assessments for related changes in the measurement of unrecognized tax benefits, related net interest and penalties, and deferred tax assets and liabilities.

As of December 31, 2018, the Company expects to record additional reductions in the measurement of its unrecognized tax benefits and related net interest and penalties of approximately $1 million within the next twelve months due to potential tax audit settlements and the lapsing of statutes of limitations on potential tax assessments. The Company does not expect to record any other material reductions in the measurement of its unrecognized tax benefits within the next twelve months.

The Company has not paid any dividends and has no plans, at this time, to pay any dividends in the future.

Off-Balance Sheet Arrangements

The Company has not created, and is not party to, any special-purpose or off-balance sheet entities for the purpose of raising capital, incurring debt or operating parts of its business that are not consolidated (to the extent of the Company’s ownership interest therein) into the consolidated financial statements. The Company has not entered into any transactions with unconsolidated entities whereby it has subordinated retained interests, derivative instruments or other contingent arrangements that expose the Company to material continuing risks, contingent liabilities or any other obligation under a variable interest in an unconsolidated entity that provides financing, liquidity, market risk or credit risk support to the Company.

The Company enters into standard indemnification agreements in its ordinary course of business. Pursuant to these agreements, the Company indemnifies, holds harmless and agrees to reimburse the indemnified party for losses suffered or incurred by the indemnified party, generally the Company’s business partners or customers, in connection with patent, copyright or other intellectual property infringement claims by any third party with respect to its current products, as well as claims relating to property damage or personal injury resulting from the performance of services by the Company or its subcontractors. The maximum potential amount of future payments the Company could be required to make under these indemnification agreements is unlimited. Historically, the Company’s costs to defend lawsuits or settle claims relating to such indemnity agreements have been minimal and management accordingly believes the estimated fair value of these agreements is immaterial.

Critical Accounting Policies and Estimates

Summary

The preparation of consolidated financial statements requires the Company to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses, and related disclosure of contingent liabilities. Critical accounting policies are those that are central to the presentation of the Company’s financial condition and results of operations that require management to make estimates about matters that are highly uncertain and that would have a material impact on the Company’s results of operations given changes in the estimate that are reasonably likely to occur from period to period or use of different estimates that reasonably could have been used in the current period. On an ongoing basis, the Company evaluates its policies and estimates. The Company bases its estimates on historical experience and on various other assumptions that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual amounts may differ from these estimates under different assumptions or conditions. There are other items within the Company’s consolidated financial statements that require estimation, but are not deemed critical as defined above. Changes in estimates used in these and other items could potentially have a material impact on the Company’s consolidated financial statements.

Revenue Recognition

The Company adopted new accounting guidance regarding the recognition of revenue from contracts with customers as of January 1, 2018 and applied the modified-retrospective method. The Company elected the practical expedient and only evaluated the contracts that were considered incomplete as of January 1, 2018 when quantifying the cumulative effect adjustment under the modified retrospective method. Ultimately, the Company determined that there was not a significant change in the timing or pattern of revenue recognition for the Company's products and services. The adoption of this standard did not have a material impact on the Company's financial position, results of operations or cash flows and, as such, did not require any adjustments to information reported in the prior year. The revenue recognition policies described below were effective as of January 1, 2018.

The Company recognizes revenue upon transfer of control of promised products and services to customers in an amount that reflects the consideration the Company expects to receive in exchange for those products or services. The Company generally enters into contracts that include a combination of products and services. Revenue is allocated to distinct performance obligations and is recognized net of allowances for returns and discounts.

The Company recognizes revenue on product sales at the time control of the product transfers to the customer. In substantially all of the Company's arrangements, title of the product transfers at shipping point and, as a result, the Company determined control transfers at the point of shipment. In more limited cases, there are destination-based shipping terms and, thus, control is deemed to transfer when the products arrive at the customer site. All incremental costs of obtaining a contract are expensed as and when incurred if the expected amortization period of the asset that would have been recognized is one year or less. Shipping and handling costs are included as a component of cost of sales. In situations where the control of the goods transfers prior to the completion of the Company's obligation to ship the products to its customers, the Company has elected the practical expedient to account for the shipping services as a fulfillment cost. Accordingly, such costs are recognized when control of the related goods is transferred to the customer. In more rare situations, the Company has revenue associated with products that contain specific customer acceptance criteria and the related revenue is not recognized before the customer acceptance criteria are satisfied. The Company elected to exclude from the measurement of the transaction price all taxes assessed by a governmental authority that are both imposed on and concurrent with specific revenue-producing transactions and collected by the Company from a customer.

Generally, the Company's contracts for products include a performance obligation related to installation. The Company has determined that the installation represents a distinct performance obligation and revenue is recognized separately upon the completion of installation. The Company determines the amount of the transaction price to allocate to the installation service based on the standalone selling price of the product and the service, which requires judgment. The Company determines relative standalone selling price of installation based upon a number of factors, including hourly service billing rates and estimated installation hours. In developing these estimates, the Company considers past history, competition, billing rates of current services and other factors.

The Company has sales from standalone software, which is included in instrument systems revenue. These arrangements typically include software licenses and maintenance contracts, both of which the Company has determined are distinct performance obligations. The Company determines the amount of the transaction price to allocate to the license and maintenance contract based on the relative standalone selling price of each performance obligation. Software license revenue is recognized at the point in time when control has been transferred to the customer. The revenue allocated to the software maintenance contract is recognized on a straight-line basis over the maintenance period, which is the contractual term of the contract, as a time-based measure of progress best reflects the Company's performance in satisfying this obligation. Unspecified rights to software upgrades are typically sold as part of the maintenance contract on a when-and-if-available basis.

Payment terms and conditions vary among the Company's revenue streams, although terms generally include a requirement of payment within 30 to 60 days of product shipment. Prior to providing payment terms to customers, an evaluation of the customer's credit risk is performed. Returns and customer credits are infrequent and insignificant and are recorded as a reduction to sales. Rights of return are not included in sales arrangements and, therefore, there is minimal variable consideration included in the transaction price of our products.

Service revenue includes (i) service and software maintenance contracts and (ii) service calls (time and materials). Instrument service contracts and software maintenance contracts are typically annual contracts, which are billed at the beginning of the contract or maintenance period. The amount of the service and software maintenance contract is recognized on a straight-line basis to revenue over the maintenance service period, which is the contractual term of the contract, as a time-based measure of progress best reflects the Company's performance in satisfying this obligation. There are no deferred costs associated with the service contract, as the cost of the service is recorded when the service is performed. Service calls are recognized to revenue at the time a service is performed.

The Company's deferred revenue liabilities at December 31, 2018 was $204 million on the consolidated balance sheets consists of the obligation on instrument service contracts and customer payments received in advance, prior to transfer of control of the instrument. The Company records deferred revenue primarily related to its service contracts, where consideration is billable at the beginning of the service period.

Loss Provisions on Accounts Receivable and Inventory
The Company maintains allowances for doubtful accounts for estimated losses resulting from the inability of its customers to make required payments. If the financial condition of the Company's customers were to deteriorate, resulting in an impairment of their ability to make payments, additional allowances may be required. The Company does not request collateral from its customers, but collectibility is enhanced through the use of credit card payments and letters of credit. The Company assesses collectibility based on a number of factors, including, but not limited to, past transaction history with the customer, the credit-worthiness of the customer, industry trends and the macro-economic environment. Historically, the Company has not experienced significant bad debt losses. Sales returns and allowances are estimates of future product returns related to current period revenue. Material differences may result in the amount and timing of revenue for any period if management made different judgments or utilized different estimates for sales returns and allowances for doubtful accounts. The Company's accounts receivable balance at December 31, 2018 was $568 million, net of allowances for doubtful accounts of $8 million.

The Company values all of its inventories at the lower of cost or net realizable value on a first-in, first-out basis ("FIFO"). The Company estimates revisions to its inventory valuations based on technical obsolescence, historical demand, projections of future demand, including that in the Company's current backlog of orders, and industry and market conditions. If actual future demand or market conditions are less favorable than those projected by management, additional write-downs may be required. The Company's inventory balance at December 31, 2018 was recorded at its net realizable value of $292 million, which is net of write-downs of $23 million.

Long-Lived Assets, Intangible Assets and Goodwill
The Company assesses the impairment of identifiable intangibles, long-lived assets and goodwill whenever events or changes in circumstances indicate that the carrying value may not be recoverable. Factors the Company considers important which could trigger impairment include, but are not limited to, the following:

- significant underperformance relative to historical or projected future operating results, particularly as it pertains to capitalized software and patent costs;
- significant negative industry or economic trends, competitive products and technologies; and
- significant changes or developments in strategic technological collaborations or legal matters which affect the Company's capitalized patents, purchased technology, trademarks and intellectual properties, such as licenses.

When the Company determines that the carrying value of an individual intangible asset, long-lived asset or goodwill may not be recoverable based upon the existence of one or more of the above indicators, an estimate of undiscounted future cash flows produced by that intangible asset, long-lived asset or goodwill, including its eventual residual value, is compared to the carrying value to determine whether impairment exists. In the event that such cash flows are not expected to be sufficient to recover the carrying amount of the asset, the asset is written-down to its estimated fair value. Net intangible assets, long-lived assets and goodwill amounted to $247 million, $343 million and $356 million, respectively, as of December 31, 2018.

The Company performs annual impairment reviews of its goodwill on January 1 of each year. For goodwill impairment review purposes, the Company has two reporting units: Waters and TA. The Company currently does not expect to record an impairment charge in the foreseeable future; however, there can be no assurance that, at the time future reviews are completed, a material impairment charge will not be recorded. The factors that could cause a material goodwill impairment charge in the future include, but are not limited to, the following:

- significant decline in the Company's projected revenue, earnings or cash flows;
- significant adverse change in legal factors or business climate;
- significant decline in the Company's stock price or the stock price of comparable companies;
- adverse action or assessment by a regulator; and
- unanticipated competition.

Income Taxes
As part of the process of preparing the consolidated financial statements, the Company is required to estimate its income taxes in each of the jurisdictions in which it operates. This process involves the Company estimating its income taxes, taking into account the amount, timing and character of taxable income, tax deductions and credits and assessing changes in tax laws, regulations, agreements and treaties. Differing treatment of items for tax and accounting purposes, such as depreciation, amortization and inventory reserves, result in deferred tax assets and liabilities, which are included within the consolidated balance sheets. In the event that actual results differ from these estimates, or the Company adjusts these estimates in future periods, such changes could materially impact the Company's financial position and results of operations.

The accounting standards for income taxes require that a company continually evaluate the necessity of establishing or changing a valuation allowance for deferred tax assets depending on whether it is more likely than not that the actual benefit of those assets will be realized in future periods.

Uncertain Tax Positions
The Company accounts for its uncertain tax return positions in accordance with the accounting standards for income taxes, which require financial statement reporting of the expected future tax consequences of uncertain tax positions on the presumption that all concerned tax authorities possess full knowledge of those tax positions, as well as all of the pertinent facts and circumstances, but prohibit any discounting of unrecognized tax benefits associated with those positions for the time value of money. The Company classified interest and penalties related to unrecognized tax benefits as a component of the provision for income taxes. At December 31, 2018, the Company had unrecognized tax benefits of $27 million.

The Company has been granted a 0% contractual tax rate in Singapore that requires the achievement of certain operational and financial milestones that the Company expects to meet, to the extent not already achieved, by December 31, 2020 and maintain through at least March 31, 2021. As part of the Company's determination of uncertain tax positions, the Company regularly assesses its progress against these operational and financial milestone targets to determine whether the milestones can be reasonably achieved. These milestones were negotiated with the Singaporean tax authorities and established based on the Company's historical financial performance; the anticipated customer end-market demand, particularly in certain regions in the world, and the Company's anticipated future operating plans. These assessments require significant judgments and estimates about the Company's ability to meet the milestone targets for the following types of objectives: reaching and maintaining annual revenue and business spending targets; meeting capital expenditures targets; attaining and sustaining employment targets; and establishing a local research and development and service center. The Company regularly monitors its actual and forecasted sales and operating results against these milestones and the Company makes the determination as to whether the future forecasted financial results are most likely to be achieved. These milestones are very similar in nature to the previous Singaporean tax holiday contractual agreements that the Company successfully completed. These milestones are not required to be met until December 21, 2020, at the earliest, which gives the Company sufficient time to make any necessary adjustments to its operating plans to achieve the milestones.

Currently, the Company has determined that it is more likely than not to realize the contractual tax rate in Singapore of 0% and has not recognized an uncertain tax position in its balance sheet related to the achievement of the contractual milestones in Singapore. However, these milestones can be significantly influenced by the business climate in Singapore and the Company's overall financial performance and, in the event that the Company determines that the milestone targets are not expected to be met, the Company would no longer be able to record a tax benefit at a 0% contractual tax rate on income earned in Singapore from and after the April 1, 2016 start date of the contract period. At such time, the Company would record an income tax charge on the affected Singapore income earned back to April 1, 2016 at the Singapore statutory tax rate(s) (currently 17%), with a corresponding income tax liability recorded on the balance sheet. For the year ended 2018, the effect of applying the contractual tax rate rather than the statutory tax rate to income from qualifying activities in Singapore increased the Company's net income and net income per diluted share by $28 million and $0.36, respectively.

Warranty
Product warranties are recorded at the time revenue is recognized for certain product shipments. While the Company engages in extensive product quality programs and processes, including actively monitoring and evaluating the quality of its component suppliers, the Company's warranty obligation is affected by product failure rates, material usage and service delivery costs incurred in correcting a product failure. Should actual product failure rates, material usage or service delivery costs differ from the Company's previous estimates, revisions to the estimated warranty liability would be required. At December 31, 2018, the Company's warranty liability was $12 million.

Litigation
As described in Part I, Item 3, Legal Proceedings, of this Form 10-K, the Company is a party to various pending litigation matters. With respect to each pending claim, management determines whether it can reasonably estimate whether a loss is probable and, if so, the probable range of that loss. If and when management has determined, with respect to a particular claim, both that a loss is probable and that it can reasonably estimate the range of that loss, the Company records a charge equal to either its best estimate of that loss or the lowest amount in that probable range of loss. The Company will disclose additional exposures when the range of loss is subject to considerable uncertainty.

Pension and Other Retirement Benefits
Assumptions used in determining projected benefit obligations and the fair values of plan assets for the Company's pension plans and other retirement benefits are evaluated periodically by management. Changes in assumptions are based on relevant Company data. Critical assumptions, such as the discount rate used to measure the benefit obligations and the expected long-term rate of return on plan assets, are evaluated and updated annually. The Company has assumed that the weighted-average expected long-term rate of return on plan assets will be 4.35% for its U.S. benefit plans and 2.75% for its non-U.S. benefit plans.

At the end of each year, the Company determines the discount rate that reflects the current rate at which the pension liabilities could be effectively settled. The Company utilized Milliman's Bond Matching model to determine the discount rate for its U.S. benefit plans. The Company determined the discount rate for its non-U.S. benefit plans based on the analysis of the Mercer Pension Discount Curve for high quality investments as of December 31, 2018 that best matched the timing of the plan's future cash flows for the period to maturity of the pension benefits. Once the interest rates were determined, the plan's cash flow was discounted at the spot interest rate back to the measurement date. At December 31, 2018, the Company determined the weighted-average discount rate to be 4.40% for the U.S. benefit plans and 1.95% for the non-U.S. benefits plans.

A one-quarter percentage point increase in the assumed long-term rate of return would decrease the Company's net periodic benefit cost by less than $1 million. A one-quarter percentage point increase in the discount rate would decrease the Company's net periodic benefit cost by less than $1 million.

Stock-based Compensation

The accounting standards for stock-based compensation require that all share-based payments to employees be recognized in the statements of operations based on their fair values. The Company has used the Black-Scholes option pricing model and Monte Carlo simulation model to determine the fair value of its stock option awards and performance stock unit awards, respectively. Under the fair-value recognition provisions of this statement, share-based compensation cost is measured at the grant date based on the value of the award and is recognized as expense over the vesting period. Determining the fair value of share-based awards at the grant date requires judgment, including estimating stock price volatility and employee stock option exercise behaviors. If actual results differ significantly from these estimates, stock-based compensation expense and the Company's results of operations could be materially impacted. As stock-based compensation expense recognized in the consolidated statements of operations is based on awards that ultimately are expected to vest, the amount of the expense has been reduced for estimated forfeitures. These accounting standards require forfeitures to be estimated at the time of grant and revised, if necessary, in subsequent periods if actual forfeitures differ from those estimates. Forfeitures are estimated based on historical experience. If factors change and the Company employs different assumptions in the application of these accounting standards, the compensation expense that the Company records in future periods may differ significantly from what the Company has recorded in the current period. The Company recognizes the expense using the straight-line attribution method.

As of December 31, 2018, unrecognized compensation costs and related weighted-average lives over which the costs will be amortized were as follows (in millions):

	Unrecognized Compensation Costs	Weighted-Average Life in Years
Stock options	$ 42	3.5
Restricted stock units	34	3.2
Performance stock units	14	2.3
Restricted stock	—	—
Total	$ 90	3.2

Business Combinations and Asset Acquisitions

The Company accounts for business acquisitions under the accounting standards for business combinations. The results of each acquisition are included in the Company's consolidated results as of the acquisition date and the purchase price of an acquisition is allocated to tangible and intangible assets and assumed liabilities based on their estimated fair values. Any excess of the fair value consideration transferred over the estimated fair values of the net assets acquired is recognized as goodwill. Acquired in-process research and development ("IPR&D") included in a business combination is capitalized as an indefinite-lived intangible asset. Development costs incurred after the acquisition are expensed as incurred and acquired IPR&D is tested for impairment annually until completion of the acquired programs. Upon commercialization, this indefinite-lived intangible asset is then accounted for as a finite-lived intangible asset and amortized on a straight-line basis over its estimated useful life, subject to periodic impairment reviews. If the research and development project is abandoned, the indefinite-lived asset is charged to expense. Legal costs, due diligence costs, business valuation costs and all other business acquisition costs are expensed when incurred.

The Company also acquires intellectual property through licensing arrangements. These arrangements often require upfront payments and may include additional milestone or royalty payments, contingent upon certain future events. IPR&D acquired in an asset acquisition (as opposed to a business combination) is expensed immediately unless there is an alternative future use. Subsequent payments made for the achievement of milestones are evaluated to determine whether they have an alternative future use or should be expensed. Payments made to third parties subsequent to commercialization are capitalized and amortized over the remaining useful life of the related asset, and are classified as intangible assets.

Contingent Consideration
In addition to the initial cash consideration paid to acquire Medimass, the Company is obligated to make additional earnout payments based on a royalty due on future sales of products containing the REIMS technology. In accordance with the accounting standards for business combinations, the Company determines the fair value of the liability for contingent consideration at each reporting date using a probability-weighted discounted cash flow model. Subsequent changes in the fair value of the contingent consideration liability are recorded in the results of operations. The fair value of the contingent consideration liability associated with future earnout payments is based on several factors, including estimated future results and a discount rate reflective of the Company's creditworthiness. A change in any of these unobservable inputs can significantly change the fair value of the contingent consideration. Although there is no contractual limit, total future undiscounted contingent consideration payments were estimated to be $2 million as of December 31, 2018, based on the Company's best estimate, as the earnout is based on future sales of certain products through 2034.

Recent Accounting Standard Changes and Developments

Information regarding recent accounting standard changes and developments is incorporated by reference from Part II, Item 8, Financial Statements and Supplementary Data, of this document and should be considered an integral part of this Item 7. See Note 2 in the Notes to the Consolidated Financial Statements for recently adopted and issued accounting standards.

Item 7A: *Quantitative and Qualitative Disclosures About Market Risk*

Derivative Transactions
The Company is a global company that operates in over 35 countries and, as a result, the Company's net sales, cost of sales, operating expenses and balance sheet amounts are significantly impacted by fluctuations in foreign currency exchange rates. The Company is exposed to currency price risk on foreign currency exchange rate fluctuations when it translates its non-U.S. dollar foreign subsidiaries' financial statements into U.S. dollars, and when any of the Company's subsidiaries purchase or sell products or services in a currency other than its own currency.

The Company's principal strategies in managing exposures to changes in foreign currency exchange rates are to (1) naturally hedge the foreign-currency-denominated liabilities on the Company's balance sheet against corresponding assets of the same currency, such that any changes in liabilities due to fluctuations in foreign currency exchange rates are typically offset by corresponding changes in assets and (2) mitigate foreign exchange risk exposure of international operations by hedging the variability in the movement of foreign currency exchange rates on a portion of its Euro-denominated net asset investments. The Company presents the derivative transactions in financing activities in the statement of cash flows.

Foreign Currency Exchange Contracts
The Company does not specifically enter into any derivatives that hedge foreign-currency-denominated operating assets, liabilities or commitments on its balance sheet, other than a portion of certain third-party accounts receivable and accounts payable, and the Company's net worldwide intercompany receivables and payables, which are eliminated in consolidation. The Company periodically aggregates these net worldwide balances by currency and then enters into foreign currency exchange contracts that mature within 90 days to hedge a portion of the remaining balance to minimize some of the Company's currency price risk exposure. The foreign currency exchange contracts are not designated for hedge accounting treatment. Principal hedged currencies include the Euro, Japanese yen, British pound, Mexican peso and Brazilian real.

Interest Rate Cross-Currency Swap Agreements
In 2018, the Company entered into three-year interest rate cross-currency swap derivative agreements with a notional value of $300 million to hedge the variability in the movement of foreign currency exchange rates on a portion of its Euro-denominated net asset investments. Under hedge accounting, the change in fair value of the derivative that relates to changes in the foreign currency spot rate are recorded in the currency translation adjustment in other comprehensive income and remain in accumulated comprehensive income in stockholders' equity until the sale or substantial liquidation of the foreign operation. The difference between the interest rate received and paid under the interest rate cross-currency swap derivative agreement is recorded in interest income in the statement of operations.

The Company's foreign currency exchange contracts and interest rate cross-currency swap agreements included in the consolidated balance sheets are classified as follows (in thousands):

	December 31, 2018		December 31, 2017	
	Notional Value	Fair Value	Notional Value	Fair Value
Foreign currency exchange contracts:				
Other current assets	$ 112,212	$ 503	$ 110,759	$ 566
Other current liabilities	$ 40,175	$ 224	$ 37,104	$ 182
Interest rate cross-currency swap agreements:				
Other assets	$ 300,000	$ 1,093	$ —	$ —
Accumulated other comprehensive income		$ (1,093)		$ —

The following is a summary of the activity included in the statements of comprehensive income related to the foreign currency exchange contracts (in thousands):

	Financial Statement Classification	Year Ended December 31,		
		2018	2017	2016
Foreign currency exchange contracts:				
Realized (losses) gains on closed contracts	Cost of sales	$ (6,684)	$ 3,894	$ (10,401)
Unrealized (losses) gains on open contracts	Cost of sales	(105)	1,054	(883)
Cumulative net pre-tax (losses) gains	Cost of sales	$ (6,789)	$ 4,948	$ (11,284)
Interest rate cross-currency swap agreements:				
Interest earned	Interest income	$ 2,713	$ —	$ —
Unrealized gains on open contracts	Stockholders' equity	$ 1,093	$ —	$ —

Assuming a hypothetical adverse change of 10% in year-end exchange rates (a strengthening of the U.S. dollar), the fair market value of the foreign currency exchange contracts outstanding as of December 31, 2018 would decrease pre-tax earnings by approximately $15 million. Assuming a hypothetical adverse change of 10% in year-end exchange rates (a strengthening of the U.S. dollar), the fair market value of the interest rate cross-currency swap agreements outstanding as of December 31, 2018 would increase by approximately $30 million and would be recorded to foreign currency translation in other comprehensive income within stockholders' equity. The related impact on interest income would not have a material effect on pre-tax earnings.

The Company's cash and cash equivalents are not subject to significant interest rate risk due to the short maturities of these instruments. The Company's cash equivalents represent highly liquid investments, with original maturities of 90 days or less, primarily in bank deposits, U.S. treasury bill money market funds and commercial paper. As of December 31, 2018, the carrying value of the Company's cash and cash equivalents approximated fair value.

The Company is exposed to the risk of interest rate fluctuations from the investments of cash generated from operations. Investments with maturities greater than 90 days are classified as investments, and are held primarily in U.S. dollar-denominated treasury bills and commercial paper, bank deposits and corporate debt securities. As of December 31, 2018, the Company estimates that a hypothetical adverse change of 100 basis points across all maturities would not have a material effect on the fair market value of its portfolio.

The Company is also exposed to the risk of exchange rate fluctuations. The Company maintains cash balances in various operating accounts in excess of federally insured limits, and in foreign subsidiary accounts in currencies other than the U.S. dollar. As of December 31, 2018 and 2017, $471 million out of $1,735 million and $3,326 million out of $3,394 million, respectively, of the Company's total cash, cash equivalents and investments were held by foreign subsidiaries. In addition, $251 million out of $1,735 million and $304 million out of $3,394 million of cash, cash equivalents and investments were held in currencies other than the U.S. dollar at December 31, 2018 and 2017, respectively. As of December 31, 2018, the Company has no holdings in auction rate securities or commercial paper issued by structured investment vehicles.

Assuming a hypothetical adverse change of 10% in year-end exchange rates (a strengthening of the U.S. dollar), the fair market value of the Company's cash, cash equivalents and investments held in currencies other than the U.S. dollar as of December 31, 2018 would decrease by approximately $25 million, of which the majority would be recorded to foreign currency translation in other comprehensive income within stockholders' equity.

Item 8: ***Financial Statements and Supplementary Data***

Management's Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. 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.

Under the supervision and with the participation of our management, including our chief executive officer and chief financial officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework in *Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on our evaluation under the framework in *Internal Control — Integrated Framework (2013)*, our management, including our chief executive officer and chief financial officer, concluded that our internal control over financial reporting was effective as of December 31, 2018.

The effectiveness of our internal control over financial reporting as of December 31, 2018 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report which is included herein.

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Waters Corporation

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Waters Corporation and its subsidiaries (the "Company") as of December 31, 2018 and 2017, and the related consolidated statements of operations, comprehensive income, stockholders' equity and cash flows for each of the three years in the period ended December 31, 2018, including the related notes and schedule of valuation and qualifying accounts for each of the three years in the period ended December 31, 2018 appearing under Item 15(c) (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control — Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2018 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control — Integrated Framework (2013) issued by the COSO.

Change in Accounting Principle

As discussed in Note 10 to the consolidated financial statements, the Company changed the manner in which it accounts for share-based payment transactions in 2017.

Basis for Opinions

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

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

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

Definition and Limitations of Internal Control over Financial Reporting

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

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

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
February 26, 2019

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

WATERS CORPORATION AND SUBSIDIARIES

CONSOLIDATED BALANCE SHEETS

	December 31, 2018	December 31, 2017
	(In thousands, except per share data)	
ASSETS		
Current assets:		
Cash and cash equivalents	$ 796,280	$ 642,319
Investments	938,944	2,751,382
Accounts receivable, net	568,316	533,825
Inventories	291,569	270,294
Other current assets	68,054	72,314
Total current assets	2,663,163	4,270,134
Property, plant and equipment, net	343,083	349,278
Intangible assets, net	246,902	228,395
Goodwill	355,614	359,819
Other assets	118,664	116,728
Total assets	$ 3,727,426	$ 5,324,354
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Notes payable and debt	$ 178	$ 100,273
Accounts payable	68,168	64,537
Accrued employee compensation	64,545	69,024
Deferred revenue and customer advances	164,965	166,840
Accrued income taxes	22,943	73,008
Accrued warranty	12,300	13,026
Other current liabilities	115,832	119,449
Total current liabilities	448,931	606,157
Long-term liabilities:		
Long-term debt	1,148,172	1,897,501
Long-term portion of retirement benefits	55,853	67,334
Long-term income tax liabilities	430,866	456,949
Other long-term liabilities	76,346	62,625
Total long-term liabilities	1,711,237	2,484,409
Total liabilities	2,160,168	3,090,566
Commitments and contingencies (Notes 6, 9, 10, 11, 12 and 16)		
Stockholders' equity:		
Preferred stock, par value $0.01 per share, 5,000 shares authorized, none issued at December 31, 2018 and December 31, 2017	—	—
Common stock, par value $0.01 per share, 400,000 shares authorized, 160,472 and 159,845 shares issued, 73,115 and 79,337 shares outstanding at December 31, 2018 and December 31, 2017, respectively	1,605	1,598
Additional paid-in capital	1,834,741	1,745,088
Retained earnings	5,995,205	5,405,380
Treasury stock, at cost, 87,357 and 80,509 shares at December 31, 2018 and December 31, 2017, respectively	(6,146,322)	(4,808,211)
Accumulated other comprehensive loss	(117,971)	(110,067)
Total stockholders' equity	1,567,258	2,233,788
Total liabilities and stockholders' equity	$ 3,727,426	$ 5,324,354

The accompanying notes are an integral part of the consolidated financial statements.

WATERS CORPORATION AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF OPERATIONS

	Year Ended December 31,		
	2018	2017	2016
	(In thousands, except per share data)		
Revenues:			
Product sales	$1,604,993	$1,552,349	$1,460,296
Service sales	814,936	756,729	707,127
Total net sales	2,419,929	2,309,078	2,167,423
Costs and operating expenses:			
Cost of product sales	656,275	623,214	595,796
Cost of service sales	336,289	323,853	295,657
Selling and administrative expenses	536,902	544,363	512,331
Research and development expenses	143,403	132,593	125,187
Purchased intangibles amortization	7,712	6,743	9,889
Litigation (settlement) provision (Note 11)	(426)	11,114	3,524
Acquired in-process research and development (Note 2)	—	5,000	—
Total costs and operating expenses	1,680,155	1,646,880	1,542,384
Operating income	739,774	662,198	625,039
Other expense	(47,794)	(340)	(700)
Interest expense	(48,641)	(56,839)	(44,911)
Interest income	38,807	36,078	20,686
Income before income taxes	682,146	641,097	600,114
Provision for income taxes	88,352	620,786	78,611
Net income	$ 593,794	$ 20,311	$ 521,503
Net income per basic common share	$ 7.71	$ 0.25	$ 6.46
Weighted-average number of basic common shares	76,992	79,793	80,786
Net income per diluted common share	$ 7.65	$ 0.25	$ 6.41
Weighted-average number of diluted common shares and equivalents	77,618	80,604	81,417

The accompanying notes are an integral part of the consolidated financial statements.

WATERS CORPORATION AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

	Year Ended December 31,		
	2018	2017	2016
		(In thousands)	
Net income	$593,794	$ 20,311	$521,503
Other comprehensive (loss) income:			
Foreign currency translation	(36,279)	101,148	(66,996)
Unrealized gains (losses) on investments before income taxes	698	(1,794)	279
Income tax benefit	443	68	111
Unrealized gains (losses) on investments, net of tax	1,141	(1,726)	390
Retirement liability adjustment before reclassifications	(6,722)	7,832	(6,783)
Amounts reclassified to other expense	48,792	3,948	3,263
Retirement liability adjustment before income taxes	42,070	11,780	(3,520)
Income tax (expense) benefit	(14,836)	(4,989)	572
Retirement liability adjustment, net of tax	27,234	6,791	(2,948)
Other comprehensive (loss) income	(7,904)	106,213	(69,554)
Comprehensive income	$585,890	$126,524	$451,949

The accompanying notes are an integral part of the consolidated financial statements.

WATERS CORPORATION AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CASH FLOWS

	Year Ended December 31,		
	2018	2017	2016
		(In thousands)	
Cash flows from operating activities:			
Net income	$ 593,794	$ 20,311	$ 521,503
Adjustments to reconcile net income to net cash provided by operating activities:			
Stock-based compensation	37,541	39,436	40,998
Deferred income taxes	2,405	45,510	1,204
Depreciation	57,952	61,450	51,684
Amortization of intangibles	50,456	44,552	44,765
Excess tax benefit related to stock option plans	—	—	13,844
Gain on sale of assets	—	—	(1,500)
In-process research and development and other non-cash charges	—	5,000	—
Change in operating assets and liabilities, net of acquisitions:			
Increase in accounts receivable	(47,921)	(24,013)	(31,721)
(Increase) decrease in inventories	(25,396)	731	(20,147)
Increase in other current assets	(12,446)	(16,323)	(2,436)
Decrease (increase) in other assets	6,047	(24,098)	(1,076)
(Decrease) increase in accounts payable and other current liabilities	(81,663)	3,175	6,842
Increase in deferred revenue and customer advances	2,721	10,386	9,974
Enactment of the 2017 Tax Act	(6,059)	530,383	—
Increase in other liabilities	(27,015)	1,140	8,986
Net cash provided by operating activities	604,446	697,640	642,920
Cash flows from investing activities:			
Additions to property, plant, equipment and software capitalization	(96,079)	(85,473)	(94,967)
Asset and business acquisitions, net of cash acquired	(31,486)	—	(5,609)
Investment in unaffiliated company	(7,615)	(7,000)	—
Payments for intellectual property licenses	—	(5,000)	—
Purchases of investments	(1,006,080)	(2,960,379)	(2,396,032)
Maturities and sales of investments	2,824,562	2,522,100	2,004,690
Proceeds from sale of assets	—	—	4,000
Net cash provided by (used in) investing activities	1,683,302	(535,752)	(487,918)
Cash flows from financing activities:			
Proceeds from debt issuances	274	1,480,190	485,298
Payments on debt	(850,435)	(1,310,214)	(325,323)
Payments of debt issuance costs	—	(2,984)	(1,705)
Proceeds from stock plans	52,429	97,789	62,189
Purchases of treasury shares	(1,315,106)	(332,544)	(325,759)
(Payments for) proceeds from derivative contracts	(6,684)	3,894	(10,401)
Net cash used in financing activities	(2,119,522)	(63,869)	(115,701)
Effect of exchange rate changes on cash and cash equivalents	(14,265)	38,669	(21,335)
Increase in cash and cash equivalents	153,961	136,688	17,966
Cash and cash equivalents at beginning of period	642,319	505,631	487,665
Cash and cash equivalents at end of period	$ 796,280	$ 642,319	$ 505,631
Supplemental cash flow information:			
Income taxes paid	$ 159,397	$ 70,583	$ 50,007
Interest paid	$ 50,798	$ 56,503	$ 43,595

The accompanying notes are an integral part of the consolidated financial statements.

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WATERS CORPORATION AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

	Number of Common Shares	Common Stock	Additional Paid-In Capital	Retained Earnings	Treasury Stock	Accumulated Other Comprehensive Income (Loss)	Total Stockholders' Equity
				(In thousands)			
Balance December 31, 2015	157,677	$ 1,577	$ 1,490,342	$ 4,863,566	$ (4,149,908)	$ (146,726)	$ 2,058,851
Net income	—	—	—	521,503	—	—	521,503
Other comprehensive loss	—	—	—	—	—	(69,554)	(69,554)
Issuance of common stock for employees:							
Employee Stock Purchase Plan	53	1	6,277	—	—	—	6,278
Stock options exercised	730	7	55,904	—	—	—	55,911
Tax benefit related to stock option plans	—	—	13,844	—	—	—	13,844
Treasury stock	—	—	—	—	(325,759)	—	(325,759)
Stock-based compensation	174	1	40,874	—	—	—	40,875
Balance December 31, 2016	158,634	$ 1,586	$ 1,607,241	$ 5,385,069	$ (4,475,667)	$ (216,280)	$ 2,301,949
Net income	—	—	—	20,311	—	—	20,311
Other comprehensive income	—	—	—	—	—	106,213	106,213
Issuance of common stock for employees:							
Employee Stock Purchase Plan	50	1	6,874	—	—	—	6,875
Stock options exercised	972	10	90,904	—	—	—	90,914
Treasury stock	—	—	—	—	(332,544)	—	(332,544)
Stock-based compensation	189	1	40,069	—	—	—	40,070
Balance December 31, 2017	159,845	$ 1,598	$ 1,745,088	$ 5,405,380	$ (4,808,211)	$ (110,067)	$ 2,233,788
Adoption of new accounting pronouncement	—	—	—	(3,969)	—	—	(3,969)
Net income	—	—	—	593,794	—	—	593,794
Other comprehensive loss	—	—	—	—	—	(7,904)	(7,904)
Issuance of common stock for employees:							
Employee Stock Purchase Plan	45	—	7,874	—	—	—	7,874
Stock options exercised	438	5	44,550	—	—	—	44,555
Treasury stock	—	—	—	—	(1,338,111)	—	(1,338,111)
Stock-based compensation	144	2	37,229	—	—	—	37,231
Balance December 31, 2018	160,472	$ 1,605	$ 1,834,741	$ 5,995,205	$ (6,146,322)	$ (117,971)	$ 1,567,258

The accompanying notes are an integral part of the consolidated financial statements.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1 Description of Business and Organization

Waters Corporation (the "Company," "we," "our," or "us") is a specialty measurement company that operates with a fundamental underlying purpose to advance the science that enables our customers to enhance human health and well-being. The Company has pioneered analytical workflow solutions involving liquid chromatography, mass spectrometry and thermal analysis innovations serving the life, materials and food sciences for more than 60 years. The Company primarily designs, manufactures, sells and services high performance liquid chromatography ("HPLC"), ultra performance liquid chromatography ("UPLC™" and together with HPLC, referred to as "LC") and mass spectrometry ("MS") technology systems and support products, including chromatography columns, other consumable products and comprehensive post-warranty service plans. These systems are complementary products that are frequently employed together ("LC-MS") and sold as integrated instrument systems using common software platforms. LC is a standard technique and is utilized in a broad range of industries to detect, identify, monitor and measure the chemical, physical and biological composition of materials, and to purify a full range of compounds. MS technology, principally in conjunction with chromatography, is employed in drug discovery and development, including clinical trial testing, the analysis of proteins in disease processes (known as "proteomics"), nutritional safety analysis and environmental testing. LC-MS instruments combine a liquid phase sample introduction and separation system with mass spectrometric compound identification and quantification. In addition, the Company designs, manufactures, sells and services thermal analysis, rheometry and calorimetry instruments through its TA™ product line. These instruments are used in predicting the suitability and stability of fine chemicals, pharmaceuticals, water, polymers, metals and viscous liquids for various industrial, consumer goods and healthcare products, as well as for life science research. The Company is also a developer and supplier of advanced software-based products that interface with the Company's instruments, as well as other manufacturers' instruments.

2 Basis of Presentation and Summary of Significant Accounting Policies

Use of Estimates

The preparation of consolidated financial statements in conformity with generally accepted accounting principles ("GAAP") requires the Company to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses, and related disclosure of contingent liabilities at the dates of the financial statements. On an ongoing basis, the Company evaluates its estimates, including those related to revenue recognition, product returns and allowances, bad debts, inventory valuation, goodwill and intangible assets, income taxes, warranty and installation provisions, litigation, retirement plan obligations, stock-based compensation, equity investments and contingencies. The Company bases its estimates on historical experience and on various other assumptions that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual amounts may differ from these estimates under different assumptions or conditions.

Risks and Uncertainties

The Company is subject to risks common to companies in the analytical instrument industry, including, but not limited to, global economic and financial market conditions, fluctuations in foreign currency exchange rates, fluctuations in customer demand, development by its competitors of new technological innovations, costs of developing new technologies, levels of debt and debt service requirements, risk of disruption, dependence on key personnel, protection and litigation of proprietary technology, shifts in taxable income between tax jurisdictions and compliance with regulations of the U.S. Food and Drug Administration and similar foreign regulatory authorities and agencies.

Principles of Consolidation

The consolidated financial statements include the accounts of the Company and its subsidiaries, which are wholly owned. The Company consolidates entities in which it owns or controls fifty percent or more of the voting shares. All inter-company balances and transactions have been eliminated.

Translation of Foreign Currencies

The functional currency of each of the Company's foreign operating subsidiaries is the local currency of its country of domicile, except for the Company's subsidiaries in Hong Kong, Singapore and the Cayman Islands, where the underlying transactional cash flows are denominated in currencies other than the respective local currency of domicile. The functional currency of the Hong Kong, Singapore and Cayman Islands subsidiaries is the U.S. dollar, based on the respective entity's cash flows.

For most of the Company's foreign operations, assets and liabilities are translated into U.S. dollars at exchange rates prevailing on the balance sheet date, while revenues and expenses are translated at average exchange rates prevailing during the respective period. Any resulting translation gains or losses are included in accumulated other comprehensive income in the consolidated balance sheets.

The Company's net sales derived from operations outside the United States were 72%, 71% and 69% in 2018, 2017 and 2016, respectively. Gains and losses from foreign currency transactions are included in net income in the consolidated statements of operations. In 2018, 2017 and 2016, foreign currency transactions resulted in net losses of $3 million, $1 million and $4 million, respectively.

Seasonality of Business

The Company typically experiences an increase in sales in the fourth quarter, as a result of purchasing habits for capital goods of customers that tend to exhaust their spending budgets by calendar year end.

Cash, Cash Equivalents and Investments

Cash equivalents represent highly liquid investments, with original maturities of 90 days or less, primarily in bank deposits, U.S. treasury bill money market funds and commercial paper. Investments with longer maturities are classified as investments, and are held primarily in U.S. treasury bills, U.S. dollar-denominated treasury bills and commercial paper, bank deposits and corporate debt securities.

Investments are classified as available-for-sale in accordance with the accounting standards for investments in debt securities. All debt securities are recorded at fair market value and any unrealized holding gains and losses, to the extent deemed temporary, are included in accumulated other comprehensive income in stockholders' equity, net of the related tax effects. If any adjustment to fair value reflects a decline in the value of the investment, the Company considers all available evidence to evaluate the extent to which the decline is "other than temporary" and, if so, records a loss as a charge to the statement of operations. The Company classifies its investments exclusive of those categorized as cash equivalents.

The Company maintains cash balances in various operating accounts in excess of federally insured limits, and in foreign subsidiary accounts in currencies other than the U.S. dollar. As of December 31, 2018 and 2017, $471 million out of $1,735 million and $3,326 million out of $3,394 million, respectively, of the Company's total cash, cash equivalents and investments were held by foreign subsidiaries. In addition, $251 million out of $1,735 million and $304 million out of $3,394 million of cash, cash equivalents and investments were held in currencies other than the U.S. dollar at December 31, 2018 and 2017, respectively.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)

Accounts Receivable and Allowance for Doubtful Accounts

Trade accounts receivable are recorded at the invoiced amount and do not bear interest. The Company has very limited use of rebates and other cash considerations payable to customers and, as a result, the transaction price determination does not have any material variable consideration. The allowance for doubtful accounts is the best estimate of the amount of probable credit losses in the existing accounts receivable. The allowance is based on a number of factors, including historical experience and the customer's credit-worthiness. The allowance for doubtful accounts is reviewed on at least a quarterly basis. Past due balances over 90 days and over a specified amount are reviewed individually for collectibility. Account balances are charged against the allowance when the Company determines it is probable that the receivable will not be recovered. The Company does not have any off-balance sheet credit exposure related to its customers. Historically, the Company has not experienced significant bad debt losses.

The following is a summary of the activity of the Company's allowance for doubtful accounts for the years ended December 31, 2018, 2017 and 2016 (in thousands):

	Balance at Beginning of Period	Additions	Deduction	Balance at End of Period
Allowance for Doubtful Accounts				
December 31, 2018	$ 6,109	$ 6,333	$ (4,779)	$ 7,663
December 31, 2017	$ 5,141	$ 3,752	$ (2,784)	$ 6,109
December 31, 2016	$ 4,617	$ 2,399	$ (1,875)	$ 5,141

Concentration of Credit Risk

The Company sells its products and services to a significant number of large and small customers throughout the world, with net sales to the pharmaceutical industry of approximately 56% in each of the years 2018, 2017 and 2016. None of the Company's individual customers accounted for more than 2% of annual Company sales in 2018, 2017 or 2016. The Company performs continuing credit evaluations of its customers and generally does not require collateral, but in certain circumstances may require letters of credit or deposits. Historically, the Company has not experienced significant bad debt losses.

Inventory

The Company values all of its inventories at the lower of cost or net realizable value on a first-in, first-out basis ("FIFO").

Income Taxes

Deferred income taxes are recognized for temporary differences between the financial statement and income tax basis of assets and liabilities using tax rates in effect for the years in which the differences are expected to reverse. A valuation allowance is provided to offset any net deferred tax assets if, based upon the available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized. Appropriate long-term liabilities have also been recorded to recognize uncertain tax positions.

As part of the 2017 Tax Act, there is a provision for the taxation of certain off-shore earnings referred to as the Global Intangible Low-Taxed Income ("GILTI") provision. This new provision taxes off-shore earnings at a rate of 10.5%, partially offset with foreign tax credits. In connection with this new provision, the Company has adopted an accounting policy to treat this new tax as a current period cost.

Property, Plant and Equipment

Property, plant and equipment are recorded at cost. Expenditures for maintenance and repairs are charged to expense, while the costs of significant improvements are capitalized. Depreciation is provided using the straight-line method over the following estimated useful lives: buildings — fifteen to thirty years; building improvements — five to ten years; leasehold improvements — the shorter of the economic useful life or life of lease; and production and other equipment — three to ten years. Upon retirement or sale, the cost of the assets disposed of and the related accumulated depreciation are eliminated from the consolidated balance sheets and related gains or losses are reflected in the consolidated statements of operations.

Asset Impairments

The Company reviews its long-lived assets for impairment in accordance with the accounting standards for property, plant and equipment. Whenever events or circumstances indicate that the carrying amount of an asset may not be recoverable, the Company evaluates the recoverability of the carrying value of the asset based on the expected future cash flows, relying on a number of factors, including, but not limited to, operating results, business plans, economic projections and anticipated future cash flows. If the asset is deemed not recoverable, it is written down to fair value and the impairment is recorded in the consolidated statements of operations.

Business Combinations and Asset Acquisitions

The Company accounts for business acquisitions under the accounting standards for business combinations. The results of each acquisition are included in the Company's consolidated results as of the acquisition date and the purchase price of an acquisition is allocated to tangible and intangible assets and assumed liabilities based on their estimated fair values. Any excess of the fair value consideration transferred over the estimated fair values of the net assets acquired is recognized as goodwill. Acquired in-process research and development ("IPR&D") included in a business combination is capitalized as an indefinite-lived intangible asset. Development costs incurred after the acquisition are expensed as incurred and acquired IPR&D is tested for impairment annually until completion of the acquired programs. Upon commercialization, this indefinite-lived intangible asset is then accounted for as a finite-lived intangible asset and amortized on a straight-line basis over its estimated useful life, subject to periodic impairment reviews. If the research and development project is abandoned, the indefinite-lived asset is charged to expense. Legal costs, due diligence costs, business valuation costs and all other business acquisition costs are expensed when incurred.

The Company also acquires intellectual property through licensing arrangements. These arrangements often require upfront payments and may include additional milestone or royalty payments, contingent upon certain future events. IPR&D acquired in an asset acquisition (as opposed to a business combination) is expensed immediately unless there is an alternative future use. Subsequent payments made for the achievement of milestones are evaluated to determine whether they have an alternative future use or should be expensed. Payments made to third parties subsequent to commercialization are capitalized and amortized over the remaining useful life of the related asset, and are classified as intangible assets.

Goodwill and Other Intangible Assets

The Company tests for goodwill impairment using a fair-value approach at the reporting unit level annually, or earlier, if an event occurs or circumstances change that would more likely than not reduce the fair value of a reporting unit below its carrying amount. Additionally, the Company performs an annual goodwill impairment assessment for its reporting units as of January 1 each year. The goodwill and other intangible assets accounting standards define a reporting unit as an operating segment, or one level below an operating segment, if discrete financial information is prepared and reviewed by management. For goodwill impairment review purposes, the

Company has two reporting units: Waters™ and TA™. Goodwill is allocated to the reporting units at the time of acquisition. Under the impairment test, if a reporting unit's carrying amount exceeds its estimated fair value, goodwill impairment is recognized to the extent that the carrying amount of goodwill exceeds the implied fair value of the goodwill. The fair value of reporting units was estimated using a discounted cash flows technique, which includes certain management assumptions, such as estimated future cash flows, estimated growth rates and discount rates.

The Company's intangible assets include purchased technology; capitalized software development costs; costs associated with acquiring Company patents, trademarks and intellectual properties, such as licenses; debt issuance costs and acquired IPR&D. Purchased intangibles are recorded at their fair market values as of the acquisition date and amortized over their estimated useful lives, ranging from one to fifteen years. Other intangibles are amortized over a period ranging from one to ten years. Debt issuance costs are amortized over the life of the related debt. Acquired IPR&D is amortized from the date of completion of the acquired program over its estimated useful life. IPR&D and indefinite-lived intangibles are tested annually for impairment.

Software Development Costs

The Company capitalizes internal and external software development costs for products offered for sale in accordance with the accounting standards for the costs of software to be sold, leased, or otherwise marketed. Capitalized costs are amortized to cost of sales over the period of economic benefit, which approximates a straight-line basis over the estimated useful lives of the related software products, generally three to ten years. The Company capitalized $34 million and $35 million of direct expenses that were related to the development of software in 2018 and 2017, respectively. Net capitalized software included in intangible assets totaled $147 million and $153 million at December 31, 2018 and 2017, respectively. See Note 8, "Goodwill and Other Intangibles".

The Company capitalizes internal software development costs for internal use. Capitalized internal software development costs are amortized over the period of economic benefit, which approximates a straight-line basis over ten years. Net capitalized internal software included in property, plant and equipment totaled $2 million and $3 million at December 31, 2018 and 2017, respectively.

Other Investments

The Company accounts for its investments that represent less than twenty percent ownership, and for which the Company does not have the ability to exercise significant influence, using the accounting standards for investments in equity securities. Investments for which the Company does not have the ability to exercise significant influence, and for which there is not a readily determinable market value, are accounted for under the cost method of accounting. The Company periodically evaluates the carrying value of its investments accounted for under the cost method of accounting and carries them at the lower of cost or estimated net realizable value. For investments in which the Company owns or controls between twenty and forty-nine percent of the voting shares, or over which it has the ability to exercise significant influence over operating and financial policies, the equity method of accounting is used. The Company's share of net income or losses of equity investments is included in the consolidated statements of operations and was not material in any period presented.

During the year ended December 31, 2018, the Company made $8 million of investments in unaffiliated companies. During the year ended December 31, 2017, the Company made a $7 million investment in a developer of analytical system solutions used to make measurements, predict stability and accelerate product discovery in the routine analytic, process monitoring and quality control release processes for life science and biopharmaceutical markets. During the year ended December 31, 2016, the Company sold an equity investment that was accounted for using the equity method of accounting and was included in other assets in the consolidated balance sheet for $4 million in cash.

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Fair Value Measurements

In accordance with the accounting standards for fair value measurements and disclosures, certain of the Company's assets and liabilities are measured at fair value on a recurring basis as of December 31, 2018 and 2017. Fair values determined by Level 1 inputs utilize observable data, such as quoted prices in active markets. Fair values determined by Level 2 inputs utilize data points other than quoted prices in active markets that are observable either directly or indirectly. Fair values determined by Level 3 inputs utilize unobservable data points for which there is little or no market data, which require the reporting entity to develop its own assumptions.

The following table represents the Company's assets and liabilities measured at fair value on a recurring basis at December 31, 2018 (in thousands):

	Total at December 31, 2018	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
U.S. Treasury securities	$ 164,315	$ —	$ 164,315	$ —
Foreign government securities	3,463	—	3,463	—
Corporate debt securities	723,059	—	723,059	—
Time deposits	108,638	—	108,638	—
Waters 401(k) Restoration Plan assets	33,104	33,104	—	—
Foreign currency exchange contracts	503	—	503	—
Interest rate cross-currency swap agreements	1,093	—	1,093	—
Total	$1,034,175	$ 33,104	$1,001,071	$ —
Liabilities:				
Contingent consideration	$ 2,476	$ —	$ —	$ 2,476
Foreign currency exchange contracts	224	—	224	—
Total	$ 2,700	$ —	$ 224	$ 2,476

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)

The following table represents the Company's assets and liabilities measured at fair value on a recurring basis at December 31, 2017 (in thousands):

	Total at December 31, 2017	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
U.S. Treasury securities	$ 591,988	$ —	$ 591,988	$ —
Foreign government securities	6,952	—	6,952	—
Corporate debt securities	1,975,160	—	1,975,160	—
Time deposits	371,511	—	371,511	—
Equity securities	147	—	147	—
Waters 401(k) Restoration Plan assets	35,645	35,645	—	—
Foreign currency exchange contracts	566	—	566	—
Total	$2,981,969	$ 35,645	$2,946,324	$ —
Liabilities:				
Contingent consideration	$ 3,247	$ —	$ —	$ 3,247
Foreign currency exchange contracts	182	—	182	—
Total	$ 3,429	$ —	$ 182	$ 3,247

Fair Value of 401(k) Restoration Plan Assets

The 401(k) Restoration Plan is a nonqualified defined contribution plan and the assets were held in registered mutual funds and have been classified as Level 1. The fair values of the assets in the plan are determined through market and observable sources from daily quoted prices on nationally recognized securities exchanges.

Fair Value of Cash Equivalents, Investments, Foreign Currency Exchange Contracts and Interest Rate Cross-Currency Swap Agreements

The fair values of the Company's cash equivalents, investments and foreign currency exchange contracts are determined through market and observable sources and have been classified as Level 2. These assets and liabilities have been initially valued at the transaction price and subsequently valued, typically utilizing third-party pricing services. The pricing services use many inputs to determine value, including reportable trades, benchmark yields, credit spreads, broker/dealer quotes, current spot rates and other industry and economic events. The Company validates the prices provided by third-party pricing services by reviewing their pricing methods and obtaining market values from other pricing sources.

Fair Value of Contingent Consideration

The fair value of the Company's liability for contingent consideration relates to earnout payments in connection with the July 2014 acquisition of Medimass Research, Development and Service Kft. and is determined using a probability-weighted discounted cash flow model, which uses significant unobservable inputs, and has been classified as Level 3. Subsequent changes in the fair value of the contingent consideration liability are recorded in the results of operations. The fair value of the contingent consideration liability associated with future earnout payments is based on several factors, including the estimated future results and a discount rate that reflects both the likelihood of achieving the estimated future results and the Company's creditworthiness. A change in any of these unobservable inputs can significantly change the fair value of the contingent consideration. Although there is no contractual limit, the fair value of future contingent consideration payments was estimated to be $2 million and $3 million at December 31, 2018 and 2017, respectively, based on the Company's best estimate, as the earnout is based on future sales of certain products, some of which are currently in development, through 2034.

Fair Value of Other Financial Instruments

The Company's accounts receivable, accounts payable and variable interest rate debt are recorded at cost, which approximates fair value due to their short-term nature. The carrying value of the Company's fixed interest rate debt was $510 million and $610 million at December 31, 2018 and 2017, respectively. The fair value of the Company's fixed interest rate debt was estimated using discounted cash flow models, based on estimated current rates offered for similar debt under current market conditions for the Company. The fair value of the Company's fixed interest rate debt was estimated to be $502 million and $608 million at December 31, 2018 and 2017, respectively, using Level 2 inputs.

Derivative Transactions

The Company is a global company that operates in over 35 countries and, as a result, the Company's net sales, cost of sales, operating expenses and balance sheet amounts are significantly impacted by fluctuations in foreign currency exchange rates. The Company is exposed to currency price risk on foreign currency exchange rate fluctuations when it translates its non-U.S. dollar foreign subsidiaries' financial statements into U.S. dollars, and when any of the Company's subsidiaries purchase or sell products or services in a currency other than its own currency.

The Company's principal strategies in managing exposures to changes in foreign currency exchange rates are to (1) naturally hedge the foreign-currency-denominated liabilities on the Company's balance sheet against corresponding assets of the same currency, such that any changes in liabilities due to fluctuations in foreign currency exchange rates are typically offset by corresponding changes in assets and (2) mitigate foreign exchange risk exposure of international operations by hedging the variability in the movement of foreign currency exchange rates on a portion of its Euro-denominated net asset investments. The Company presents the derivative transactions in financing activities in the statement of cash flows.

Foreign Currency Exchange Contracts

The Company does not specifically enter into any derivatives that hedge foreign-currency-denominated operating assets, liabilities or commitments on its balance sheet, other than a portion of certain third-party accounts receivable and accounts payable, and the Company's net worldwide intercompany receivables and payables, which are eliminated in consolidation. The Company periodically aggregates its net worldwide balances by currency and then enters into foreign currency exchange contracts that mature within 90 days to hedge a portion of the remaining balance to minimize some of the Company's currency price risk exposure. The foreign currency exchange contracts are not designated for hedge accounting treatment. Principal hedged currencies include the Euro, Japanese yen, British pound, Mexican peso and Brazilian real.

Interest Rate Cross-Currency Swap Agreements

In 2018, the Company entered into three-year interest rate cross-currency swap derivative agreements with a notional value of $300 million to hedge the variability in the movement of foreign currency exchange rates on a portion of its Euro-denominated net asset investments. Under hedge accounting, the change in fair value of the derivative that relates to changes in the foreign currency spot rate are recorded in the currency translation adjustment in other comprehensive income and remain in accumulated comprehensive income in stockholders' equity until the sale or substantial liquidation of the foreign operation. The difference between the interest rate received and paid under the interest rate cross-currency swap derivative agreement is recorded in interest income in the statement of operations.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)

The Company's foreign currency exchange contracts and interest rate cross-currency swap agreements included in the consolidated balance sheets are classified as follows (in thousands):

	December 31, 2018		December 31, 2017	
	Notional Value	Fair Value	Notional Value	Fair Value
Foreign currency exchange contracts:				
Other current assets	$ 112,212	$ 503	$ 110,759	$ 566
Other current liabilities	$ 40,175	$ 224	$ 37,104	$ 182
Interest rate cross-currency swap agreements:				
Other assets	$ 300,000	$ 1,093	$ —	$ —
Accumulated other comprehensive income		$ (1,093)		$ —

The following is a summary of the activity included in the statements of comprehensive income related to the foreign currency exchange contracts (in thousands):

	Financial Statement Classification	Year Ended December 31,		
		2018	2017	2016
Foreign currency exchange contracts:				
Realized (losses) gains on closed contracts	Cost of sales	$ (6,684)	$ 3,894	$ (10,401)
Unrealized (losses) gains on open contracts	Cost of sales	(105)	1,054	(883)
Cumulative net pre-tax (losses) gains	Cost of sales	$ (6,789)	$ 4,948	$ (11,284)
Interest rate cross-currency swap agreements:				
Interest earned	Interest income	$ 2,713	$ —	$ —
Unrealized gains on open contracts	Stockholders' equity	$ 1,093	$ —	$ —

Stockholders' Equity

In January 2019, the Company's Board of Directors authorized the Company to repurchase up to $4 billion of its outstanding common stock over a two-year period. This new program replaced the remaining amounts available under the April 2018 authorization of $3 billion. During 2018, 2017 and 2016, the Company repurchased 6.8 million, 1.8 million and 2.3 million shares of the Company's outstanding common stock at a cost of $1,329 million, $323 million and $318 million, respectively, under the April 2018 authorization and other previously announced programs. In addition, the Company repurchased $10 million, $10 million and $8 million of common stock related to the vesting of restricted stock units during the years ended December 31, 2018, 2017 and 2016, respectively. The Company believes that it has the financial flexibility to fund these share repurchases given current cash levels and debt borrowing capacity, as well as to invest in research, technology and business acquisitions to further grow the Company's sales and profits.

In December 2018, the Company accrued $23 million as a result of treasury stock purchases that were unsettled as of December 31, 2018. These transactions were settled in January 2019.

Product Warranty Costs

The Company accrues estimated product warranty costs at the time of sale, which are included in cost of sales in the consolidated statements of operations. While the Company engages in extensive product quality programs and processes, including actively monitoring and evaluating the quality of its component suppliers, the Company's warranty obligation is affected by product failure rates, material usage and service delivery costs incurred in correcting a product failure. The amount of the accrued warranty liability is based on historical information, such as past experience, product failure rates, number of units repaired and estimated costs of material and labor. The liability is reviewed for reasonableness at least quarterly.

The following is a summary of the activity of the Company's accrued warranty liability for the years ended December 31, 2018, 2017 and 2016 (in thousands):

	Balance at Beginning of Period	Accruals for Warranties	Settlements Made	Balance at End of Period
Accrued warranty liability:				
December 31, 2018	$ 13,026	$ 5,033	$ (5,759)	$ 12,300
December 31, 2017	$ 13,391	$ 8,746	$ (9,111)	$ 13,026
December 31, 2016	$ 13,349	$ 9,755	$ (9,713)	$ 13,391

Advertising Costs

All advertising costs are expensed as incurred and are included in selling and administrative expenses in the consolidated statements of operations. Advertising expenses were $7 million, $6 million and $11 million for 2018, 2017 and 2016, respectively.

Research and Development Expenses

Research and development expenses are comprised of costs incurred in performing research and development activities, including salaries and benefits, facilities costs, overhead costs, contract services and other outside costs. Research and development expenses are expensed as incurred. During 2017, the Company incurred a $5 million charge for acquired in-process research and development related to the licensing of certain intellectual property relating to mass spectrometry technologies yet to be commercialized and for which there was no future alternative use as of the acquisition date. These licensing arrangements are significantly related to new, biologically-focused applications, as well as other applications, and require the Company to make additional future payments of up to $7 million if certain milestones are achieved, as well as royalties on future net sales.

Stock-Based Compensation

The Company has two stock-based compensation plans, which are described in Note 13, "Stock-Based Compensation".

Earnings Per Share

In accordance with the earnings per share accounting standards, the Company presents two earnings per share ("EPS") amounts. Income per basic common share is based on income available to common shareholders and the weighted-average number of common shares outstanding during the periods presented. Income per diluted common share includes additional dilution from potential common stock, such as stock issuable pursuant to the exercise of stock options outstanding.

Retirement Plans

The Company sponsors various retirement plans, which are described in Note 16, "Retirement Plans".

Comprehensive Income

The Company accounts for comprehensive income in accordance with the accounting standards for comprehensive income, which establish the accounting rules for reporting and displaying comprehensive income.

These standards require that all components of comprehensive income be reported in a financial statement that is displayed with the same prominence as other financial statements.

Subsequent Events

In January 2019, the Company's Board of Directors authorized the Company to repurchase up to $4 billion of its outstanding common stock over a two-year period. See discussion under the heading, "Stockholders' Equity", above.

In January 2019, the Company made organizational changes to better align our resources with our growth and innovation strategies, resulting in a worldwide workforce reduction, impacting 1% of the Company's employees. The Company currently estimates that it will incur approximately $15 million of severance and related costs during 2019.

In February 2019, certain defined terms related to the subsidiary guarantors were amended in the Company's credit agreement and senior unsecured note agreements. In addition, the Company amended the senior unsecured note agreements to allow the Company to elect an increase in the permitted leverage ratio from 3.50:1 to 4.0:1, for a period of three consecutive quarters, for a material acquisition of $400 million or more. During the period of time where the leverage ratio exceeds 3.50:1, the interest payable on the senior unsecured notes shall increase by 0.50%. The debt covenants in the senior unsecured note agreements were also modified to address the change in accounting guidance for leases.

Recently Adopted Accounting Standards

In May 2014, amended accounting guidance was issued regarding the recognition of revenue from contracts with customers. The objective of this guidance is to significantly enhance comparability and clarify principles of revenue recognition practices across entities, industries, jurisdictions and capital markets. This guidance was originally effective for annual and interim reporting periods beginning after December 15, 2016; however, the Financial Accounting Standards Board ("FASB") amended the standard in August 2015 to delay the effective period date by one year to annual and interim periods beginning after December 15, 2017. Adoption prior to December 15, 2016 was not permitted. In March 2016, the FASB clarified the implementation guidance on principal versus agent considerations and, in April 2016, clarification was made regarding certain aspects of identifying performance obligations and licensing implementation guidance. In May 2016, additional guidance was issued related to disclosure of remaining performance obligations, as well as other amendments to guidance on collectibility, non-cash consideration and the presentation of sales and other similar taxes collected from customers. The Company adopted this standard as of January 1, 2018 and applied the modified-retrospective method. The Company elected the practical expedient and only evaluated the contracts that were considered incomplete as of January 1, 2018 when quantifying the cumulative effect adjustment under the modified retrospective method. The adoption of this standard did not have a material impact on the Company's financial position, results of operations or cash flows and, as such, did not require any adjustments to information reported in the prior year.

In January 2016, accounting guidance was issued which primarily affects the classification and measurement of certain financial instruments, principally equity investments and certain financial liabilities. Under the new guidance, there will no longer be an available-for-sale classification for equity securities with readily determinable fair values. Changes to the fair value of equity investments will be recognized through earnings. Equity investments carried at cost should be adjusted for changes in observable prices, as applicable, and qualitatively assessed for impairment annually. Changes to the fair value of financial liabilities under the fair value option due to instrument specific credit risk will be recognized separately in other comprehensive income. The new guidance also requires financial assets and financial liabilities to be presented separately and grouped by measurement category in the notes to the financial statements. The Company adopted this standard as of January 1, 2018 and the adoption of this standard did not have a material impact on the Company's financial position, results of operations and cash flows.

In August 2016, accounting guidance was issued that clarifies the classification of certain cash flows. The new guidance addresses eight specific areas where current accounting guidance is either unclear or does not specifically address classification issues. This guidance is effective for annual and interim periods beginning after December 15, 2017 and early adoption is permitted. The Company adopted this standard as of January 1, 2018 and the adoption of this standard did not have a material impact on the Company's cash flows.

In October 2016, accounting guidance was issued regarding intra-entity transfers of assets other than inventory. The new guidance eliminates the deferral of tax effects on intra-entity transfers other than inventory and requires an entity to recognize the income tax consequences when the transfer occurs. The Company adopted this standard as of January 1, 2018 with a $4 million charge to beginning retained earnings in the consolidated balance sheet. Please see Note 10, "Income Taxes", for additional information.

In January 2017, accounting guidance was issued that clarifies the definition of a business. The new guidance provides a more robust framework to use in determining when a set of assets and activities is a business, thus narrowing the definition and the amount of transactions accounted for as business combinations. The Company adopted this standard as of January 1, 2018 and will apply this guidance prospectively to any business combination transactions that take place in the future.

In March 2017, accounting guidance was issued regarding the presentation of net periodic pension cost and net periodic postretirement benefit cost. The new guidance requires that an employer disaggregate the service cost component from other components of net benefit cost, with service cost reported in the same line items as other compensation costs and the other components of net benefit costs presented outside income from operations. The Company adopted this standard as of January 1, 2018 and has reported the components of net periodic benefit cost other than the service cost component in other income on the consolidated statements of operations for all periods presented. Please see Note 16, "Retirement Plans", for additional information.

In May 2017, accounting guidance was issued that clarifies the accounting for a change to the terms or conditions of a share-based payment award. The standard provides more specific guidance for determining when a change to an award requires modification accounting and when it should be deemed purely administrative in nature. The Company adopted this standard as of January 1, 2018 and the adoption of this standard did not have a material impact on the Company's financial position, results of operations and cash flows.

In August 2017, accounting guidance was issued which simplifies the application of hedge accounting and enables companies to better portray the economics of their risk management activities in their financial statements. The Company adopted this standard in the second quarter of 2018, and this adoption did not have a material impact on the Company's financial position, results of operations and cash flows.

Recently Issued Accounting Standards

In February 2016, accounting guidance was issued regarding the accounting for leases. This new comprehensive lease standard amends various aspects of existing accounting guidance for leases. The core principle of the new guidance will require lessees to present the assets and liabilities that arise from leases on their balance sheets. This guidance is effective for annual and interim reporting periods beginning after December 15, 2018 and early adoption is permitted. The Company has adopted this standard using a modified retrospective transition approach to be applied to leases existing as of, or entered into after, January 1, 2019. The adoption of this standard will have a material effect on the Company's balance sheet by recording a right-of-use lease asset and lease liability that is estimated to be approximately $97 million; however, it will not have an overall material impact on the Company's results of operations and cash flows.

In June 2016, accounting guidance was issued that modifies the recognition of credit losses related to financial assets, such as debt securities, trade receivables, net investments in leases, off-balance sheet credit exposures, and other financial assets that have the contractual right to receive cash. Current guidance requires the recognition of a credit loss when it is considered probable that a loss event has occurred. The new guidance requires the measurement of expected credit losses to be based upon relevant information, including historical experience, current conditions, and reasonable and supportable forecasts that affect the collectability of the asset. As such, expected credit losses may be recognized sooner under the new guidance due to the broader range of information that will be required to determine credit loss estimates. The new guidance also amends the current other-than-temporary impairment model used for debt securities classified as available-for-sale. When the fair value of an available-for-sale debt security is below its amortized cost, the new guidance requires the total unrealized loss to be bifurcated into its credit and non-credit components. Any expected credit losses or subsequent recoveries will be recognized in earnings and any changes not considered credit related will continue to be recognized within other comprehensive income. This guidance is effective for annual and interim periods beginning after December 15, 2019. The Company currently does not expect that the adoption of this standard will have a material effect on the Company's financial position, results of operations and cash flows.

In January 2017, accounting guidance was issued that simplifies the accounting for goodwill impairment. The guidance eliminates step 2 of the goodwill impairment test, which requires a hypothetical purchase price allocation. This guidance is effective for annual and interim periods beginning after December 15, 2019 and early adoption is permitted. The Company currently does not expect that the adoption of this standard will have a material effect on the Company's financial position, results of operations and cash flows.

In March 2017, accounting guidance was issued to amend the amortization period for certain purchased callable debt securities held at a premium. Specifically, the amortization period for certain callable debt securities will be shortened to end at the earliest call date. This guidance is effective for annual and interim periods beginning after December 15, 2018 and early adoption is permitted. The Company currently does not believe that the adoption of this standard will have a material impact on the Company's financial position, results of operations and cash flows.

In February 2018, accounting guidance was issued to address the impact of the 2017 Tax Cuts and Jobs Act on items recorded in accumulated other comprehensive income. Current accounting guidance requires deferred tax liabilities and assets to be adjusted for the effect of a change in tax laws or rates with the effect recorded in income from continuing operations, even if the related tax effects were originally recognized in other comprehensive income, the new guidance allows a reclassification from accumulated other comprehensive income to retained earnings for stranded tax effects resulting from the 2017 Tax Act. This guidance is effective for annual and interim periods beginning after December 15, 2018 and early adoption is permitted. The Company does not expect that the adoption of this standard will have a material impact on the Company's financial position, results of operations and cash flows.

In August 2018, accounting guidance was issued that modifies the disclosure requirements of fair value measurements. The amendments remove disclosures that are no longer considered cost beneficial, clarify the specific requirements of disclosure and add disclosure requirement identified as relevant. This guidance is effective for annual and interim periods beginning after December 15, 2019 and early adoption is permitted. The Company does not expect that the adoption of this standard will have a material impact on the Company's financial position, results of operations and cash flows.

In August 2018, accounting guidance was issued that modifies the disclosure requirements of retirement benefit plans. The amendments remove disclosures that are no longer considered cost beneficial, clarify the specific requirements of disclosure and add disclosure requirement identified as relevant. This guidance is effective for annual and interim periods beginning after December 15, 2020 and early adoption is permitted. The Company does not expect that the adoption of this standard will have a material impact on the Company's financial position, results of operations and cash flows.

3 Revenue Recognition

The Company adopted new accounting guidance regarding the recognition of revenue from contracts with customers as of January 1, 2018 and applied the modified-retrospective method. The Company elected the practical expedient and only evaluated the contracts that were considered incomplete as of January 1, 2018 when quantifying the cumulative effect adjustment under the modified retrospective method. Ultimately, the Company determined that there was not a significant change in the timing or pattern of revenue recognition for the Company's products and services. The adoption of this standard did not have a material impact on the Company's financial position, results of operations or cash flows and, as such, did not require any adjustments to information reported in the prior year. The revenue recognition policies described below were effective as of January 1, 2018.

The Company recognizes revenue upon transfer of control of promised products and services to customers in an amount that reflects the consideration the Company expects to receive in exchange for those products or services. The Company generally enters into contracts that include a combination of products and services. Revenue is allocated to distinct performance obligations and is recognized net of allowances for returns and discounts.

The Company recognizes revenue on product sales at the time control of the product transfers to the customer. In substantially all of the Company's arrangements, title of the product transfers at shipping point and, as a result, the Company determined control transfers at the point of shipment. In more limited cases, there are destination-based shipping terms and, thus, control is deemed to transfer when the products arrive at the customer site. All incremental costs of obtaining a contract are expensed as and when incurred if the expected amortization period of the asset that would have been recognized is one year or less. Shipping and handling costs are included as a component of cost of sales. In situations where the control of the goods transfers prior to the completion of the Company's obligation to ship the products to its customers, the Company has elected the practical expedient to account for the shipping services as a fulfillment cost. Accordingly, such costs are recognized when control of the related goods is transferred to the customer. In more rare situations, the Company has revenue associated with products that contain specific customer acceptance criteria and the related revenue is not recognized before the customer acceptance criteria are satisfied. The Company elected to exclude from the measurement of the transaction price all taxes assessed by a governmental authority that are both imposed on and concurrent with specific revenue-producing transactions and collected by the Company from a customer.

Generally, the Company's contracts for products include a performance obligation related to installation. The Company has determined that the installation represents a distinct performance obligation and revenue is recognized separately upon the completion of installation. The Company determines the amount of the transaction price to allocate to the installation service based on the standalone selling price of the product and the service, which requires judgment. The Company determines relative standalone selling price of installation based upon a number of factors, including hourly service billing rates and estimated installation hours. In developing these estimates, the Company considers past history, competition, billing rates of current services and other factors.

The Company has sales from standalone software, which is included in instrument systems revenue. These arrangements typically include software licenses and maintenance contracts, both of which the Company has determined are distinct performance obligations. The Company determines the amount of the transaction price to allocate to the license and maintenance contract based on the relative standalone selling price of each performance obligation. Software license revenue is recognized at the point in time when control has been transferred to the customer. The revenue allocated to the software maintenance contract is recognized on a straight-line basis over the maintenance period, which is the contractual term of the contract, as a time-based measure of progress best reflects the Company's performance in satisfying this obligation. Unspecified rights to software upgrades are typically sold as part of the maintenance contract on a when-and-if-available basis.

Payment terms and conditions vary among the Company's revenue streams, although terms generally include a requirement of payment within 30 to 60 days of product shipment. Prior to providing payment terms to customers, an evaluation of the customer's credit risk is performed. Returns and customer credits are infrequent and insignificant and are recorded as a reduction to sales. Rights of return are not included in sales arrangements and, therefore, there is minimal variable consideration included in the transaction price of our products.

Service revenue includes (i) service and software maintenance contracts and (ii) service calls (time and materials). Instrument service contracts and software maintenance contracts are typically annual contracts, which are billed at the beginning of the contract or maintenance period. The amount of the service and software maintenance contract is recognized on a straight-line basis to revenue over the maintenance service period, which is the contractual term of the contract, as a time-based measure of progress best reflects the Company's performance in satisfying this obligation. There are no deferred costs associated with the service contract, as the cost of the service is recorded when the service is performed. Service calls are recognized to revenue at the time a service is performed.

The Company's deferred revenue liabilities on the consolidated balance sheets consists of the obligation on instrument service contracts and customer payments received in advance, prior to transfer of control of the instrument. The Company records deferred revenue primarily related to its service contracts, where consideration is billable at the beginning of the service period.

The following is a summary of the activity of the Company's deferred revenue and customer advances for the year ended December 31, 2018, 2017 and 2016 (in thousands):

	December 31,		
	2018	2017	2016
Balance at the beginning of the period	$ 192,589	$ 173,780	$ 170,201
Recognition of revenue included in balance at beginning of the period	(159,258)	(143,589)	(140,688)
Revenue deferred during the period, net of revenue recognized	170,926	162,398	144,267
Balance at the end of the period	$ 204,257	$ 192,589	$ 173,780

As of December 31, 2018 and 2017, $39 million and $26 million of deferred revenue and customer advances were classified in other long-term liabilities, respectively.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)

The amount of deferred revenue and customer advances equals the transaction price allocated to unfulfilled performance obligations for the period presented. Such amounts are expected to be recognized in the future as follows (in thousands):

	December 31, 2018
Deferred revenue and customer advances expected to be recognized:	
In one year or less	$ 164,965
In 13-24 months	22,856
In 25 months and beyond	16,436
Total	$ 204,257

4 Marketable Securities

The Company's marketable securities within cash equivalents and investments included in the consolidated balance sheets are detailed as follows (in thousands):

	December 31, 2018			
	Amortized Cost	Unrealized Gain	Unrealized Loss	Fair Value
U.S. Treasury securities	$ 164,619	$ 16	$ (320)	$164,315
Foreign government securities	3,486	1	(24)	3,463
Corporate debt securities	725,778	41	(2,760)	723,059
Time deposits	108,638	—	—	108,638
Total	$1,002,521	$ 58	$ (3,104)	$999,475
Amounts included in:				
Cash equivalents	$ 60,532	$ —	$ (1)	$ 60,531
Investments	941,989	58	(3,103)	938,944
Total	$1,002,521	$ 58	$ (3,104)	$999,475

	December 31, 2017			
	Amortized Cost	Unrealized Gain	Unrealized Loss	Fair Value
U.S. Treasury securities	$ 593,599	$ 82	$ (1,693)	$ 591,988
Foreign government securities	6,982	—	(30)	6,952
Corporate debt securities	1,977,329	897	(3,066)	1,975,160
Time deposits	371,515	—	(4)	371,511
Equity securities	77	70	—	147
Total	$2,949,502	$ 1,049	$ (4,793)	$2,945,758
Amounts included in:				
Cash equivalents	$ 194,377	$ —	$ (1)	$ 194,376
Investments	2,755,125	1,049	(4,792)	2,751,382
Total	$2,949,502	$ 1,049	$ (4,793)	$2,945,758

The estimated fair value of marketable debt securities by maturity date is as follows (in thousands):

	December 31, 2018	December 31, 2017
Due in one year or less	$797,649	$2,042,673
Due after one year through three years	201,826	902,938
Total	$999,475	$2,945,611

In 2018, net realized losses on sales of investments were $1 million. Realized gains and losses on sales of investments were not material in 2017 and 2016.

5 Inventories

Inventories are classified as follows (in thousands):

	December 31, 2018	December 31, 2017
Raw materials	$111,641	$ 99,033
Work in progress	15,552	15,324
Finished goods	164,376	155,937
Total inventories	$291,569	$270,294

During 2018, 2017 and 2016, the Company recorded inventory-related excess and obsolescence provisions of $8 million, $2 million and $9 million, respectively.

6 Property, Plant and Equipment

Property, plant and equipment consist of the following (in thousands):

	December 31, 2018	December 31, 2017
Land and land improvements	$ 36,554	$ 37,525
Buildings and leasehold improvements	299,103	294,219
Production and other equipment	494,302	484,475
Construction in progress	41,909	22,140
Total property, plant and equipment	871,868	838,359
Less: accumulated depreciation and amortization	(528,785)	(489,081)
Property, plant and equipment, net	$ 343,083	$ 349,278

In February 2018, the Company's Board of Directors approved expanding its precision chemistry consumable manufacturing operations in the U.S. The Company anticipates spending an estimated $215 million to build and equip this new state-of-the-art manufacturing facility, and has spent $11 million on this facility through December 31, 2018.

During 2018, 2017 and 2016, the Company retired and disposed of approximately $9 million, $15 million and $15 million of property, plant and equipment, respectively, most of which was fully depreciated and no longer in use. Gains on disposal were immaterial for the years ended December 31, 2018 and 2017.

7 Acquisitions

In July 2018, the Company acquired the sole intellectual property rights to the Desorption Electrospray Ionization ("DESI") imaging technology for $30 million in cash and a future contractual obligation to pay a minimum royalty of $3 million over the remaining life of the patent. DESI is a mass spectrometry imaging technique that is used to develop medical therapies. The Company accounted for this transaction as an asset acquisition as it did not meet the definition of a business. The Company allocated $33 million of fair value to a purchased intangible asset which will be amortized over the useful life of 12 years.

In September 2016, the Company acquired all of the outstanding stock of Rubotherm GmbH ("Rubotherm"), a manufacturer of gravimetric analysis systems, for approximately $6 million in cash, $5 million of which was paid at closing and an additional $1 million paid after closing to settle certain liabilities. Rubotherm develops and manufactures analytical test instruments for thermogravimetric and sorption measurements that are used in both industrial and academic research laboratories in disciplines that include chemistry, material science and engineering. The Rubotherm acquisition will help support and further expand product offerings within TA's thermal analysis business.

In each acquisition, the sellers provided the Company with customary representations, warranties and indemnification, which would be settled in the future if and when a breach of the contractual representation or warranty condition occurs. The pro forma effect of the ongoing operations for Waters Corporation, the DESI imaging technology and Rubotherm, either individually or in the aggregate, as though these acquisitions had occurred at the beginning of the periods covered by this report was immaterial.

8 Goodwill and Other Intangibles

The carrying amount of goodwill was $356 million and $360 million at December 31, 2018 and 2017, respectively. During the year ended December 31, 2018, the effect of foreign currency translation decreased goodwill by $4 million.

The Company's intangible assets included in the consolidated balance sheets are detailed as follows (dollars in thousands):

	December 31, 2018			December 31, 2017		
	Gross Carrying Amount	Accumulated Amortization	Weighted-Average Amortization Period	Gross Carrying Amount	Accumulated Amortization	Weighted-Average Amortization Period
Capitalized software	$ 454,307	$ 307,634	5 years	$ 438,652	$ 285,461	5 years
Purchased intangibles	201,566	144,184	11 years	169,870	138,750	11 years
Trademarks and IPR&D	13,677	—	—	13,923	—	—
Licenses	5,568	4,875	6 years	5,840	4,628	6 years
Patents and other intangibles	77,753	49,276	8 years	72,815	43,866	8 years
Total	$ 752,871	$ 505,969	7 years	$ 701,100	$ 472,705	7 years

The gross carrying value of intangible assets and accumulated amortization for intangible assets decreased by $23 million and $17 million, respectively, in the year ended December 31, 2018 due to the effects of foreign currency translation. Amortization expense for intangible assets was $50 million, $45 million and $45 million for the years ended December 31, 2018, 2017 and 2016, respectively. Amortization expense for intangible assets is estimated to be $51 million per year for each of the next five years.

9 Debt

In November 2017, the Company entered into a new credit agreement (the “2017 Credit Agreement”) that provides for a $1.5 billion revolving facility and a $300 million term loan. The revolving facility and term loan both mature on November 30, 2022 and require no scheduled prepayments before that date.

The interest rates applicable to the 2017 Credit Agreement are, at the Company’s option, equal to either the alternate base rate (which is a rate per annum equal to the greatest of (a) the prime rate in effect on such day, (b) the Federal Reserve Bank of New York Rate on such day plus 1/2 of 1% per annum and (c) the adjusted LIBO rate on such day (or if such day is not a business day, the immediately preceding business day) for a deposit in U.S. dollars with a maturity of one month plus 1% per annum) or the applicable 1, 2, 3 or 6 month adjusted LIBO rate or EURIBO rate for Euro-denominated loans, in each case, plus an interest rate margin based upon the Company’s leverage ratio, which can range between 0 and 12.5 basis points for alternate base rate loans and between 80 and 112.5 basis points for LIBO rate or EURIBO rate loans. The facility fee on the 2017 Credit Agreement ranges between 7.5 and 25 basis points per annum, based on the leverage ratio, of the amount of the revolving facility commitments and the outstanding term loan. The 2017 Credit Agreement requires that the Company comply with an interest coverage ratio test of not less than 3.50:1 as of the end of any fiscal quarter for any period of four consecutive fiscal quarters and a leverage ratio test of not more than 3.50:1 as of the end of any fiscal quarter. In addition, the 2017 Credit Agreement includes negative covenants, affirmative covenants, representations and warranties and events of default that are customary for investment grade credit facilities.

As of December 31, 2018 and 2017, the Company had a total of $560 million and $700 million of outstanding senior unsecured notes, respectively. Interest on the fixed rate senior unsecured notes is payable semi-annually each year. Interest on the floating rate senior unsecured notes is payable quarterly. The Company may prepay all or some of the senior unsecured notes at any time in an amount not less than 10% of the aggregate principal amount outstanding, plus the applicable make-whole amount or prepayment premium for Series H and J senior unsecured notes. In the event of a change in control of the Company (as defined in the note purchase agreement), the Company may be required to prepay the senior unsecured notes at a price equal to 100% of the principal amount thereof, plus accrued and unpaid interest. These senior unsecured notes require that the Company comply with an interest coverage ratio test of not less than 3.50:1 for any period of four consecutive fiscal quarters and a leverage ratio test of not more than 3.50:1 as of the end of any fiscal quarter. In addition, these senior unsecured notes include customary negative covenants, affirmative covenants, representations and warranties and events of default.

In 2018, the Company entered into three-year interest rate cross-currency swap derivative agreements with a notional value of $300 million to hedge the variability in the movement of foreign currency exchange rates on a portion of its Euro-denominated net asset investments. See Note 2, “Basis of Presentation and Summary of Significant Accounting Policies.”

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The Company had the following outstanding debt at December 31, 2018 and 2017 (in thousands):

	December 31, 2018	December 31, 2017
Foreign subsidiary lines of credit	$ 178	$ 273
Senior unsecured notes - Series D - 3.22%, due March 2018	—	100,000
Total notes payable and debt, current	178	100,273
Senior unsecured notes - Series B - 5.00%, due February 2020	100,000	100,000
Senior unsecured notes - Series E - 3.97%, due March 2021	50,000	50,000
Senior unsecured notes - Series F - 3.40%, due June 2021	100,000	100,000
Senior unsecured notes - Series G - 3.92%, due June 2024	50,000	50,000
Senior unsecured notes - Series H - floating rate*, due June 2024	50,000	50,000
Senior unsecured notes - Series I - 3.13%, due May 2023	50,000	50,000
Senior unsecured notes - Series J - floating rate**, due May 2024	—	40,000
Senior unsecured notes - Series K - 3.44%, due May 2026	160,000	160,000
Credit agreement	590,000	1,300,000
Unamortized debt issuance costs	(1,828)	(2,499)
Total long-term debt	1,148,172	1,897,501
Total debt	$1,148,350	$1,997,774

* Series H senior unsecured notes bear interest at a 3-month LIBOR for that floating rate interest period plus 1.25%.

** Series J senior unsecured notes bore interest at a 3-month LIBOR for that floating rate interest period plus 1.45%.

As of December 31, 2018 and 2017, the Company had a total amount available to borrow under existing credit agreements of $1,208 million and $498 million, respectively, after outstanding letters of credit. The weighted-average interest rates applicable to the senior unsecured notes and credit agreement borrowings collectively were 3.83% and 2.98% at December 31, 2018 and 2017, respectively. As of December 31, 2018, the Company was in compliance with all debt covenants.

The Company and its foreign subsidiaries also had available short-term lines of credit totaling $90 million and $91 million at December 31, 2018 and 2017, respectively, for the purpose of short-term borrowing and issuance of commercial guarantees. The weighted-average interest rates applicable to these short-term borrowings were 1.88% and 1.48% for December 31, 2018 and 2017, respectively.

Annual maturities of debt outstanding at December 31, 2018 are as follows (in thousands):

	Total
2019	$ 178
2020	100,000
2021	150,000
2022	590,000
2023	50,000
Thereafter	260,000
Total	$1,150,178

10 Income Taxes

Income tax data for the years ended December 31, 2018, 2017 and 2016 is as follows (in thousands):

	Year Ended December 31, 2018	2017	2016
The components of income from operations before income taxes are as follows:			
Domestic	$ 57,822	$ 55,751	$ 35,154
Foreign	624,324	585,346	564,960
Total	$ 682,146	$ 641,097	$ 600,114

	Year Ended December 31, 2018	2017	2016
The current and deferred components of the provision for income taxes on operations are as follows:			
Current	$85,947	$575,276	$77,407
Deferred	2,405	45,510	1,204
Total	$88,352	$620,786	$78,611
The jurisdictional components of the provision for income taxes on operations are as follows:			
Federal	$24,021	$535,777	$19,693
State	(9,717)	26,561	3,090
Foreign	74,048	58,448	55,828
Total	$88,352	$620,786	$78,611

The differences between income taxes computed at the United States statutory rate and the provision for income taxes are summarized as follows for the years ended December 31, 2018, 2017 and 2016 (in thousands):

	Year Ended December 31, 2018	2017	2016
Federal tax computed at U.S. statutory income tax rate	$143,251	$ 224,384	$ 210,040
Enactment of the 2017 Tax Act	(6,059)	550,000	—
Foreign currency exchange impact on distributed earnings	7,495	—	—
GILTI, net of foreign tax credits	13,727	—	—
Settlement of tax audits	—	706	345
State income tax, net of federal income tax benefit	2,910	1,289	2,008
Net effect of foreign operations	(66,092)	(134,117)	(133,518)
Effect of stock-based compensation	(9,089)	(19,566)	—
Other, net	2,209	(1,910)	(264)
Provision for income taxes	$ 88,352	$ 620,786	$ 78,611

The four principal jurisdictions in which the Company manufactures are the U.S., Ireland, the U.K. and Singapore, where the statutory tax rates were 21%, 12.5%, 19% and 17%, respectively, as of December 31, 2018. The Company has a contractual tax rate in Singapore of 0% on qualifying activities in Singapore through March 2021, based upon the achievement of certain contractual milestones, which the Company expects to continue to meet. The effect of applying the contractual tax rate rather than the statutory tax rate to income from qualifying activities in Singapore increased the Company’s net income during the years ended December 31, 2018, 2017 and 2016 by $28 million, $25 million and $23 million, respectively, and increased the Company's net income per diluted share by $0.36, $0.31 and $0.29, respectively.

The Company's effective tax rates were 13.0%, 96.8% and 13.1% for the years ended December 31, 2018, 2017 and 2016, respectively, and were impacted by the following:

- In December 2017, the U.S. enacted legislation informally referred to as the Tax Cuts and Jobs Act (the "2017 Tax Act"). For the year ended December 31, 2017 the Company accrued a $550 million tax provision related to the 2017 Tax Act. The $550 million expense consisted of $490 million related to the federal transition tax, $40 million for state income taxes and foreign withholding taxes and $20 million for the revaluation of the Company's deferred tax assets and liabilities at the new federal tax rate of 21%. This provision reduced net income per diluted share by $6.82 in 2017, and the Company's effective tax rate was 11.0% excluding this $550 million provision.
- During 2018, the Internal Revenue Service issued proposed regulations on the federal transition tax and various other aspects of the Tax Reform law. The Company finalized its analysis of the transition tax and related liabilities, including uncertain tax positions, in the fourth quarter of 2018 pursuant to U.S. Securities and Exchange Commission ("SEC") Staff Accounting Bulletin No. 118. As a result of the new guidance issued and additional work to complete the calculation of its federal transition tax, the Company reduced its provisional accrual for federal, state and foreign taxes by net $24 million during 2018. In addition, the Company also assessed its uncertain tax positions related to these taxes and accrued income tax reserves of $18 million during 2018. The net favorable impact to the 2018 provision for income taxes is $6 million.
- The provision for income taxes for 2018 includes a $7 million expense related to the 2017 Tax Act. This additional tax results from the change in foreign currency exchange rates on the earnings taxed on December 31, 2017 under 2017 Tax Act as compared with the foreign currency exchange rates on the date of distribution of assets into the U.S. We do not expect this expense to recur in future periods.
- The 2018 effective income tax rate of 13.0% was impacted by the reduction in the U.S. federal income tax rate from 35% to 21% as a result of the 2017 Tax Act, which decreased the Company's effective tax rate by 2.0 percentage points as compared to 2017. The 2017 Tax act also added a new Global Intangible Low-Taxed Income (GILTI) tax, which increased the Company's 2018 effective tax rate by approximately 2.0 percentage points.
- After the completion of the Company's review of its capital allocation strategy in the fourth quarter of 2018, the Company determined that it will provide income taxes on all future foreign earnings from 2018 forward. As a result, this change added 0.6 percentage points to the 2018 effective tax rate as compared to 2017.
- In addition, the reduction in the U.S. federal income tax rate from 35% to 21% as a result of the 2017 Tax Act also reduced the 2018 tax benefit on stock compensation. The Company recorded a tax benefit on stock-based compensation in 2018 and 2017 that decreased income tax expense by $9 million and $20 million, respectively, and added $0.11 and $0.24 to net income per diluted share, respectively.
- The difference between the 2017 and 2016 effective tax rates can be attributed primarily to the 2016 provision for income taxes including a $3 million tax benefit (0.7 percentage points) related to the release of a valuation allowance on certain net operating loss carryforwards.

The remaining differences between effective tax rates can primarily be attributed to differences in the proportionate amounts of pre-tax income recognized in jurisdictions with different effective tax rates.

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The tax effects of temporary differences and carryforwards which give rise to deferred tax assets and deferred tax liabilities are summarized as follows (in thousands):

	December 31, 2018	December 31, 2017
Deferred tax assets:		
Net operating losses and credits	$ 63,052	$ 75,630
Depreciation	7,495	5,952
Amortization	3,633	—
Stock-based compensation	9,984	9,815
Deferred compensation	27,939	21,434
Revaluation of equity investments and licenses	3,148	3,465
Inventory	4,588	4,864
Accrued liabilities and reserves	7,213	8,230
Other	8,727	11,873
Total deferred tax assets	135,779	141,263
Valuation allowance	(53,893)	(62,098)
Deferred tax assets, net of valuation allowance	81,886	79,165
Deferred tax liabilities:		
Capitalized software	(19,491)	(19,630)
Amortization	—	(3,394)
Indefinite-lived intangibles	(13,753)	(13,254)
Deferred tax liability on foreign earnings	(20,443)	(21,000)
Total deferred tax liabilities	(53,687)	(57,278)
Net deferred tax assets	$ 28,199	$ 21,887

The Company has gross foreign net operating losses of $240 million that do not expire under current laws. As of December 31, 2018, the Company has provided a deferred tax valuation allowance of $54 million, of which $51 million relates to certain foreign net operating losses. The Company's net deferred tax assets associated with net operating losses and tax credit carryforwards are approximately $12 million as of December 31, 2018, which represent the future tax benefit of foreign net operating loss carryforwards that do not expire under current law.

As a result of the adoption of new accounting guidance related to stock-based compensation in 2017, the Company no longer records excess tax benefits related to stock-based compensation in equity. The income tax benefits associated with equity compensation expense recognized for tax purposes and credited to income tax expense were $9 million and $20 million for the years ended December 31, 2018 and 2017, respectively. For the year ended December 31, 2016, the income tax benefit recognized for tax purposes and credited to additional paid-in capital was $14 million.

The Company accounts for its uncertain tax positions in accordance with the accounting standards for income taxes, which require financial statement reporting of the expected future tax consequences of uncertain tax positions on the presumption that all concerned tax authorities possess full knowledge of those tax positions, as well as all of the pertinent facts and circumstances, but prohibit any discounting of unrecognized tax benefits associated with those positions for the time value of money. The Company continues to classify interest and penalties related to unrecognized tax benefits as a component of the provision for income taxes.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)

The following is a summary of the activity of the Company's uncertain tax positions for the years ended December 31, 2018, 2017 and 2016 (in thousands):

	2018	2017	2016
Balance at the beginning of the period	$ 5,843	$ 9,964	$14,450
Net reductions for settlement of tax audits	—	(22)	(828)
Net reductions for lapse of statutes taken during the period	(436)	(5,178)	(4,998)
Net additions for tax positions taken during the prior period	17,651	—	—
Net additions for tax positions taken during the current period	3,050	1,079	1,340
Balance at the end of the period	$26,108	$ 5,843	$ 9,964

With limited exceptions, the Company is no longer subject to tax audit examinations in significant jurisdictions for the years ended on or before December 31, 2013. However, carryforward tax attributes that were generated in years beginning on or before January 1, 2014 may still be adjusted upon examination by tax authorities if the attributes are utilized. The Company continuously monitors the lapsing of statutes of limitations on potential tax assessments for related changes in the measurement of unrecognized tax benefits, related net interest and penalties, and deferred tax assets and liabilities.

As of December 31, 2018, the Company expects to record additional reductions in the measurement of its unrecognized tax benefits and related net interest and penalties of approximately $1 million within the next twelve months due to potential tax audit settlements and the lapsing of statutes of limitations on potential tax assessments. The Company does not expect to record any other material reductions in the measurement of its unrecognized tax benefits within the next twelve months.

In addition, upon completion of the Company's review of its capital allocation strategy in the fourth quarter of 2018, the Company has determined that it will provide income taxes on all future foreign earnings. However, the Company will continue to be permanently reinvested in relation to the cumulative historical outside basis difference that is not related to earnings. The determination of the unrecognized deferred tax liability on cumulative historical outside basis differences that are not related to earnings is not practicable.

The Company adopted new accounting guidance which eliminates the deferral of tax effects on intra-entity transfers other than inventory and requires an entity to recognize the income tax consequences when the transfer occurs. The Company adopted this standard as of January 1, 2018 with a $4 million charge to beginning retained earnings in the consolidated balance sheet.

11 Litigation

From time to time, the Company and its subsidiaries are involved in various litigation matters arising in the ordinary course of business. The Company believes it has meritorious arguments in its current litigation matters and believes any outcome, either individually or in the aggregate, will not be material to the Company's financial position, results of operations or cash flows. During the year ended December 31, 2017, the Company incurred $11 million of litigation provisions and related costs, primarily related to the issuance of a verdict in a patent litigation case. In the first quarter of 2018, the Company resolved the case with a final settlement that resulted in a gain of $2 million. During the year ended December 31, 2016, the Company recorded $4 million of litigation provisions and related costs. The accrued patent litigation expense is in other current liabilities in the consolidated balance sheets at December 31, 2018 and 2017.

12 Other Commitments and Contingencies

Lease agreements, expiring at various dates through 2031, cover buildings, office equipment and automobiles. Rental expense was $28 million, $27 million and $28 million for the years ended December 31, 2018, 2017 and

2016, respectively. Future minimum rents payable as of December 31, 2018 under non-cancelable leases with initial terms exceeding one year are as follows (in thousands):

2019	$ 28,417
2020	23,424
2021	16,032
2022	11,816
2023 and thereafter	23,269
Total	$ 102,958

The Company licenses certain technology and software from third parties. Future minimum license fees payable under existing license agreements as of December 31, 2018 are immaterial for the years ended December 31, 2019 and thereafter. The Company enters into licensing arrangements with third parties that require future milestone or royalty payments contingent upon future events. Upon the achievement of certain milestones in existing agreements, the Company could make additional future payments of up to $7 million, as well as royalties on future net sales.

The Company enters into standard indemnification agreements in its ordinary course of business. Pursuant to these agreements, the Company indemnifies, holds harmless and agrees to reimburse the indemnified party for losses suffered or incurred by the indemnified party, generally the Company's business partners or customers, in connection with patent, copyright or other intellectual property infringement claims by any third party with respect to its current products, as well as claims relating to property damage or personal injury resulting from the performance of services by the Company or its subcontractors. The maximum potential amount of future payments the Company could be required to make under these indemnification agreements is unlimited. Historically, the Company's costs to defend lawsuits or settle claims relating to such indemnity agreements have been minimal and management accordingly believes the estimated fair value of these agreements is immaterial.

13 Stock-Based Compensation

In May 2012, the Company's shareholders approved the Company's 2012 Equity Incentive Plan ("2012 Plan"). As of December 31, 2018, the 2012 Plan has 2.4 million shares available for grant in the form of incentive or non-qualified stock options, stock appreciation rights ("SARs"), restricted stock, restricted stock units, performance stock units or other types of awards. The Company issues new shares of common stock upon exercise of stock options, restricted stock unit conversion or performance stock unit conversion. Under the 2012 Plan, the exercise price for stock options may not be less than the fair market value of the underlying stock at the date of grant. The 2012 Plan is scheduled to terminate on May 9, 2022. Options generally will expire no later than ten years after the date on which they are granted and will become exercisable as directed by the Compensation Committee of the Board of Directors and generally vest in equal annual installments over a five-year period. A SAR may be granted alone or in conjunction with an option or other award. Shares of restricted stock, and restricted stock units and performance stock units may be issued under the 2012 Plan for such consideration as is determined by the Compensation Committee of the Board of Directors. As of December 31, 2018, the Company had stock options, restricted stock and restricted and performance stock unit awards outstanding.

In May 2009, the Company's shareholders approved the 2009 Employee Stock Purchase Plan, under which eligible employees may contribute up to 15% of their earnings toward the quarterly purchase of the Company's common stock. The plan makes available 0.9 million shares of the Company's common stock, which includes the remaining shares available under the 1996 Employee Stock Purchase Plan. As of December 31, 2018, 1.4 million shares have been issued under both the 2009 and 1996 Employee Stock Purchase Plans. Each plan period lasts three months beginning on January 1, April 1, July 1 and October 1 of each year. The purchase price for each share of stock is the lesser of 90% of the market price on the first day of the plan period or 100% of the market price on the last day of the plan period. Stock-based compensation expense related to this plan was $1 million for each of the years ended December 31, 2018, 2017 and 2016, respectively.

The Company accounts for stock-based compensation costs in accordance with the accounting standards for stock-based compensation, which require that all share-based payments to employees be recognized in the statements of operations, based on their grant date fair values. The Company recognizes the expense using the straight-line attribution method. The stock-based compensation expense recognized in the consolidated statements of operations is based on awards that ultimately are expected to vest; therefore, the amount of expense has been reduced for estimated forfeitures. Forfeitures are estimated based on historical experience. If actual results differ significantly from these estimates, stock-based compensation expense and the Company's results of operations could be materially impacted. In addition, if the Company employs different assumptions in the application of these standards, the compensation expense that the Company records in the future periods may differ significantly from what the Company has recorded in the current period.

The consolidated statements of operations for the years ended December 31, 2018, 2017 and 2016 include the following stock-based compensation expense related to stock option awards, restricted stock awards, restricted stock unit awards, performance stock unit awards and the employee stock purchase plan (in thousands):

	2018	2017	2016
Cost of sales	$ 2,212	$ 3,032	$ 2,738
Selling and administrative expenses	30,443	33,335	34,451
Research and development expenses	4,886	3,069	3,809
Total stock-based compensation	$37,541	$39,436	$40,998

During the years ended December 31, 2018, 2017 and 2016, the Company recognized $1 million, $4 million and $7 million, respectively, of stock compensation expense related to the modification of certain stock awards upon the retirement of senior executives.

Stock Options

In determining the fair value of the stock options, the Company makes a variety of assumptions and estimates, including volatility measures, expected yields and expected stock option lives. The fair value of each option grant was estimated on the date of grant using the Black-Scholes option pricing model. The Company uses implied volatility on its publicly-traded options as the basis for its estimate of expected volatility. The Company believes that implied volatility is the most appropriate indicator of expected volatility because it is generally reflective of historical volatility and expectations of how future volatility will differ from historical volatility. The expected life assumption for grants is based on historical experience for the population of non-qualified stock option exercises. The risk-free interest rate is the yield currently available on U.S. Treasury zero-coupon issues with a remaining term approximating the expected term used as the input to the Black-Scholes model. The relevant data used to determine the value of the stock options granted during the year ended December 31, 2018, 2017 and 2016 are as follows:

Options Issued and Significant Assumptions Used to Estimate Option Fair Values	2018	2017	2016
Options issued in thousands	321	389	324
Risk-free interest rate	2.7%	2.2%	1.9%
Expected life in years	6	6	6
Expected volatility	25.3%	22.7%	24.7%
Expected dividends	—	—	—

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)

Weighted-Average Exercise Price and Fair Value of Options on the Date of Grant	2018	2017	2016
Exercise price	$196.78	$170.24	$135.02
Fair value	$ 59.89	$ 45.73	$ 37.44

The following table summarizes stock option activity for the plans for the year ended December 31, 2018 (in thousands, except per share data):

	Number of Shares	Exercise Price per Share			Weighted-Average Exercise Price per Share
Outstanding at December 31, 2017	2,039	$ 38.09	to	$194.26	$ 124.41
Granted	321	$188.26	to	$208.47	$ 196.78
Exercised	(433)	$ 38.09	to	$154.33	$ 102.92
Canceled	(137)	$ 98.21	to	$154.33	$ 125.93
Outstanding at December 31, 2018	1,790	$ 38.09	to	$208.47	$ 142.47

The following table details the options outstanding at December 31, 2018 by range of exercise prices (in thousands, except per share data):

Exercise Price Range	Number of Shares Outstanding	Weighted-Average Exercise Price	Remaining Contractual Life of Options Outstanding	Number of Shares Exercisable	Weighted-Average Exercise Price
$38.09 to $123.55	575	$ 103.24	5.1	450	$ 99.53
$123.56 to $141.74	597	$ 133.21	7.4	290	$ 132.29
$141.75 to $208.47	618	$ 187.92	9.0	54	$ 182.46
Total	1,790	$ 142.47	7.2	794	$ 117.08

During 2018, 2017 and 2016, the total intrinsic value of the stock options exercised (i.e., the difference between the market price at exercise and the price paid by the employee to exercise the options) was $44 million, $76 million and $53 million, respectively. The total cash received from the exercise of these stock options was $45 million, $91 million and $56 million for the years ended December 31, 2018, 2017 and 2016, respectively.

The aggregate intrinsic value of the outstanding stock options at December 31, 2018 was $86 million. Options exercisable at December 31, 2018, 2017 and 2016 were 0.8 million, 0.9 million and 1.3 million, respectively. The weighted-average exercise prices of options exercisable at December 31, 2018, 2017 and 2016 were $117.08, $103.63 and $92.26, respectively. The weighted-average remaining contractual life of the exercisable outstanding stock options at December 31, 2018 was 5.8 years.

At December 31, 2018, the Company had 1.8 million stock options that are vested and expected to vest. The intrinsic value, weighted-average exercise price and remaining contractual life of the vested and expected to vest stock options were $86 million, $142.18 and 7.1 years, respectively, at December 31, 2018.

As of December 31, 2018, there were $41 million of total unrecognized compensation costs related to unvested stock option awards that are expected to vest. These costs are expected to be recognized over a weighted-average period of 3.5 years.

Restricted Stock

During the years ended December 31, 2018, 2017 and 2016, the Company granted five thousand, eight thousand and ten thousand shares of restricted stock, respectively. The weighted-average fair value per share on the grant date of the restricted stock granted in 2018, 2017 and 2016 was $194.73, $130.35 and $113.88, respectively. The Company has recorded $1 million of compensation expense in each of the years ended December 31, 2018, 2017 and 2016 related to the restricted stock grants. As of December 31, 2018, the Company had five thousand unvested shares of restricted stock outstanding, which have been fully expensed.

Restricted Stock Units

The following table summarizes the unvested restricted stock unit award activity for the year ended December 31, 2018 (in thousands, except per share data):

	Shares	Weighted-Average Fair Value per Share
Unvested at December 31, 2017	374	$ 124.81
Granted	91	$ 207.85
Vested	(139)	$ 115.75
Forfeited	(22)	$ 131.72
Unvested at December 31, 2018	304	$ 153.31

Restricted stock units are generally granted annually in February and vest in equal annual installments over a five-year period. The amount of compensation costs recognized for the years ended December 31, 2018, 2017 and 2016 on the restricted stock units expected to vest were $16 million, $17 million and $17 million, respectively. As of December 31, 2018, there were $32 million of total unrecognized compensation costs related to the restricted stock unit awards that are expected to vest. These costs are expected to be recognized over a weighted-average period of 3.2 years.

Performance Stock Units

The Company’s performance stock units are equity compensation awards with a market vesting condition based on the Company’s Total Shareholder Return (“TSR”) relative to the TSR of the components of the S&P Health Care Index. TSR is the change in value of a stock price over time, including the reinvestment of dividends. The vesting schedule ranges from 0% to 200% of the target shares awarded.

In determining the fair value of the performance stock units, the Company makes a variety of assumptions and estimates, including volatility measures, expected yields and expected terms. The fair value of each performance stock unit grant was estimated on the date of grant using the Monte Carlo simulation model. The Company uses implied volatility on its publicly-traded options as the basis for its estimate of expected volatility. The Company believes that implied volatility is the most appropriate indicator of expected volatility because it is generally reflective of historical volatility and expectations of how future volatility will differ from historical volatility. The expected life assumption for grants is based on the performance period of the underlying performance stock units. The risk-free interest rate is the yield currently available on U.S. Treasury zero-coupon issues with a remaining term approximating the expected term used as the input to the Monte Carlo simulation model. The correlation coefficient is used to model the way in which each company in the S&P Health Care Index tends to move in relation to each other during the performance period. The relevant data used to determine the value of the performance stock units granted during the year ended December 31, 2018, 2017 and 2016 are as follows:

Performance Stock Units Issued and Significant Assumptions Used to Estimate Fair Values	2018	2017	2016
Performance stock units issued in thousands	40	40	27
Risk-free interest rate	2.4%	1.6%	1.4%
Expected life in years	3.0	3.0	3.0
Expected volatility	22.0%	20.9%	23.3%
Average volatility of peer companies	25.9%	25.6%	26.1%
Correlation Coefficient	35.9%	37.8%	38.6%
Expected dividends	—	—	—

The following table summarizes the unvested performance stock unit award activity for the year ended December 31, 2018 (in thousands, except per share data):

	Shares	Weighted-Average Fair Value per Share
Unvested at December 31, 2017	64	$ 196.29
Granted	40	$ 235.63
Forfeited	(4)	$ 188.45
Unvested at December 31, 2018	100	$ 212.34

The amount of compensation costs recognized for the years ended December 31, 2018 and 2017 on the performance stock units expected to vest were $5 million and less than $1 million, respectively. As of December 31, 2018, there were $14 million of total unrecognized compensation costs related to the restricted stock unit awards that are expected to vest. These costs are expected to be recognized over a weighted-average period of 2.3 years.

14 Earnings Per Share

Basic and diluted EPS calculations are detailed as follows (in thousands, except per share data):

	Year Ended December 31, 2018		
	Net Income (Numerator)	Weighted-Average Shares (Denominator)	Per Share Amount
Net income per basic common share	$593,794	76,992	$ 7.71
Effect of dilutive stock option, restricted stock, performance stock unit and restricted stock unit securities	—	626	(0.06)
Net income per diluted common share	$593,794	77,618	$ 7.65

	Year Ended December 31, 2017		
	Net Income (Numerator)	Weighted-Average Shares (Denominator)	Per Share Amount
Net income per basic common share	$ 20,311	79,793	$ 0.25
Effect of dilutive stock option, restricted stock, performance stock unit and restricted stock unit securities	—	811	—
Net income per diluted common share	$ 20,311	80,604	$ 0.25

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)

	Year Ended December 31, 2016		
	Net Income (Numerator)	Weighted-Average Shares (Denominator)	Per Share Amount
Net income per basic common share	$521,503	80,786	$ 6.46
Effect of dilutive stock option, restricted stock, performance stock unit and restricted stock unit securities	—	631	(0.05)
Net income per diluted common share	$521,503	81,417	$ 6.41

For the years ended December 31, 2018, 2017 and 2016, the Company had 0.1 million, 0.4 million and 0.9 million stock options that were antidilutive, respectively, due to having higher exercise prices than the Company's average stock price during the period. These securities were not included in the computation of diluted EPS. The effect of dilutive securities was calculated using the treasury stock method.

15 Accumulated Other Comprehensive Income

The components of accumulated other comprehensive income (loss) are detailed as follows (in thousands):

	Currency Translation	Unrealized Gain (Loss) on Retirement Plans	Unrealized Gain (Loss) on Investments	Accumulated Other Comprehensive Income (Loss)
Balance at December 31, 2017	$ (69,418)	$ (37,103)	$ (3,546)	$ (110,067)
Other comprehensive (loss) income, net of tax	(36,279)	27,234	1,141	(7,904)
Balance at December 31, 2018	$(105,697)	$ (9,869)	$ (2,405)	$ (117,971)

16 Retirement Plans

U.S. employees are eligible to participate in the Waters Employee Investment Plan, a 401(k) defined contribution plan, immediately upon hire. Employees may contribute up to 60% of eligible pay on a pre-tax or post-tax basis and the Company makes matching contributions of 100% for contributions up to 6% of eligible pay. The Company also sponsors a 401(k) Restoration Plan, which is a nonqualified defined contribution plan. Employees are 100% vested in employee and Company matching contributions for both plans. For the years ended December 31, 2018, 2017 and 2016, the Company's matching contributions amounted to $17 million, $16 million and $15 million, respectively.

The Company adopted new accounting guidance which requires that an employer disaggregate the service cost component from other components of net benefit cost. As a result of the adoption of this standard, the components of net periodic benefit cost other than the service cost component are included in other income in the consolidated statements of operations and all previous periods have been adjusted accordingly.

In May 2018, the Company's board of directors approved the termination of two defined benefit pension plans in the U.S. for which the pay credit accruals have been frozen, the Waters Retirement Plan and the Waters Retirement Restoration Plan (collectively, the "U.S. Pension Plans"). In December 2018, the Company settled the Waters Retirement Plan obligation by making lump-sum cash payments and purchasing annuity contracts for participants to permanently extinguish the pension plan's obligations. As a result, the Company recorded a $46 million charge to other expense, which consisted of a $6 million cash contribution to the plan and a $40 million non-cash charge related to the reversal of unrecognized actuarial losses recorded in accumulated other comprehensive income in the stockholders' equity. The $46 million pre-tax charge reduced net income per diluted share by $0.39. The termination of the Waters Retirement Restoration Plan is expected to be completed in 2019.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)

The Company also sponsors other employee benefit plans in the U.S., including a retiree healthcare plan, which provides reimbursement for medical expenses and is contributory. There are various employee benefit plans outside the United States (both defined benefit and defined contribution plans). Certain non-U.S. defined benefit plans ("Non-U.S. Pension Plans") are included in the disclosures below, which are required under the accounting standards for retirement benefits.

The Company contributed $13 million, $12 million and $12 million in the years ended December 31, 2018, 2017 and 2016, respectively, to the non-U.S. plans (primarily defined contribution plans) which are currently outside of the scope of the required disclosures. The eligibility and vesting of non-U.S. plans are consistent with local laws and regulations.

The net periodic pension cost is made up of several components that reflect different aspects of the Company's financial arrangements as well as the cost of benefits earned by employees. These components are determined using the projected unit credit actuarial cost method and are based on certain actuarial assumptions. The Company's accounting policy is to reflect in the projected benefit obligation all benefit changes to which the Company is committed as of the current valuation date; use a market-related value of assets to determine pension expense; amortize increases in prior service costs on a straight-line basis over the expected future service of active participants as of the date such costs are first recognized; and amortize cumulative actuarial gains and losses in excess of 10% of the larger of the market-related value of plan assets and the projected benefit obligation over the expected future service of active participants.

Summary data for the U.S. Pension Plans, U.S. Retiree Healthcare Plan and Non-U.S. Pension Plans are presented in the following tables, using the measurement dates of December 31, 2018 and 2017, respectively.

The reconciliation of the projected benefit obligations for the plans at December 31, 2018 and 2017 is as follows (in thousands):

	2018			2017		
	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans
Projected benefit obligation, January 1	$ 168,064	$17,121	$96,378	$159,416	$14,921	$85,311
Service cost	568	566	5,368	450	546	5,082
Employee contributions	—	1,159	622	—	1,041	605
Interest cost	6,491	636	1,707	6,829	618	1,518
Actuarial losses (gains)	6,415	(621)	(2,274)	8,658	942	(2,590)
Benefits paid	(3,416)	(1,007)	(3,277)	(5,058)	(947)	(2,078)
Plan amendments	—	(130)	(44)	—	—	636
Plan settlements	(177,150)	—	(2,791)	(2,231)	—	(1,229)
Other plans	—	—	1,063	—	—	196
Currency impact	—	—	(3,030)	—	—	8,927
Projected benefit obligation, December 31	$ 972	$17,724	$93,722	$168,064	$17,121	$96,378

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)

The accumulated benefit obligations for the plans at December 31, 2018 and 2017 are as follows (in thousands):

	2018			2017		
	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans
Accumulated benefit obligation	$ 972	**	$82,026	$168,064	**	$82,615

** Not applicable.

The reconciliation of the fair value of the plan assets at December 31, 2018 and 2017 is as follows (in thousands):

	2018			2017		
	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans
Fair value of plan assets, January 1	$ 171,373	$ 11,125	$ 74,990	$ 144,665	$ 9,142	$ 65,548
Actual return on plan assets	2,555	(584)	1,070	27,729	1,542	390
Company contributions	6,625	387	10,778	6,162	347	4,733
Employee contributions	—	1,159	622	—	1,041	605
Plan settlements	(177,137)	—	—	(2,125)	—	(915)
Benefits paid	(3,416)	(1,007)	(3,277)	(5,058)	(947)	(2,078)
Other plans	—	—	—	—	—	(213)
Currency impact	—	—	(2,596)	—	—	6,920
Fair value of plan assets, December 31	$ —	$ 11,080	$ 81,587	$ 171,373	$ 11,125	$ 74,990

The summary of the funded status for the plans at December 31, 2018 and 2017 is as follows (in thousands):

	2018			2017		
	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans
Projected benefit obligation	$ (972)	$ (17,724)	$ (93,722)	$ (168,064)	$ (17,121)	$ (96,378)
Fair value of plan assets	—	11,080	81,587	171,373	11,125	74,990
Funded status	$ (972)	$ (6,644)	$ (12,135)	$ 3,309	$ (5,996)	$ (21,388)

The summary of the amounts recognized in the consolidated balance sheets for the plans at December 31, 2018 and 2017 is as follows (in thousands):

	2018			2017		
	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans
Long-term assets	$ —	$ —	$ 3,284	$ 4,562	$ —	$ 1,245
Current liabilities	(972)	(387)	(1)	(76)	(347)	—
Long-term liabilities	—	(6,257)	(15,418)	(1,177)	(5,649)	(22,633)
Net amount recognized at December 31	$ (972)	$ (6,644)	$(12,135)	$ 3,309	$ (5,996)	$(21,388)

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)

For the Non-U.S. Pension Plans, all of the plans where the projected benefit obligation is in excess of plan assets also have an accumulated benefit obligation that is in excess of plan assets. The summary of the Non-U.S. Pension Plans that have projected benefit obligations and accumulated benefit obligations in excess of plan assets at December 31, 2018 and 2017 is as follows (in thousands):

	2018	2017
Projected benefit obligation	$60,359	$81,498
Accumulated benefit obligations	$56,029	$71,967
Fair value of plan assets	$44,940	$58,865

The summary of the components of net periodic pension costs for the plans for the years ended December 31, 2018, 2017 and 2016 is as follows (in thousands):

	2018			2017			2016		
	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans
Service cost	$ 568	$ 566	$ 5,368	$ 450	$ 546	$ 5,082	$ 377	$ 473	$ 4,954
Interest cost	6,491	636	1,707	6,829	618	1,518	6,931	557	1,699
Expected return on plan assets	(6,833)	(706)	(1,974)	(10,298)	(587)	(1,688)	(9,635)	(519)	(1,596)
Settlement loss	45,157	—	—	155	—	232	—	—	—
Net amortization:									
Prior service credit	—	(19)	(108)	—	—	(168)	—	—	(192)
Net actuarial loss	3,082	—	680	2,770	—	959	2,702	—	753
Net periodic pension cost (benefit)	$48,465	$ 477	$ 5,673	$ (94)	$ 577	$ 5,935	$ 375	$ 511	$ 5,618

The summary of the changes in amounts recognized in other comprehensive income (loss) for the plans for the years ended December 31, 2018, 2017 and 2016 is as follows (in thousands):

	2018			2017			2016		
	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans
Prior service credit (cost)	$ —	$ 130	$ 44	$ —	$ —	$ (636)	$ —	$ —	$ —
Net (loss) gain arising during the year	(10,616)	(670)	4,088	8,879	13	1,609	(3,352)	(594)	(3,361)
Amortization:									
Prior service credit	—	(19)	(35)	—	—	(168)	—	—	(192)
Net loss	48,239	—	680	2,925	—	1,191	2,702	—	753
Other Plans	—	—	(354)	—	—	—	—	—	(360)
Currency impact	—	—	583	—	—	(2,033)	—	—	884
Total recognized in other comprehensive (loss) income	$ 37,623	$ (559)	$ 5,006	$11,804	$ 13	$ (37)	$ (650)	$ (594)	$(2,276)

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)

The summary of the amounts included in accumulated other comprehensive loss in stockholders' equity for the plans at December 31, 2018 and 2017 is as follows (in thousands):

	2018			2017		
	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans
Net actuarial (loss) gain	$ (59)	$ (83)	$(13,987)	$(37,682)	$ 588	$(18,857)
Prior service credit	—	112	666	—	—	530
Total	$ (59)	$ 29	$(13,321)	$(37,682)	$ 588	$(18,327)

The summary of the amounts included in accumulated other comprehensive loss expected to be included in next year's net periodic benefit cost for the plans at December 31, 2018 is as follows (in thousands):

	2018		
	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans
Net actuarial loss	$ —	$ —	$ (537)
Prior service credit	—	19	147
Total	$ —	$ 19	$ (390)

The plans' investment asset mix is as follows at December 31, 2018 and 2017:

	2018		2017		
	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans	U.S. Pension Plans	U.S. Retiree Healthcare Plan	Non-U.S. Pension Plans
Equity securities	61%	7%	77%	65%	7%
Debt securities	39%	18%	23%	35%	16%
Cash and cash equivalents	0%	5%	0%	0%	8%
Insurance contracts and other	0%	70%	0%	0%	69%
Total	100%	100%	100%	100%	100%

The plans' investment policies include the following asset allocation guidelines:

	U.S. Retiree Healthcare Plan		Non-U.S. Pension Plans
	Policy Target	Range	Policy Target
Equity securities	65%	40% - 90%	5%
Debt securities	35%	10% - 60%	20%
Cash and cash equivalents	0%	0% - 20%	10%
Insurance contracts and other	0%	0% - 20%	65%

The asset allocation policy for the U.S. Retiree Healthcare Plan was developed in consideration of the following long-term investment objectives: achieving a return on assets consistent with the investment policy, achieving portfolio returns which compare favorably with those of other similar plans, professionally managed portfolios and of appropriate market indexes and maintaining sufficient liquidity to meet the obligations of the plan. Within the equity portfolio of the U.S. Retiree Healthcare Plan, investments are diversified among market capitalization and investment strategy, and targets a 20% allocation of the equity portfolio to be invested in financial markets outside of the United States. The Company does not invest in its own stock within the U.S. Retiree Healthcare Plan's assets.

Plan assets are measured at fair value using the following valuation techniques and inputs:

Level 1: The fair value of these types of investments is based on market and observable sources from daily quoted prices on nationally recognized securities exchanges.

Level 2: The fair value of these types of investments utilizes data points other than quoted prices in active markets that are observable either directly or indirectly.

Level 3: These bank and insurance investment contracts are issued by well-known, highly-rated companies. The fair value disclosed represents the present value of future cash flows under the terms of the respective contracts. Significant assumptions used to determine the fair value of these contracts include the amount and timing of future cash flows and counterparty credit risk.

There have been no changes in the above valuation techniques associated with determining the value of the plans' assets during the years ended December 31, 2018 and 2017.

The fair value of the Company's retirement plan assets are as follows at December 31, 2018 (in thousands):

	Total at December 31, 2018	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
U.S. Retiree Healthcare Plan:				
Mutual funds(a)	11,080	11,080	—	—
Total U.S. Retiree Healthcare Plan	11,080	11,080	—	—
Non-U.S. Pension Plans:				
Cash equivalents(b)	4,439	4,439	—	—
Mutual funds(c)	20,430	20,430	—	—
Bank and insurance investment contracts(d)	56,718	—	—	56,718
Total Non-U.S. Pension Plans	81,587	24,869	—	56,718
Total fair value of retirement plan assets	$ 92,667	$ 35,949	$ —	$ 56,718

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)

The fair value of the Company's retirement plan assets are as follows at December 31, 2017 (in thousands):

	Total at December 31, 2017	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
U.S. Pension Plans:				
Mutual funds(e)	$ 163,438	$ 163,438	$ —	$ —
Total U.S. Pension Plans	163,438	163,438	—	—
U.S. Retiree Healthcare Plan:				
Mutual funds(f)	11,125	11,125	—	—
Total U.S. Retiree Healthcare Plan	11,125	11,125	—	—
Non-U.S. Pension Plans:				
Cash equivalents(b)	5,783	5,783	—	—
Mutual funds(g)	17,244	17,244	—	—
Bank and insurance investment contracts(d)	51,963	—	—	51,963
Total Non-U.S. Pension Plans	74,990	23,027	—	51,963
Total fair value of retirement plan assets	249,553	$ 197,590	$ —	$ 51,963
Investments valued at NAV	7,935			
Total retirement plan assets	$ 257,488			

(a) The mutual fund balance in the U.S. Retiree Healthcare Plan is invested in the following categories: 40% in the common stock of large-cap U.S. companies, 21% in the common stock of international growth companies and 39% in fixed income bonds of U.S. companies and U.S. government.

(b) Primarily represents deposit account funds held with various financial institutions.

(c) The mutual fund balance in the Non-U.S. Pension Plans is primarily invested in the following categories: 56% in international bonds, 24% in the common stock of international companies and 20% in various other global investments.

(d) Amount represents bank and insurance guaranteed investment contracts.

(e) The mutual fund balance in the U.S. Pension Plans are invested in the following categories: 45% in the common stock of large-cap U.S. companies, 30% in the common stock of international growth companies and 25% in fixed income bonds issued by U.S. companies and by the U.S. government and its agencies.

(f) The mutual fund balance in the U.S. Retiree Healthcare Plan is invested in the following categories: 41% in the common stock of large-cap U.S. companies, 24% in the common stock of international growth companies and 35% in fixed income bonds of U.S. companies and U.S. government.

(g) The mutual fund balance in the Non-U.S. Pension Plans is invested in the following categories: 58% in international bonds and 32% in the common stock of international companies, 1% in mortgages and real estate and 9% in various other global investments.

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The following table summarizes the changes in fair value of the Level 3 retirement plan assets for the years ended December 31, 2018 and 2017 (in thousands):

	Insurance Guaranteed Investment Contracts
Fair value of assets, December 31, 2016	$ 45,093
Net purchases (sales) and appreciation (depreciation)	6,870
Fair value of assets, December 31, 2017	51,963
Net purchases (sales) and appreciation (depreciation)	4,755
Fair value of assets, December 31, 2018	$ 56,718

The weighted-average assumptions used to determine the benefit obligation in the consolidated balance sheets at December 31, 2018, 2017 and 2016 are as follows:

	2018		2017		2016	
	U.S.	Non-U.S.	U.S.	Non-U.S.	U.S.	Non-U.S.
Discount rate	4.40%	1.95%	3.94%	1.79%	4.41%	1.71%
Increases in compensation levels	**	2.66%	**	2.43%	**	2.47%

** Not applicable

The weighted-average assumptions used to determine the net periodic pension cost for the years ended December 31, 2018, 2017 and 2016 are as follows:

	2018		2017		2016	
	U.S.	Non-U.S.	U.S.	Non-U.S.	U.S.	Non-U.S.
Discount rate	3.96%	1.93%	4.28%	1.80%	4.42%	2.20%
Return on plan assets	4.35%	2.75%	6.53%	2.64%	6.47%	2.74%
Increases in compensation levels	**	2.70%	**	2.63%	**	2.50%

** Not applicable

To develop the expected long-term rate of return on assets assumption, the Company considered historical returns and future expectations for returns for each asset class, as well as the target asset allocation of the pension portfolio and historical expenses paid by the plan. A one-quarter percentage point increase in the assumed long-term rate of return on assets would decrease the Company's net periodic benefit cost by less than $1 million. A one-quarter percentage point increase in the discount rate would decrease the Company's net periodic benefit cost by less than $1 million.

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During fiscal year 2019, the Company expects to contribute a total of approximately $3 million to $6 million to the Company's defined benefit plans. Estimated future benefit payments from the plans as of December 31, 2018 are as follows (in thousands):

	U.S. Pension and Retiree Healthcare Plans	Non-U.S. Pension Plans	Total
2019	$ 1,084	$ 1,551	$ 2,635
2020	1,160	2,552	3,712
2021	1,243	2,782	4,025
2022	1,307	2,821	4,128
2023	1,366	3,038	4,404
2024 - 2028	7,146	19,277	26,423

17 Business Segment Information

The accounting standards for segment reporting establish standards for reporting information about operating segments in annual financial statements and require selected information for those segments to be presented in interim financial reports of public business enterprises. They also establish standards for related disclosures about products and services, geographic areas and major customers. The Company's business activities, for which discrete financial information is available, are regularly reviewed and evaluated by the chief operating decision maker. As a result of this evaluation, the Company determined that it has two operating segments: Waters™ and TA™.

The Waters operating segment is primarily in the business of designing, manufacturing, selling and servicing LC and MS instruments, columns and other precision chemistry consumables that can be integrated and used along with other analytical instruments. The TA operating segment is primarily in the business of designing, manufacturing, selling and servicing thermal analysis, rheometry and calorimetry instruments. The Company's two operating segments have similar economic characteristics; product processes; products and services; types and classes of customers; methods of distribution; and regulatory environments. Because of these similarities, the two segments have been aggregated into one reporting segment for financial statement purposes. Please refer to the consolidated financial statements for financial information regarding the one reportable segment of the Company.

Net sales for the Company's products and services are as follows for the years ended December 31, 2018, 2017 and 2016 (in thousands):

	2018	2017	2016
Product net sales:			
Waters instrument systems	$1,000,625	$ 988,750	$ 943,218
Chemistry consumables	400,287	372,157	345,413
TA instrument systems	204,081	191,442	171,665
Total product sales	1,604,993	1,552,349	1,460,296
Service net sales:			
Waters service	738,433	686,656	639,432
TA service	76,503	70,073	67,695
Total service sales	814,936	756,729	707,127
Total net sales	$2,419,929	$2,309,078	$2,167,423

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Net sales are attributable to geographic areas based on the region of destination. Geographic sales information is presented below for the years ended December 31, 2018, 2017 and 2016 (in thousands):

	2018	2017	2016
Net Sales:			
Asia:			
China	$ 443,321	$ 387,059	$ 331,354
Japan	173,357	167,258	167,977
Asia Other	305,613	308,300	283,653
Total Asia	922,291	862,617	782,984
Americas:			
United States	683,596	669,274	665,280
Americas Other	151,581	140,715	141,902
Total Americas	835,177	809,989	807,182
Europe	662,461	636,472	577,257
Total net sales	$2,419,929	$2,309,078	$2,167,423

None of the Company's individual customers accounts for more than 2% of annual Company sales. Net sales by customer class are as follows for the years ended December 31, 2018, 2017 and 2016 (in thousands):

	2018	2017	2016
Pharmaceutical	$1,365,731	$1,294,668	$1,206,316
Industrial	737,144	721,088	690,119
Governmental and academic	317,054	293,322	270,988
Total net sales	$2,419,929	$2,309,078	$2,167,423

Net sales for the Company recognized at a point in time versus over time are as follows for the years ended December 31, 2018, 2017 and 2016 (in thousands):

	2018	2017	2016
Net sales recognized at a point in time:			
Instrument systems	$1,204,706	$1,180,192	$1,114,883
Chemistry consumables	400,287	372,157	345,413
Service sales recognized at a point in time (time & materials)	317,549	299,385	279,482
Total net sales recognized at a point in time	1,922,542	1,851,734	1,739,778
Net sales recognized over time:			
Service and software sales recognized over time (contracts)	497,387	457,344	427,645
Total net sales	$2,419,929	$2,309,078	$2,167,423

Long-lived assets information at December 31, 2018 and 2017 is presented below (in thousands):

	2018	2017	2016
Long-lived assets:			
United States	$ 203,664	$ 186,344	$ 207,062
Americas Other	1,680	1,720	832
Total Americas	205,344	188,064	207,894
Europe	118,513	136,440	114,848
Asia	19,226	24,774	14,376
Total long-lived assets	$ 343,083	$ 349,278	$ 337,118

The Other category includes Canada, Latin America and Puerto Rico. Long-lived assets exclude goodwill, other intangible assets and other assets.

18 Unaudited Quarterly Results

The Company's unaudited quarterly results are summarized below (in thousands, except per share data):

2018	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total
Net sales	$530,670	$596,219	$578,021	$715,019	$2,419,929
Costs and operating expenses:					
Cost of sales	221,421	243,135	241,139	286,869	992,564
Selling and administrative expenses	130,407	136,645	126,997	142,853	536,902
Research and development expenses	34,480	35,644	35,173	38,106	143,403
Purchased intangibles amortization	1,659	1,602	2,114	2,337	7,712
Litigation (settlement) provisions	(1,672)	—	924	322	(426)
Total costs and operating expenses	386,295	417,026	406,347	470,487	1,680,155
Operating income	144,375	179,193	171,674	244,532	739,774
Other income (expense)	346	(1,828)	(811)	(45,501)	(47,794)
Interest expense	(13,838)	(11,692)	(11,435)	(11,676)	(48,641)
Interest income	9,666	8,888	9,802	10,451	38,807
Income before income taxes	140,549	174,561	169,230	197,806	682,146
Provision for income taxes	28,598	18,884	28,216	12,654	88,352
Net income	$111,951	$155,677	$141,014	$185,152	$ 593,794
Net income per basic common share	1.42	2.00	1.84	2.48	7.71
Weighted-average number of basic common shares	78,883	77,833	76,575	74,802	76,992
Net income per diluted common share	1.40	1.98	1.83	2.46	7.65
Weighted-average number of diluted common shares and equivalents	79,715	78,438	77,136	75,345	77,618

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)

2017	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total
Net sales	$497,969	$558,250	$565,584	$ 687,275	$2,309,078
Costs and operating expenses:					
Cost of sales	211,095	229,627	235,892	270,453	947,067
Selling and administrative expenses	130,673	130,093	135,206	148,391	544,363
Research and development expenses	30,752	32,937	33,782	35,122	132,593
Purchased intangibles amortization	1,729	1,693	1,682	1,639	6,743
Litigation provisions	—	10,018	—	1,096	11,114
Acquired in-process research and development	5,000	—	—	—	5,000
Total costs and operating expenses	379,249	404,368	406,562	456,701	1,646,880
Operating income	118,720	153,882	159,022	230,574	662,198
Other income (expense)	149	(97)	12	(404)	(340)
Interest expense	(12,725)	(14,083)	(14,750)	(15,281)	(56,839)
Interest income	7,343	8,370	9,516	10,849	36,078
Income before income taxes	113,487	148,072	153,800	225,738	641,097
Provision for income taxes	7,930	16,250	17,696	578,910	620,786
Net income (loss)	$105,557	$131,822	$136,104	$(353,172)	$ 20,311
Net income (loss) per basic common share	1.32	1.65	1.71	(4.44)	0.25
Weighted-average number of basic common shares	80,073	79,979	79,712	79,454	79,793
Net income (loss) per diluted common share	1.31	1.63	1.69	(4.44)	0.25
Weighted-average number of diluted common shares and equivalents	80,769	80,756	80,521	79,454	80,604

The Company typically experiences an increase in sales in the fourth quarter, as a result of purchasing habits for capital goods of customers that tend to exhaust their spending budgets by calendar year end. Selling and administrative expenses are typically higher after the first quarter in each year as the Company's annual payroll merit increases take effect. Selling and administrative expenses will vary in the fourth quarter in relation to performance in the quarter and for the year. In the first quarter of 2018 and third quarter of 2017, the Company recorded $1 million and $4 million of stock compensation expenses, respectively, in selling and administrative expenses related to the modification of certain stock awards upon the retirement of senior executives.

In the second quarter of 2017, the Company incurred a $10 million litigation provision related to the issuance of a verdict in a patent litigation case. In the first quarter of 2018, the Company resolved the case with a final settlement that resulted in a gain of $2 million (see Note 11). In the first quarter of 2017, the Company recorded a $5 million charge related to acquired in-process research and development (see Note 2). In the fourth quarter of 2018, the Company settled a pension plan obligation and recorded a $46 million charge, which consisted of a $6 million cash contribution to the plan and a $40 million non-cash charge related to the reversal of unrecognized actuarial losses recorded in accumulated other comprehensive income in the stockholders' equity (see Note 16). In the fourth quarter of 2017, the Company recorded a $550 million income tax provision as a result of the 2017 Tax Act (see Note 10).

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

None.

Item 9A: ***Controls and Procedures***

Evaluation of Disclosure Controls and Procedures

The Company's chief executive officer and chief financial officer (principal executive officer and principal financial officer), with the participation of management, evaluated the effectiveness of the Company's disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of the end of the period covered by this annual report on Form 10-K. Based on this evaluation, the Company's chief executive officer and chief financial officer concluded that the Company's disclosure controls and procedures were effective as of December 31, 2018 (1) to ensure that information required to be disclosed by the Company, including its consolidated subsidiaries, in the reports that it files or submits under the Exchange Act is accumulated and communicated to the Company's management, including its chief executive officer and chief financial officer, to allow timely decisions regarding the required disclosure and (2) to provide reasonable assurance that information required to be disclosed by the Company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms.

Management's Annual Report on Internal Control Over Financial Reporting

See Management's Report on Internal Control Over Financial Reporting in Item 8 on page 49 of this Form 10-K.

Report of the Independent Registered Public Accounting Firm

See the report of PricewaterhouseCoopers LLP in Item 8 on page 50 of this Form 10-K.

Changes in Internal Controls Over Financial Reporting

No change was identified in the Company's internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during the quarter ended December 31, 2018 that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting.

Item 9B: ***Other Information***

None.

PART III

Item 10: ***Directors, Executive Officers and Corporate Governance***

Information regarding the Company’s directors and any material changes to the process by which security holders may recommend nominees to the Board of Directors is contained in the definitive proxy statement for the 2019 Annual Meeting of Stockholders under the headings “Election of Directors”, “Directors Meetings and Board Committees”, “Corporate Governance”, “Report of the Audit Committee of the Board of Directors” and “Compensation of Directors and Executive Officers”. Information regarding compliance with Section 16(a) of the Exchange Act is contained in the Company’s definitive proxy statement for the 2019 Annual Meeting of Stockholders under the heading “Section 16(a) Beneficial Ownership Reporting Compliance”. Information regarding the Company’s Audit Committee and Audit Committee Financial Expert is contained in the definitive proxy statement for the 2019 Annual Meeting of Stockholders under the headings “Report of the Audit Committee of the Board of Directors” and “Directors Meetings and Board Committees”. Such information is incorporated herein by reference. Information regarding the Company’s executive officers is contained in Part I of this Form 10-K.

The Company has adopted a Global Code of Business Conduct & Ethics (the “Code”) that applies to all of the Company’s employees (including its executive officers) and directors and that is in compliance with Item 406 of Regulation S-K. The Code has been distributed to all employees of the Company. In addition, the Code is available on the Company’s website, www.waters.com, under the caption “Corporate Governance”. The Company intends to satisfy the disclosure requirement regarding any amendment to, or waiver of a provision of, the Code applicable to any executive officer or director by posting such information on its website. The Company shall also provide to any person without charge, upon request, a copy of the Code. Any such request must be made in writing to the Secretary of the Company, c/o Waters Corporation, 34 Maple Street, Milford, MA 01757.

The Company’s corporate governance guidelines and the charters of the audit committee, compensation committee, finance committee and nominating and corporate governance committee of the Board of Directors are available on the Company’s website, www.waters.com, under the caption “Corporate Governance”. The Company shall provide to any person without charge, upon request, a copy of any of the foregoing materials. Any such request must be made in writing to the Secretary of the Company, c/o Waters Corporation, 34 Maple Street, Milford, MA 01757.

In 2017, the Company adopted a proxy access bylaw provision that allows eligible stockholders or groups of up to 20 stockholders who have held at least 3% of the Company’s common stock continuously for three years to nominate up to two individuals or 20% of the Board of Directors, whichever is greater, for election at the Company’s Annual Meeting of Stockholders, and to have those individuals included in the Company’s proxy materials for that meeting. The Company believes that the proxy access bylaw adopted by the Company strikes an appropriate balance between providing meaningful proxy access for stockholders and limiting the potential for abuse.

Item 11: ***Executive Compensation***

This information is contained in the Company’s definitive proxy statement for the 2019 Annual Meeting of Stockholders under the headings “Compensation of Directors and Executive Officers”, “Compensation Committee Interlocks and Insider Participation” and “Compensation Committee Report”. Such information is incorporated herein by reference.

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

Except for the Equity Compensation Plan information set forth below, this information is contained in the Company’s definitive proxy statement for the 2019 Annual Meeting of Stockholders under the heading “Security Ownership of Certain Beneficial Owners and Management”. Such information is incorporated herein by reference.

Equity Compensation Plan Information

The following table provides information as of December 31, 2018 about the Company's common stock that may be issued upon the exercise of options, warrants, and rights under its existing equity compensation plans (in thousands):

	A	B	C
	Number of Securities to be Issued Upon Exercise of Outstanding Options, Warrants and Rights (1)	Weighted-Average Exercise Price of Outstanding Options, Warrants and Rights (1)	Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans (excluding securities reflected in column (A))
Equity compensation plans approved by security holders	2,234	$ 142.47	3,005
Equity compensation plans not approved by security holders	—	—	—
Total	2,234	$ 142.47	3,005

(1) Column (a) includes an aggregate of 444 shares of common stock to be issued upon settlement of restricted stock, restricted stock units and performance stock units. The weighted-average share price in column (b) does not take into account restricted stock, restricted stock units or performance stock units, which do not have an exercise price.

See Note 13, Stock-Based Compensation, in the Notes to Consolidated Financial Statements for a description of the material features of the Company's equity compensation plans.

Item 13: ***Certain Relationships and Related Transactions and Director Independence***

This information is contained in the Company's definitive proxy statement for the 2019 Annual Meeting of Stockholders under the headings "Directors Meetings and Board Committees", "Corporate Governance" and "Compensation of Directors and Executive Officers". Such information is incorporated herein by reference.

Item 14: ***Principal Accountant Fees and Services***

This information is contained in the Company's definitive proxy statement for the 2019 Annual Meeting of Stockholders under the headings "Ratification of Selection of Independent Registered Public Accounting Firm" and "Report of the Audit Committee of the Board of Directors". Such information is incorporated herein by reference.

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PART IV

Item 15: ***Exhibits, Financial Statement Schedules***

(a) Documents filed as part of this report:

(1) Financial Statements:

The consolidated financial statements of the Company and its subsidiaries are filed as part of this Form 10-K and are set forth on pages 52 to 97. The report of PricewaterhouseCoopers LLP, an independent registered public accounting firm, dated February 26, 2019, is set forth on page 50 of this Form 10-K.

(2) Financial Statement Schedule:

See (c) below.

(3) Exhibits:

Exhibit Number	Description of Document
3.1	Second Amended and Restated Certificate of Incorporation of Waters Corporation.(1)(P)
3.2	Certificate of Amendment of Second Amended and Restated Certificate of Incorporation of Waters Corporation, dated as of May 12, 1999.(3)
3.3	Certificate of Amendment of Second Amended and Restated Certificate of Incorporation of Waters Corporation, dated as of July 27, 2000.(4)
3.4	Certificate of Amendment of Second Amended and Restated Certificate of Incorporation of Waters Corporation, dated as of May 25, 2001.(5)
3.5	Amended and Restated Bylaws of Waters Corporation, dated as of December 5, 2017.(29)
10.1	Waters Corporation Retirement Plan.(2)(P)(*)
10.2	Waters Corporation 2003 Equity Incentive Plan.(6)(*)
10.3	First Amendment to the Waters Corporation 2003 Equity Incentive Plan.(7)(*)
10.4	Form of Director Stock Option Agreement under the Waters Corporation 2003 Equity Incentive Plan, as amended.(8)(*)
10.5	Form of Director Restricted Stock Agreement under the Waters Corporation 2003 Equity Incentive Plan, as amended.(8)(*)
10.6	Form of Executive Officer Stock Option Agreement under the Waters Corporation 2003 Equity Incentive Plan, as amended.(8)(*)
10.7	Second Amendment to the Waters Corporation 2003 Equity Incentive Plan.(9)(*)
10.8	Third Amendment to the Waters Corporation 2003 Equity Incentive Plan.(10)(*)
10.9	Amended and Restated Waters 401(k) Restoration Plan, effective January 1, 2008.(11)(*)
10.10	Change of Control/Severance Agreement, dated as of February 27, 2008, between Waters Corporation and Mark T. Beaudouin.(12)(*)
10.11	Change of Control/Severance Agreement, dated as of February 27, 2008, between Waters Corporation and Elizabeth B. Rae.(12)(*)
10.12	Change of Control/Severance Agreement, dated as of February 27, 2008, between Waters Corporation and Eugene G. Cassis.(21)(*)

Exhibit Number	Description of Document
10.13	Amended and Restated Waters Retirement Restoration Plan, effective January 1, 2008.(13)(*)
10.14	Amended and Restated Waters Corporation 1996 Non-Employee Director Deferred Compensation Plan, Effective January 1, 2008.(13)(*)
10.15	2014 Waters Corporation Management Incentive Plan.(21)(*)
10.16	Waters Corporation 2009 Employee Stock Purchase Plan.(14)(*)
10.17	Note Purchase Agreement, dated as of February 1, 2010, between Waters Corporation and the purchases named therein.(15)
10.18	First Amendment to the Note Purchase Agreement, dated as of February 1, 2010.(16)
10.19	Note Purchase Agreement, dated March 15, 2011, between Waters Corporation and the purchases named therein.(16)
10.20	Waters Corporation 2012 Equity Incentive Plan.(17)(*)
10.21	Form of Waters 2012 Stock Option Agreement - Executive Officers.(18)(*)
10.22	Form of Waters 2012 Stock Option Agreement - Directors.(18)(*)
10.23	Form of Waters 2012 Restricted Stock Agreement - Directors.(18)(*)
10.24	Form of Waters 2012 Restricted Stock Unit Agreement for Executive Officers - Five Year Vesting.(19)(*)
10.25	Form of Waters 2012 Restricted Stock Unit Agreement for Executive Officers - One Year Vesting.(19)(*)
10.26	Note Purchase Agreement, dated June 30, 2014, between Waters Corporation and the purchases named therein.(20)
10.27	Change of Control/Severance Agreement, dated as of April 1, 2015, between Waters Corporation and Michael F. Silveira.(22)(*)
10.28	President and Chief Executive Employment Agreement.(23)(*)
10.29	Change of Control/Severance Agreement, dated as of September 8, 2015, between Waters Corporation and Christopher J. O'Connell.(23)(*)
10.30	Note Purchase Agreement, dated as of May 12, 2016, between Waters Corporation and the purchasers named therein.(24)
10.31	Form of Waters 2012 Performance Stock Unit Award Agreement.(25)(*)
10.32	Senior Vice President and Chief Financial Officer Employment Agreement.(26)(*)
10.33	Change of Control/Severance Agreement, dated as of January 9, 2017, between Waters Corporation and Sherry L. Buck.(26)(*)
10.34	Form of Change of Control/Severance Agreement.(27)(*)
10.35	Employment Agreement, dated July 21, 2017, between Waters Corporation and Dr. Rohit Khanna.(28)(*)
10.36	Credit Agreement, dated as of November 30, 2017, among Waters Corporation, JPMorgan Chase Bank, N.A., JP Morgan Europe Limited and other Lenders party thereto.(30)
10.37	First Amendment to the Credit Agreement, dated as of November 30, 2017, among Waters Corporation, JPMorgan Chase Bank, N.A., JP Morgan Europe Limited and other Lenders party thereto.

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Exhibit Number	Description of Document
10.38	Second Amendment to the Note Purchase Agreement, dated as of February 1, 2010.
10.39	First Amendment to the Note Purchase Agreement, dated as of March 15, 2011.
10.40	First Amendment to the Note Purchase Agreement, dated as of June 30, 2014.
10.41	First Amendment to the Note Purchase Agreement, dated as of May 12, 2016.
21.1	Subsidiaries of Waters Corporation.
23.1	Consent of PricewaterhouseCoopers LLP, an independent registered public accounting firm.
31.1	Chief Executive Officer Certification Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Chief Financial Officer Certification Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1	Chief Executive Officer Certification Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.(**)
32.2	Chief Financial Officer Certification Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.(**)
101	The following materials from Waters Corporation's Annual Report on Form 10-K for the year ended December 31, 2018, formatted in XBRL (Extensible Business Reporting Language): (i) the Consolidated Balance Sheets, (ii) the Consolidated Statements of Operations, (iii) the Consolidated Statements of Comprehensive Income (iv) the Consolidated Statements of Cash Flows, (v) the Consolidated Statements of Stockholders' Equity and (vi) Notes to Consolidated Financial Statements.

(1) Incorporated by reference to the Registrant's Report on Form 10-K dated March 29, 1996 (File No. 001-14010).

(2) Incorporated by reference to the Registrant's Registration Statement on Form S-1 (File No. 333-96934).

(3) Incorporated by reference to the Registrant's Report on Form 10-Q dated August 11, 1999 (File No. 001-14010).

(4) Incorporated by reference to the Registrant's Report on Form 10-Q dated August 8, 2000 (File No. 001-14010).

(5) Incorporated by reference to the Registrant's Report on Form 10-K dated March 28, 2002 (File No. 001-14010).

(6) Incorporated by reference to the Registrant's Report on Form S-8 dated November 20, 2003 (File No. 333-110613).

(7) Incorporated by reference to the Registrant's Report on Form 10-K dated March 12, 2004 (File No. 001-14010).

(8) Incorporated by reference to the Registrant's Report on Form 10-Q dated November 10, 2004 (File No. 001-14010).

(9) Incorporated by reference to the Registrant's Report on Form 10-Q dated August 5, 2005 (File No. 001-14010).

(10) Incorporated by reference to the Registrant's Report on Form 10-K dated March 1, 2007 (File No. 001-14010).

(11) Incorporated by reference to the Registrant's Report on Form 10-Q dated November 2, 2007 (File No. 001-14010).

(12) Incorporated by reference to the Registrant's Report on Form 10-K dated February 29, 2008 (File No. 001-14010).

(13) Incorporated by reference to the Registrant's Report on Form 10-K dated February 27, 2009 (File No. 001-14010).

(14) Incorporated by reference to the Registrant's Report on Form S-8 dated July 10, 2009 (File No. 333-160507).

(15) Incorporated by reference to the Registrant's Report on Form 10-K dated February 26, 2010 (File No. 001-14010).

(16) Incorporated by reference to the Registrant's Report on Form 10-Q dated May 6, 2011 (File No. 001-14010).

(17) Incorporated by reference to the Registrant's Report on Form S-8 dated September 5, 2012 (File No. 333-183721).

(18) Incorporated by reference to the Registrant's Report on Form 8-K dated December 11, 2012 (File No. 001-14010).

(19) Incorporated by reference to the Registrant's Report on Form 8-K dated December 11, 2013 (File No. 001-14010).

(20) Incorporated by reference to the Registrant's Report on Form 10-Q dated August 1, 2014 (File No. 001-14010).

(21) Incorporated by reference to the Registrant's Report on Form 10-K dated February 27, 2015 (File No. 001-14010).

(22) Incorporated by reference to the Registrant's Report on Form 10-Q dated May 8, 2015 (File No. 001-14010).

(23) Incorporated by reference to the Registrant's Report on Form 10-Q dated August 7, 2015 (File No. 001-14010).

(24) Incorporated by reference to the Registrant's Report on Form 10-Q dated August 5, 2016 (File No. 001-14010).

(25) Incorporated by reference to the Registrant's Report on Form 8-K dated December 15, 2016 (File No. 001-14010).

(26) Incorporated by reference to the Registrant's Report on Form 10-K dated February 24, 2017 (File No. 001-14010).

(27) Incorporated by reference to the Registrant's Report on Form 8-K dated March 27, 2017 (File No. 001-14010).

(28) Incorporated by reference to the Registrant's Report on Form 10-Q dated November 3, 2017 (File No. 001-14010).

(29) Incorporated by reference to the Registrant's Report on Form 8-K dated December 8, 2017 (File No. 001-14010).

(30) Incorporated by reference to the Registrant's Report on Form 10-K dated February 27, 2018 (File No. 001-14010).

(P) Paper Filing

(*) Management contract or compensatory plan required to be filed as an Exhibit to this Form 10-K.

(**) This exhibit shall not be deemed "filed" for purposes of Section 18 of the Exchange Act, or otherwise subject to the liability of that section, nor shall it be deemed incorporated by reference into any filing under the Securities Act of 1933, as amended, or the Exchange Act, whether made before or after the date hereof and irrespective of any general incorporation language in any filing, except to the extent the Company specifically incorporates it by reference.

(b) See Item 15 (a) (3) above.

(c) Financial Statement Schedule:

The following additional financial statement schedule should be considered in conjunction with the consolidated financial statements. All other schedules have been omitted because the required information is either not applicable or not sufficiently material to require submission of the schedule.

WATERS CORPORATION AND SUBSIDIARIES
SCHEDULE II - VALUATION AND QUALIFYING ACCOUNTS
For each of the three years in the period ended December 31, 2018

	Balance at Beginning of Period	Charged to Provision for Income Taxes*	Other**	Balance at End of Period
Valuation allowance for deferred tax assets:				
2018	$62,098	$ (2,128)	$(6,077)	$53,893
2017	$61,225	$ (6,363)	$ 7,236	$62,098
2016	$68,595	$ (5,473)	$(1,897)	$61,225

* These amounts have been recorded as part of the income statement provision for income taxes. The income statement effects of these amounts have largely been offset by amounts related to changes in other deferred tax balance sheet accounts.

** The change in the valuation allowance during the year ended December 31, 2018 is primarily due to the write-off of a valuation allowance to Retained Earnings for the tax effect related to intra-entity asset transfers. The change in the valuation allowance during the years ended December 31, 2017 and 2016 is primarily due to the effect of foreign currency translation on a valuation allowance related to a net operating loss carryforward. In addition, 2016 includes the release of a valuation allowance related to a foreign tax credit carryforward due to expiration.

Item 16: ***Form 10-K Summary***

The optional summary in Item 16 has not been included in this Form 10-K.

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.

WATERS CORPORATION

/s/ SHERRY L. BUCK
Sherry L. Buck
Senior Vice President and
Chief Financial Officer

Date: February 26, 2019

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed by the following persons on behalf of the registrant and in the capacities indicated on February 26, 2019.

/S/ CHRISTOPHER J. O'CONNELL Christopher J. O'Connell	Chairman of the Board of Directors and Chief Executive Officer (principal executive officer)
/S/ SHERRY L. BUCK Sherry L. Buck	Senior Vice President and Chief Financial Officer (principal financial officer) (principal accounting officer)
/S/ LINDA BADDOUR Linda Baddour	Director
/S/ DR. MICHAEL J. BERENDT Dr. Michael J. Berendt	Director
/S/ EDWARD CONARD Edward Conard	Director
/S/ DR. LAURIE H. GLIMCHER Dr. Laurie H. Glimcher	Director
/S/ GARY HENDRICKSON Gary Hendrickson	Director
/S/ CHRISTOPHER A. KUEBLER Christopher A. Kuebler	Director
/S/ FLEMMING ORNSKOV Flemming Ornskov	Director
/S/ JOANN A. REED JoAnn A. Reed	Director
/S/ THOMAS P. SALICE Thomas P. Salice	Director

Exhibit 10.37

EXECUTION VERSION

FIRST AMENDMENT dated as of February 12, 2019 (this "Amendment"), to the CREDIT AGREEMENT dated as of November 30, 2017 (the "Credit Agreement"), among WATERS CORPORATION, a Delaware corporation (the "Company"), the LENDERS from time to time party hereto, and JPMORGAN CHASE BANK, N.A., as Administrative Agent.

WHEREAS, the Lenders have agreed to extend credit to the Company under the Credit Agreement on the terms and subject to the conditions set forth therein;

WHEREAS, the Company has requested that the Administrative Agent and the Lenders agree to amend the Credit Agreement to make certain changes as set forth herein; and

WHEREAS, in order to effectuate the foregoing, the Company, the Lenders party hereto (which constitute the Required Lenders for this Amendment) and the Administrative Agent have agreed that the Credit Agreement be amended, on the terms and subject to the conditions set forth herein;

NOW, THEREFORE, in consideration of the mutual agreements herein contained and other good and valuable consideration, the sufficiency and receipt of which are hereby acknowledged, the parties hereto hereby agree as follows:

SECTION 1. Defined Terms. Capitalized terms used but not otherwise defined herein (including in the recitals hereto) have the meanings assigned to them in the Credit Agreement.

SECTION 2. Amendment to the Credit Agreement. Effective as of the First Amendment Effective Date (as defined below), the Credit Agreement is hereby amended as follows:

(a) Section 1.01 is hereby amended by adding the following defined terms in the appropriate alphabetical order:

"CFC" means a controlled foreign corporation within the meaning of Section 957 of the Code.

"CFC Holdco" means a Subsidiary that has no material assets other than equity interests in one or more CFCs.

(b) The definition of "Excluded Subsidiary" in Section 1.01 of the Credit Agreement is hereby amended and restated in its entirety as follows:

"Excluded Subsidiary" means at any time (a) any Foreign Subsidiary, (b) any subsidiary of a Foreign Subsidiary, (c) any Domestic Subsidiary that is a disregarded entity for United States Federal income tax purposes substantially all of the assets of which consist of equity interests in one or more Foreign Subsidiaries, (d) any Subsidiary that is prohibited or restricted by applicable law from providing a guarantee of the Obligations or if such guarantee would require governmental (including regulatory) consent, approval, license or authorization, (e) any special purpose securitization vehicle (or similar entity), (f) any Subsidiary that is a not-for-profit organization, (g) any other Subsidiary with respect to which, in the reasonable judgment of the Administrative Agent (confirmed in writing by notice to the Company), the cost or other consequences (including any adverse tax consequences) of providing the Subsidiary Guarantee Agreement shall be excessive in view of the benefits to be obtained by the Lenders therefrom, (h) any other Subsidiaries acquired or organized after the Effective Date that, together with their own subsidiaries on a combined consolidated basis, shall not, individually or in the aggregate for all such Subsidiaries under this clause (h), have accounted for more than 5% of Consolidated Total Assets or more than 5% of the consolidated total revenues of the Company and the Subsidiaries at the end of, or for the period of four fiscal quarters ended with, the most recent fiscal quarter of the Company for which financial statements shall have been delivered pursuant to Section 5.06(a) or (b) (or, prior to the delivery of any such financial statements, at the end of or for the period of four fiscal quarters ended September 30, 2017), and (i) any CFC Holdco.

(c) The definition of "Guarantee Requirement" in Section 1.01 of the Credit Agreement is hereby amended and restated in its entirety as follows:

"Guarantee Requirement" means, at any time, that the Subsidiary Guarantee Agreement (or a supplement referred to in Section 16 thereof) shall have been executed by each Subsidiary (other than any Excluded Subsidiary) existing at such time, shall have been delivered to the Administrative Agent and shall be in full force and effect; provided, however, that (a) in the case of a Subsidiary that becomes subject to the Guarantee Requirement after the Effective Date, the Guarantee Requirement shall be satisfied with respect to such Subsidiary if a supplement to the Subsidiary Guarantee Agreement is executed by such Subsidiary, delivered to the Administrative Agent and in full force and effect no later than (i) 30 days after the date on which such Subsidiary becomes subject to the Guarantee Requirement or (ii) such other date as the Administrative Agent may reasonably determine, but in any case no later than 60 days after the date on which such Subsidiary becomes subject to the Guarantee Requirement and (b) a Subsidiary Guarantor shall automatically be released from its obligations under the Subsidiary Guarantee Agreement (including any supplement referred to in Section 16 thereof) and no longer be subject to the Guarantee Requirement in the event that the Company delivers a written notice to the Administrative Agent certifying that such Subsidiary Guarantor is an Excluded Subsidiary.

(d) The definition of "Subsidiary Guarantors" in Section 1.01 of the Credit Agreement is hereby amended and restated in its entirety as follows:

"Subsidiary Guarantors" means each Person listed on Schedule 1.01 and each other Person that becomes party to a Subsidiary Guarantee Agreement as a Subsidiary Guarantor, and the permitted successors and assigns of each such Person; provided, however, that a Subsidiary Guarantor shall cease to be a Subsidiary Guarantor in the event such Person is released from its obligations under the Subsidiary Guarantee Agreement (including any supplement referred to in Section 16 thereof) as provided in clause (b) of the proviso of the definition of "Guarantee Requirement" or as provided in Section 6 of the Subsidiary Guarantee Agreement.

SECTION 3. Representations and Warranties. To induce the other parties hereto to enter into this Amendment, the Company represents and warrants to such other parties that, on and as of the First Amendment Effective Date:

(a) This Amendment has been duly authorized, executed and delivered by the Company and this Amendment constitutes the Company's legal, valid and binding obligations, enforceable against the Company in accordance with their terms, subject to applicable bankruptcy, insolvency, reorganization, moratorium or other laws affecting creditors' rights generally and to general principles of equity, regardless of whether considered in a proceeding in equity or at law.

(b) The representations and warranties set forth in Article III of the Credit Agreement are true and correct on and as of the First Amendment Effective Date (i) in the case of any representation and warranty that is qualified by materiality, in all respects and (ii) otherwise, in all material respects, except to the extent they expressly and exclusively relate to an earlier date, in which case such representations and warranties shall be true and correct (x) in the case of any representation and warranty that is qualified by materiality, in all respects and (y) otherwise, in all material respects, as of such earlier date.

(c) On the First Amendment Effective Date, after giving effect to this Amendment and the transactions contemplated hereby, no Default or Event of Default has occurred and is continuing.

SECTION 4. Effectiveness. This Amendment shall become effective on the first date on which each of the following conditions shall have been satisfied (the "First Amendment Effective Date").

(a) The Administrative Agent (i) shall have executed this Amendment and (ii) shall have received from the Company and Lenders that constitute at least the Required Lenders, either a counterpart of this Amendment signed on behalf of such party or evidence satisfactory to the Administrative Agent (which may include a facsimile transmission or transmission by electronic mail (in .pdf or .tif format)) that such party has signed a counterpart of this Amendment.

(b) The Administrative Agent shall have received a certificate, dated the First Amendment Effective Date and signed by an authorized officer of the

Company, confirming the accuracy of the representations and warranties set forth in Section 3 hereof.

(c) The Administrative Agent shall have received, to the extent invoiced, payment or reimbursement of all fees and expenses (including reasonable fees, charges and disbursements of counsel) required to be paid or reimbursed by the Company under the Credit Agreement in connection with this Amendment.

The Administrative Agent shall notify the Company and the Lenders of the First Amendment Effective Date, and such notice shall be conclusive and binding.

SECTION 5. Effect of Amendment. Except as expressly set forth herein, this Amendment shall not by implication or otherwise limit, impair, constitute a waiver of or otherwise affect the rights or remedies of the Lenders or the Administrative Agent under the Credit Agreement or any other Loan Document, and shall not alter, modify, amend or in any way affect any of the terms, conditions, obligations, covenants or agreements contained in the Credit Agreement or any other Loan Document, all of which are ratified and affirmed in all respects and shall continue in full force and effect. This Amendment shall constitute a "Loan Document" for all purposes of the Credit Agreement and the other Loan Documents. On and after the First Amendment Effective Date, any reference to the Credit Agreement contained in the Loan Documents shall mean the Credit Agreement as modified hereby.

SECTION 6. Counterparts. This Amendment may be executed in any number of counterparts, each of which shall constitute an original, but all of which taken together shall constitute one and the same instrument and any of the parties hereto may execute this Amendment by signing any such counterpart. Delivery of an executed counterpart of a signature page of this Amendment by facsimile or other electronic transmission shall be effective as delivery of a manually executed counterpart of this Amendment.

SECTION 7. Governing Law. THIS AMENDMENT SHALL BE GOVERNED BY AND CONSTRUED IN ACCORDANCE WITH THE LAWS OF THE STATE OF NEW YORK.

SECTION 8. Headings. The headings of this Amendment are for purposes of reference only and shall not limit or otherwise affect the meaning hereof.

IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be duly executed by their respective authorized officers as of the day and year first above written.

WATERS CORPORATION,

by /s/ John E. Lynch
Name: John E. Lynch
Title: Vice President, Corporate Treasurer

SIGNATURE PAGE TO
FIRST AMENDMENT
to the WATERS CORPORATION
CREDIT AGREEMENT

JPMORGAN CHASE BANK, N.A.,
as a Lender, as an Issuing Bank and as Administrative Agent,

by /s/ David Hyman
Name: David Hyman
Title: Executive Director

To approve this Amendment:

BANK OF AMERICA, N.A.,

by /s/ Linda E.D. Alto
Name: Linda E.C. Alto
Title: Senior Vice President

For any Lender requiring a second signature line:

by ______________________________
Name:
Title:

To approve this Amendment:

Institution:

HSBC BANK USA, N.A.,

by /s/ Elizabeth Peck
Name: Elizabeth Peck
Title: Director

To approve this Amendment:

Institution:

CITIZENS BANK, N.A.,

by /s/ Kathryn Hinderhofer
Name: Kathryn Hinderhofer
Title: Assistant Vice President

To approve this Amendment:

Institution:

MUFG BANK, LTD (F/K/A THE BANK OF TOKYO-MITSUBISHI, LTD.)

by /s/ Yassef Yousef
Name: Yassef Yousef
Title: Director

SIGNATURE PAGE TO
FIRST AMENDMENT
to the WATERS CORPORATION
CREDIT AGREEMENT

To approve this Amendment:

Institution:

TD BANK, N.A.,

by /s/ Matt Waszmer
Name: Matt Waszmer
Title: Senior Vice President

To approve this Amendment:

Institution:

DWB CAPITAL LLC

by /s/ Devan Patel
Name: Devan Patel
Title: Vice President

For any Lender requiring a second signature line:

by /s/ Brigitta Perezic
Name: Brigitta Perezic
Title: First Vice President

To approve this Amendment:

Institution:

BARCLAYS BANK PLC,

by /s/ Jonathan D. Stone
Name: Jonathan D. Stone
Title: Director

To approve this Amendment:

Institution:

KEYBANK NATIONAL ASSOCIATION

by /s/ Marc Evans
Name: Marc Evans
Title: Vice President

SIGNATURE PAGE TO
FIRST AMENDMENT
to the WATERS CORPORATION
CREDIT AGREEMENT

To approve this Amendment:

Institution:

SUNTRUST BANK

by /s/ Antpn Brykalin
Name: Antpn Brykalin
Title: Vice President

To approve this Amendment:

Institution:

THE HUNTINGTON NATIONAL BANK,

by /s/ Jared Shaner
Name: Jared Shaner
Title: Vice President

SIGNATURE PAGE TO
FIRST AMENDMENT
to the WATERS CORPORATION
CREDIT AGREEMENT

To approve this Amendment:

Institution:

BRANCH BANKING AND TRUST COMPANY

by /s/ J. Carlos Naverrete
Name: J. Carlos Naverrete
Title: Vice President

SIGNATURE PAGE TO
FIRST AMENDMENT
to the WATERS CORPORATION
CREDIT AGREEMENT

To approve this Amendment:

Institution:

PNC BANK, NATIONAL ASSOCIATION,

by /s/ Joshua Kezele
Name: Joshua Kezele
Title: Vice President

To approve this Amendment:

Institution:

THE BANK OF NEW YORK MELLON,

by /s/ Thomas J. Tarasovich, Jr.
Name: Thomas J. Tarasovich, Jr.
Title: Vice President

To approve this Amendment:

Institution:

The Governor & Company of the Bank of Ireland

by /s/ Cara Phelan
Name: Cara Phelan
Title: Approved Signatory

by /s/ Conor Linehan
Name: Conor Linehan
Title: Approved Signatory

SIGNATURE PAGE TO
FIRST AMENDMENT
to the WATERS CORPORATION
CREDIT AGREEMENT

To approve this Amendment:

Institution:

THE NORTHERN TRUST COMPANY

by /s/ Eric Siebert
Name: Eric Siebert
Title: Vice President

SIGNATURE PAGE TO
FIRST AMENDMENT
to the WATERS CORPORATION
CREDIT AGREEMENT

To approve this Amendment:

Institution:

WEBSTER BANK, NATIONAL ASSOCIATION

by /s/ Steven W. Collins
Name: Steven W. Collins
Title: Vice President

EXHIBIT 10.38

EXECUTION VERSION

WATERS CORPORATION

SECOND AMENDMENT TO NOTE PURCHASE AGREEMENT

RE:

Note Purchase Agreement Dated as of February 1, 2010

and

$100,000,000 5.00% Senior Guaranteed Notes, Series B,
due February 1, 2020

DATED AS OF FEBRUARY 12 , 2019

TABLE OF CONTENTS

(Not a part of this Second Amendment to Note Purchase Agreement)

WATERS CORPORATION
34 MAPLE STREET
MILFORD, MA 01757

SECOND AMENDMENT TO NOTE PURCHASE AGREEMENT

RE: Note Purchase Agreement dated as of February 1, 2010
and
$100,000,000 5.00% Senior Guaranteed Notes, Series B, due February 1, 2020

Dated as of February 12, 2019

To each of the holders (the "*Noteholders*")
listed in Schedule I to this Second
Amendment to Note Purchase Agreement

Ladies and Gentlemen:

Reference is made to (i) the Note Purchase Agreement dated as of February 1, 2010, by and among Waters Corporation, a Delaware corporation (the *"Company"*), and each of you (the *"Agreement"*) and (ii) the $100,000,000 aggregate principal amount of 5.00% Senior Guaranteed Notes, Series B, due February 1, 2020 of the Company of which $100,000,000 is currently outstanding (the *"Notes"*). Capitalized terms used in this Second Amendment to Note Purchase Agreement (this *"Amendment"*) without definition shall have the meanings given such terms in the Agreement.

For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Company requests the amendment of certain provisions of the Agreement as hereinafter provided.

Upon your acceptance hereof in the manner hereinafter provided and upon satisfaction of all conditions to the effectiveness hereof and receipt by the Company of similar acceptances from the Noteholders, this Amendment shall be effective, but only in the respects hereinafter set forth:

SECTION 1. AMENDMENTS TO AGREEMENT.

Section 1.1. Leverage Ratio. Section 10.9 of the Agreement is hereby amended and restated in its entirety to read as follows:

Section 10.9. Leverage Ratio.

(a) The Company will not permit the Leverage Ratio as of the end of any fiscal quarter to exceed 3.50:1.00; provided that, following the completion of a Material Acquisition that, on a pro forma basis, giving effect to any related incurrence or repayment of Debt, would result in an increase in the Company's Leverage Ratio, if the Company shall so elect by a notice delivered to the holders of Notes as of the last day of the fiscal quarter the Material Acquisition was consummated (a "**Leverage Ratio Increase Election**"), such maximum Leverage Ratio shall be increased to 4.00:1.00 at the end of and for the fiscal quarter during which such Material Acquisition shall have been consummated and at the end of and for each of the following three consecutive fiscal quarters (the period during which any such increase in the Leverage Ratio shall be in effect being called a "**Leverage Ratio Increase Period**"), and in which event, the Company shall be obligated to pay the Incremental Interest Payment provided for in Section 10.9(c). The Company may terminate any Leverage Ratio Increase Period by a notice delivered to the holders of Notes, whereupon, on the last day of the fiscal quarter during which such notice is given and on the last day of each fiscal quarter thereafter until another Leverage Ratio Increase Period has commenced as provided in this Section, the maximum Leverage Ratio shall be 3.50:1.00. If a Leverage Ratio Increase Election shall have been made under this Section, the Company may not make another Leverage Ratio Increase Election unless, following the termination or expiration of the most recent prior Leverage Ratio Increase Period, the Leverage Ratio as of the last day of at least two consecutive full fiscal quarters of the Company shall not have exceeded 3.50:1.00. Notwithstanding the foregoing, the Company shall not be permitted to make more than two Leverage Ratio Increase Elections during the term of this Agreement.

(b) If the Leverage Ratio exceeds 3.50 to 1.00 as permitted by Section 10.9(a), as evidenced by an Officer's Certificate delivered pursuant to Section 7.2(a), the interest rate payable on the Notes shall be increased by 0.50% (the "**Incremental Interest**"). Such Incremental Interest shall begin to accrue on the first day of the fiscal quarter following the fiscal quarter in respect of which such Officer's Certificate was delivered, and shall continue to accrue until the Company has provided an Officer's Certificate pursuant to Section 7.2(a) demonstrating that, as of the last day of the fiscal quarter in respect of which such Officer's Certificate is delivered, the Leverage Ratio is not more than 3.50 to 1.00. In the event such Officer's Certificate evidencing that the Leverage Ratio is not more than 3.50 to 1.00 is delivered, the Incremental Interest shall cease to accrue on the last day of the fiscal quarter in respect of which such Officer's Certificate is delivered.

(c) Within 10 Business Days of the delivery of an Officer's Certificate pursuant to Section 7.2(a) evidencing that the Leverage Ratio exceeds 3.50 to 1.00, the Company shall pay to each holder of a Note the amount attributable to the Incremental Interest (the "**Incremental Interest Payment**") which shall be the product of (i) the aggregate outstanding principal amount of Notes held by such holder (or its predecessor(s) in interest) as of the first day that Incremental Interest begins to accrue, (ii) 0.50% (to reflect the Incremental Interest) and (iii) 0.25% (to reflect that the Incremental Interest is payable quarterly). The Incremental Interest Payment, if any, shall be paid quarterly by wire transfer of immediately available funds to each holder of the Notes in accordance with the terms of this Agreement.

Section 1.2. Accounting Terms. Section 22.3 of the Agreement is hereby amended by adding clause (c) to read as follows:

(c) Without limiting the foregoing, leases shall continue to be classified and accounted for on a basis consistent with that reflected in the financial statements of the Company and its consolidated Subsidiaries for the fiscal year ended December 31, 2015 for all purposes of this Agreement, notwithstanding any change in GAAP relating thereto, unless the parties hereto shall enter into a mutually acceptable amendment addressing such changes, as provided for above. For the avoidance of doubt, the Company shall include relevant reconciliations in reasonable detail between GAAP in place at the applicable time to GAAP in place (related to such treatment of leases) for the fiscal year ended December 31, 2015 with respect to the applicable covenant compliance calculations contained in each certificate of Senior Financial Officer delivered pursuant to Section 7.2(a) during such period. Notwithstanding the foregoing, in the event that the Primary Credit Agreement is amended or modified with the effect that any provision (including but not limited to the leverage covenant contained therein) shall include a lease of property of a Person as lessee as debt for purposes of such provision (notwithstanding that such lease would not have been included as debt under GAAP as in effect on December 31, 2015), then such lease shall be included as a Capital Lease under this Agreement.

Section 1.3. Release of Guarantors. Section 22.9 of the Agreement is hereby amended and restated in its entirety to read as follows:

Section 22.9. Release of Guarantors. Notwithstanding any contrary provision herein or in the Notes or in any Guarantee Agreement, if the Company shall request the release under a Guarantee Agreement (x) of any Subsidiary to be sold or otherwise disposed of (including through the sale or disposition of any Subsidiary owning such Subsidiary) to a Person other than the Company or a Subsidiary in a transaction permitted under the terms of this Agreement or (y) of any Subsidiary because such Subsidiary has become an Excluded Subsidiary, and, in other case, shall deliver to the holders of the Notes a certificate of a Responsible Officer to the effect that (i) such sale, other disposition or such designation of such Subsidiary as an Excluded Subsidiary will comply with the terms of this Agreement, (ii) such Subsidiary shall not be a guarantor or obligor under a Primary Credit Agreement or any note purchase agreement of the Company from time to time ("**Note Purchase Agreement**" together with the Primary Credit Agreement, the "**Material Agreements**"), and (iii) (A) if such Subsidiary Guarantor is a guarantor or is otherwise liable for or in respect of any Material Agreement, then such Subsidiary Guarantor has been released and discharged (or will be released and discharged concurrently with the release of such Subsidiary Guarantor under its Subsidiary Guaranty) under the Material Agreements, (B) at the time of, and after giving effect to, such release and discharge, no Default or Event of Default shall be existing, (C) no amount is then due and payable under such Subsidiary Guaranty and (D) if in connection with such Subsidiary Guarantor being released and discharged under any Material Agreement any fee or other form of consideration is given to any holder of Indebtedness under such Material Agreement for such release, the holders of the Notes shall receive equivalent consideration substantially concurrently therewith. In the event of any such release, for purposes of Section 10.6, all Indebtedness of such Subsidiary shall be deemed to have been incurred concurrently with such release.

Section 1.4. Amendment to Defined Terms. Schedule B of the Agreement is hereby amended by added the following defined terms in alphabetic order to read as follows:

"**CFC**" means a controlled foreign corporation within the meaning of Section 957 of the Code.

"**CFC Holdco**" means a Subsidiary that has no material assets other than equity interests in one or more CFCs.

Section 1.5. Amendment to Defined Terms. The following definitions set forth in Schedule B of the Agreement are hereby amended by amending and restating in their entirety to read as follows:

"Excluded Subsidiary" means at any time (a) any Foreign Subsidiary, (b) any subsidiary of a Foreign Subsidiary (c) any Domestic Subsidiary that is a disregarded entity for United States Federal income tax purposes substantially all of the assets of which consist of equity interests in one or more Foreign Subsidiaries, (d) any Subsidiary that is prohibited or restricted by applicable law from providing a Guaranty or if such Guaranty would require governmental (including regulatory) consent, approval, license or authorization, (e) any special purpose securitization vehicle (or similar entity), (f) any Subsidiary that is not-for-profit organization, (g) any other Subsidiary with respect to which, in the reasonable judgment of the Required Holders (confirmed in writing by notice to the Company), the cost or other consequences (including adverse tax consequences) of providing the Guarantee Agreement shall be excessive in view of the benefits to be obtained by the holders of Notes therefrom, (h) any other Subsidiaries acquired or organized after the date of Closing that, together with their own subsidiaries on a combined consolidated basis, shall not, individually or in the aggregate for all such Subsidiaries under this clause (h), have accounted for more than 5% of Consolidated Total Assets or more than 5% of the consolidated total revenues of the Company and the Subsidiaries at the end of, or for the period of four fiscal quarters ended with, the most recent fiscal quarter of the Company for which financial statements shall have been delivered pursuant to Section 7.1(a) or (b) (or, prior to the delivery of any such financial statements, at the end of or for the period of four fiscal quarters ended March 31, 2016), and (i) any CFC Holdco.

"Guarantee Requirement" means, at any time, that the Guarantee Agreement (or a supplement referred to in Section 16 thereof) shall have been executed by each Subsidiary (other than any Excluded Subsidiary) existing at such time, shall have been delivered to the holders of the Notes and shall be in full force and effect; *provided, however,* that (a) in the case of a Subsidiary that becomes subject to the Guarantee Requirement after the date of Closing, the Guarantee Requirement shall be satisfied with respect to such Subsidiary if a supplement to the Guarantee Agreement is executed by such Subsidiary, delivered to the holders of the Notes and in full force and effect no later than (i) 30 days after the date on which such Subsidiary becomes subject to the Guarantee Requirement (or such later date as is permitted in the Primary Credit Agreement except that such later date shall in no event be more than 60 days after the date on which such Subsidiary becomes subject to the Guarantee Requirement) or (ii) such other date as the Required Holders may reasonably determine, but in any case no later than 60 days after the date on which such Subsidiary becomes subject to the Guarantee Requirement and (b) a Guarantor shall automatically be released from its obligations under the Guarantee Agreement (including any supplement referred to in Section 16 thereof) and no longer be subject to the Guarantee Requirement in the event that the Company complies with the requirements of Section 22.9 and delivers a written notice to the holders of the Notes certifying that such Guarantor is an Excluded Subsidiary.

"Guarantors" means each Person listed on Schedule C and each other Person that becomes party to a Guarantee Agreement as a Guarantor, and the permitted successors and assigns of each such Person; provided, however, that a Guarantor shall cease to be a Guarantor in the event such Person is released from its obligations under the Guarantee Agreement (including any supplement referred to in Section 16 thereof) as provided in clause (b) of the proviso of the definition of "Guarantee Requirement" or as provided in Section 6 of the Guarantee Agreement.

"Material Acquisition" means (a) the acquisition by the Company or a Subsidiary of assets of or an interest in another Person or (b) the merger or consolidation of the Company with another corporation; provided that, in each case, the aggregate consideration therefor involves cash in the amount of $400,000,000 or more.

SECTION 2. CONDITIONS PRECEDENT.

This Amendment shall not become effective until, and shall become effective on, the Business Day when each of the following conditions shall have been satisfied (the "*Effective Date*"):

(a) Each Noteholder shall have received this Amendment, duly executed by the Company.

(b) The Required Holders shall have consented to this Amendment as evidenced by their execution thereof.

(c) The representations and warranties of the Company set forth in Section 3 hereof shall be true and correct as of the date of the execution and delivery of this Amendment and as of the Effective Date.

(d) Any consents or approvals from any holder or holders of any outstanding security or indebtedness of the Company and any amendments of agreements pursuant to which any securities or indebtedness may have been issued which shall be necessary to permit the consummation of the transactions contemplated hereby shall have been obtained and all such consents or amendments shall be reasonably satisfactory in form and substance to the Required Holders and their special counsel.

(e) All corporate and other proceedings in connection with the transactions contemplated by this Amendment and all documents and instruments incident to such transactions shall be satisfactory to the Required Holders and their special counsel, and the Required Holders and their special counsel shall have received all such counterpart originals or certified or other copies of such documents as the Required Holders or such special counsel may reasonably request.

(f) The Company shall have paid the fees, charges and disbursements of the Noteholders' special counsel, Chapman and Cutler LLP, which fees, charges and disbursements are reflected in a statement of such special counsel delivered to the Company at the time of the execution and delivery of this Amendment.

(g) Simultaneous with the execution of this Amendment, the Company shall have enter into (i) that certain First Amendment to Note Purchase Agreement dated as of March 15, 2011 ("*2011 NPA Amendment*"), (ii) that certain First Amendment to Note Purchase Agreement dated as of June 30, 2014 ("*2014 NPA Amendment*"), (iii) that certain First Amendment to Note Purchase Agreement dated as of May 12, 2016 ("*2016 NPA Amendment*"; together with this Amendment, the 2011 NPA Amendment and 2014 NPA Amendment, collectively, the "*NPA Amendments*"), and (iv) that certain First Amendment to Credit Agreement dated as of November 30, 2017 among the Company, the lenders party thereto and JPMorgan Chase Bank, N.A., as Administrative Agent (the "*Credit Agreement Amendment*").

(h) each holder of a Note shall have received an amendment fee in an amount equal to 0.05% of the outstanding principal amount of its Notes.

SECTION 3. REPRESENTATIONS AND WARRANTIES.

The Company hereby represents and warrants that as of the date of execution and delivery of this Amendment and as of the Effective Date:

(a) The Company is duly incorporated, validly existing and in good standing under the laws of its jurisdiction of incorporation.

(b) The Company has the corporate power to own its property and to carry on its business as now being conducted.

(c) The Company is duly qualified and in good standing as a foreign corporation authorized to do business in each jurisdiction in which the failure to do so would, individually or in the aggregate, have a Material Adverse Effect.

(d) This Amendment and the Agreement, as amended hereby, and the transactions contemplated hereby are within the corporate powers of the Company, have been duly authorized by all necessary corporate action on the part of the Company, and this Amendment and the Agreement, as amended hereby, have been duly executed and delivered by the Company and constitute legal, valid and binding obligations of the Company enforceable in accordance with their respective terms.

(e) Before and after giving effect to this Amendment, there are no Defaults or Events of Default under the Agreement, as amended hereby.

(f) The execution, delivery and performance of this Amendment and the Agreement, as amended hereby, does not and will not result in a violation of or default under (A) the articles of incorporation or bylaws of the Company, (B) any agreement to which the Company is a party or by which it is bound or to which the Company or any of its properties is subject, (C) any order, writ, injunction or decree binding on the Company, or (D) any statute, regulation, rule or other law applicable to the Company.

(g) No consent, approval or authorization of, or registration, filing or declaration with, any Governmental Authority is required in connection with the execution, delivery or performance by the Company of this Amendment and the Agreement, as amended hereby.

(h) Other than this Amendment and the First Amendment to Note Purchase Agreement dated as of March 15, 2011, there are no other amendments, modifications, supplements or waivers to the Agreement.

(i) The Noteholders listed on Schedule I to this Amendment are the holders of record of all outstanding Notes issued under the Agreement and set forth opposite their names in such Schedule is the correct outstanding principal amount of the Notes of such Noteholder.

(j) Other than the 0.05% amendment fee provided to the holders of Notes in connection with NPA Amendments, the Company or its affiliates have not paid or agreed to pay any fees or other consideration, or given any additional security or collateral, or shortened the maturity or average life of any indebtedness or permanently reduced any borrowing capacity, in each case, required in connection with the obtaining of any consents or approvals in connection with the transactions contemplated hereby including, in connection with the NPA Amendments or the Credit Agreement Amendment.

SECTION 4. MISCELLANEOUS.

Section 4.1. Except as amended herein, all terms and provisions of the Agreement and related agreements and instruments are hereby ratified, confirmed and approved in all respects.

Section 4.2. Each reference in the Agreement to “this Agreement,” “hereunder,” “hereof,” or words of similar import in instruments or documents provided for in the Agreement or delivered or to be delivered thereunder or in connection therewith, shall, except where the context otherwise requires, be deemed a reference to the Agreement, as amended hereby.

Section 4.3. The descriptive headings of the various Sections or parts of this Amendment are for convenience only and shall not affect the meaning or construction of any of the provisions hereof.

Section 4.4. This Amendment shall be construed and enforced in accordance with, and the rights of the parties shall be governed by, the law of the State of New York excluding choice-of-law principles of the law of such State that would permit the application of the laws of a jurisdiction other than such State.

Section 4.5. This Amendment is expressly subject to Section 22.8 (Jurisdiction and Process; Waiver of Jury Trial) of the Agreement, which Section is incorporated herein and made applicable hereto by this reference.

Section 4.6. All warranties, representations, and covenants made by the Company herein will be considered to have been relied upon by the Noteholders and will survive the execution and delivery of this Amendment.

Section 4.7. This Amendment will inure to the benefit of and be binding upon the successors and assigns of each of the parties. The provisions of this Amendment for the benefit of the Noteholders are intended in all cases, whether explicitly so stated or not, to be for the benefit of all holders, from time to time, of the Notes, and will be enforceable by any such holder, whether or not an express assignment to such holder of rights under this Amendment has been made by such Noteholder or its successors or assigns.

Section 4.8. This Amendment may be executed in any number of counterparts, each of which shall be deemed to be an original and all of which, taken together, shall constitute but one and the same Amendment. Delivery of an executed counterpart of this Amendment by facsimile or email shall be as effective as delivery of a manually executed counterpart of this Amendment.

[REMAINDER OF PAGE INTENTIONALLY BLANK]

The execution hereof by the holders shall constitute a contract among the Company and the holders for the uses and purposes hereinabove set forth. This Amendment may be executed in any number of counterparts, each executed counterpart constituting an original but all together only one agreement.

WATERS CORPORATION

By: ______________________________

Name: John E. Lynch
Title: Vice President, Corporate Treasurer

This foregoing Amendment is hereby accepted and agreed to as of the date aforesaid. The execution by each holder listed below shall constitute its respective several and not joint confirmation that it is the owner and holder of the Notes set opposite its name on Schedule I hereto.

HARTFORD LIFE AND ACCIDENT INSURANCE COMPANY

By: Hartford Investment Management Company
Their Agent and Attorney-in-Fact

By: ______________________________
Name: Dawn M. Crunden
Title: Senior Vice President

THE NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY

By: Northwestern Mutual Investment Management Company, LLC, its investment adviser

By: ________________________________
Name: Brian P. McDonald
Title: Managing Director

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY

By: Barings LLC as its Investment Adviser

By: ______________________________
Name: Steven J. Katz
Title: Managing Director & Senior Counsel

C.M. LIFE INSURANCE COMPANY

By: Barings LLC as its Investment Adviser

By: ______________________________
Name: Steven J. Katz
Title: Managing Director & Senior Counsel

MASSMUTUAL ASIA LIMITED

By: Barings LLC as its Investment Adviser

By: ______________________________
Name: Steven J. Katz
Title: Managing Director & Senior Counsel

NEW YORK LIFE INSURANCE COMPANY

By: ______________________________
Name: Clara Fagan
Title: Corporate Vice President

NEW YORK LIFE INSURANCE AND ANNUITY CORPORATION

By New York Life Investment Management LLC, its Investment Manager

By: ______________________________
Name: Clara Fagan
Title: Director

JACKSON NATIONAL LIFE INSURANCE COMPANY

By: PPM America, Inc., as attorney in fact,
on behalf of Jackson National Life Insurance Company

By: ______________________________
Name: Elena S. Unger
Title: Vice President

CONNECTICUT GENERAL LIFE INSURANCE COMPANY

By: CIGNA Investments, Inc. (authorized agent)

By: ______________________________
Name: Christopher D. Potter
Title: Managing Director

LIFE INSURANCE COMPANY OF NORTH AMERICA

By: CIGNA Investments, Inc. (authorized agent)

By: ______________________________
Name: Christopher D. Potter
Title: Managing Director

UNITED OF OMAHA LIFE INSURANCE COMPANY

By: ______________________________
Name: Justin P. Kavan
Title: Senior Vice President

THRIVENT FINANCIAL FOR LUTHERANS

By: ________________________________
Name: William Hochmuth
Title: Managing Director

AMERICAN UNITED LIFE INSURANCE COMPANY

By: ______________________________
Name: Mike Bullock
Title: Vice President, Private Placements

THE STATE LIFE INSURANCE COMPANY

By: American United Life Insurance Company
Its: Agent

By: ______________________________
Name: Mike Bullock
Title: Vice President, Private Placements

PIONEER MUTUAL LIFE INSURANCE COMPANY

By: American United Life Insurance Company
Its: Agent

By: ______________________________
Name: Mike Bullock
Title: Vice President, Private Placements

CMFG LIFE INSURANCE COMPANY (F/K/A CUNA MUTUAL INSURANCE SOCIETY)

By: MEMBERS Capital Advisors, Inc., acting as Investment Advisor:

By: ______________________________

Name: Anne M. Finucane
Title: Managing Director, Investments

AMERITAS LIFE INSURANCE CORP.
AMERITAS LIFE INSURANCE CORP., SUCCESSOR BY MERGER TO THE UNION CENTRAL LIFE INSURANCE COMPANY
AMERITAS LIFE INSURANCE CORP., SUCCESSOR BY MERGER TO ACACIA LIFE INSURANCE COMPANY
AMERITAS LIFE INSURANCE CORP. OF NEW YORK

By: Ameritas Investment Partners Inc., as Agent

By: ______________________________
Tina Udell, VP & Managing Director

SOUTHERN FARM BUREAU LIFE INSURANCE COMPANY

By: ______________________________
Name: David Divine
Title: Portfolio Manager

THE LINCOLN NATIONAL LIFE INSURANCE COMPANY

By: Macquarie Investment Management Advisers, a series of Macquarie Investment Management Business Trust, Attorney-In-Fact

By: ____________________
Name: Jamie Chiarieri
Title: Vice President

PRIVATE PLACEMENT NOTE PAYMENT GRID

$100,000,000 5.00% SENIOR GUARANTEED NOTES, SERIES B, DUE FEBRUARY 1, 2020

NOTEHOLDER	OUTSTANDING PRINCIPAL BALANCE
The Northwestern Mutual Life Insurance Company	$24,000,000
Mass Mutual Life Insurance Company	$ 1,800,000
Mass Mutual Life Insurance Company	$ 1,200,000
Mass Mutual Life Insurance Company	$ 2,250,000
Mass Mutual Life Insurance Company	$ 850,000
Mass Mutual Life Insurance Company	$ 700,000
C.M. Life Insurance Company	$ 600,000
MassMutual Asia Limited	$ 600,000
The Lincoln National Life Insurance Company	$ 8,000,000
New York Life Insurance and Annuity Corporation	$ 4,000,000
New York Life Insurance Company	$ 1,500,000
Jackson National Life	$14,000,000
Connecticut General Life Insurance Company	$ 1,000,000
Life Insurance Company of North America	$ 3,000,000
Life Insurance Company of North America	$ 1,000,000

Connecticut General Life Insurance Company	$	1,000,000
Connecticut General Life Insurance Company	$	1,000,000
Connecticut General Life Insurance Company	$	2,000,000
Connecticut General Life Insurance Company	$	1,000,000
Connecticut General Life Insurance Company	$	1,000,000
United of Omaha Life Insurance Company	$	9,000,000
Thrivent Financial for Lutherans	$	6,000,000
CMFG Life Insurance Company (f/k/a Cuna Mutual Insurance Society)	$	5,000,000
Ameritas Life Insurance Corp., successor by merger to The Union Central Life Insurance Company	$	2,000,000
Ameritas Life Insurance Corp.	$	1,000,000
Ameritas Life Insurance Corp., successor by merger to Acacia Life Insurance Company	$	1,000,000
Ameritas Life Insurance Corp. of New York	$	1,000,000
Hartford Life and Accident Insurance Company	$	500,000
Southern Farm Bureau Life Insurance Company	$	4,000,000
		100,000,000

EXHIBIT 10.39

EXECUTION VERSION

WATERS CORPORATION

FIRST AMENDMENT TO NOTE PURCHASE AGREEMENT

RE:

Note Purchase Agreement Dated as of March 15, 2011

and

$50,000,000 3.97% Senior Guaranteed Notes, Series E, due March 15, 2021

DATED AS OF FEBRUARY 12, 2019

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(Not a part of this First Amendment to Note Purchase Agreement)

WATERS CORPORATION
34 MAPLE STREET
MILFORD, MA 01757

FIRST AMENDMENT TO NOTE PURCHASE AGREEMENT

RE: Note Purchase Agreement dated as of March 15, 2011
and
$50,000,000 3.97% Senior Guaranteed Notes, Series E, due March 15, 2021

Dated as of February 12, 2019

To each of the holders (the "*Noteholders*")
listed in Schedule I to this First
Amendment to Note Purchase Agreement

Ladies and Gentlemen:

Reference is made to (i) the Note Purchase Agreement dated as of March 15, 2011, by and among Waters Corporation, a Delaware corporation (the *"Company"*), and each of you (the *"Agreement"*) and (ii) the $50,000,000 aggregate principal amount of 3.97% Senior Guaranteed Notes, Series E, due March 15, 2021 of the Company of which $50,000,000 is currently outstanding (the *"Notes"*). Capitalized terms used in this First Amendment to Note Purchase Agreement (this *"Amendment"*) without definition shall have the meanings given such terms in the Agreement.

For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Company requests the amendment of certain provisions of the Agreement as hereinafter provided.

Upon your acceptance hereof in the manner hereinafter provided and upon satisfaction of all conditions to the effectiveness hereof and receipt by the Company of similar acceptances from the Noteholders, this Amendment shall be effective, but only in the respects hereinafter set forth:

SECTION 1. AMENDMENTS TO AGREEMENT.

Section 1.1. Leverage Ratio. Section 10.9 of the Agreement is hereby amended and restated in its entirety to read as follows:

Section 10.9. Leverage Ratio.

(a) The Company will not permit the Leverage Ratio as of the end of any fiscal quarter to exceed 3.50:1.00; provided that, following the completion of a Material Acquisition that, on a pro forma basis, giving effect to any related incurrence or repayment of Debt, would result in an increase in the Company's Leverage Ratio, if the Company shall so elect by a notice delivered to the holders of Notes as of the last day of the fiscal quarter the Material Acquisition was consummated (a "**Leverage Ratio Increase Election**"), such maximum Leverage Ratio shall be increased to 4.00:1.00 at the end of and for the fiscal quarter during which such Material Acquisition shall have been consummated and at the end of and for each of the following three consecutive fiscal quarters (the period during which any such increase in the Leverage Ratio shall be in effect being called a "**Leverage Ratio Increase Period**"), and in which event, the Company shall be obligated to pay the Incremental Interest Payment provided for in Section 10.9(c). The Company may terminate any Leverage Ratio Increase Period by a notice delivered to the holders of Notes, whereupon, on the last day of the fiscal quarter during which such notice is given and on the last day of each fiscal quarter thereafter until another Leverage Ratio Increase Period has commenced as provided in this Section, the maximum Leverage Ratio shall be 3.50:1.00. If a Leverage Ratio Increase Election shall have been made under this Section, the Company may not make another Leverage Ratio Increase Election unless, following the termination or expiration of the most recent prior Leverage Ratio Increase Period, the Leverage Ratio as of the last day of at least two consecutive full fiscal quarters of the Company shall not have exceeded 3.50:1.00. Notwithstanding the foregoing, the Company shall not be permitted to make more than two Leverage Ratio Increase Elections during the term of this Agreement.

(b) If the Leverage Ratio exceeds 3.50 to 1.00 as permitted by Section 10.9(a), as evidenced by an Officer's Certificate delivered pursuant to Section 7.2(a), the interest rate payable on the Notes shall be increased by 0.50% (the "**Incremental Interest**"). Such Incremental Interest shall begin to accrue on the first day of the fiscal quarter following the fiscal quarter in respect of which such Officer's Certificate was delivered, and shall continue to accrue until the Company has provided an Officer's Certificate pursuant to Section 7.2(a) demonstrating that, as of the last day of the fiscal quarter in respect of which such Officer's Certificate is delivered, the Leverage Ratio is not more than 3.50 to 1.00. In the event such Officer's Certificate evidencing that the Leverage Ratio is not more than 3.50 to 1.00 is delivered, the Incremental Interest shall cease to accrue on the last day of the fiscal quarter in respect of which such Officer's Certificate is delivered.

(c) Within 10 Business Days of the delivery of an Officer's Certificate pursuant to Section 7.2(a) evidencing that the Leverage Ratio exceeds 3.50 to 1.00, the Company shall pay to each holder of a Note the amount attributable to the Incremental Interest (the "**Incremental Interest Payment**") which shall be the product of (i) the aggregate outstanding principal amount of Notes held by such holder (or its predecessor(s) in interest) as of the first day that Incremental Interest begins to accrue, (ii) 0.50% (to reflect the Incremental Interest) and (iii) 0.25% (to reflect that the Incremental Interest is payable quarterly). The Incremental Interest Payment, if any, shall be paid quarterly by wire transfer of immediately available funds to each holder of the Notes in accordance with the terms of this Agreement.

Section 1.2. Accounting Terms. Section 22.3 of the Agreement is hereby amended by adding clause (c) to read as follows:

(c) Without limiting the foregoing, leases shall continue to be classified and accounted for on a basis consistent with that reflected in the financial statements of the Company and its consolidated Subsidiaries for the fiscal year ended December 31, 2015 for all purposes of this Agreement, notwithstanding any change in GAAP relating thereto, unless the parties hereto shall enter into a mutually acceptable amendment addressing such changes, as provided for above. For the avoidance of doubt, the Company shall include relevant reconciliations in reasonable detail between GAAP in place at the applicable time to GAAP in place (related to such treatment of leases) for the fiscal year ended December 31, 2015 with respect to the applicable covenant compliance calculations contained in each certificate of Senior Financial Officer delivered pursuant to Section 7.2(a) during such period. Notwithstanding the foregoing, in the event that the Primary Credit Agreement is amended or modified with the effect that any provision (including but not limited to the leverage covenant contained therein) shall include a lease of property of a Person as lessee as debt for purposes of such provision (notwithstanding that such lease would not have been included as debt under GAAP as in effect on December 31, 2015), then such lease shall be included as a Capital Lease under this Agreement.

Section 1.3. Release of Guarantors. Section 22.9 of the Agreement is hereby amended and restated in its entirety to read as follows:

Section 22.9. Release of Guarantors. Notwithstanding any contrary provision herein or in the Notes or in any Guarantee Agreement, if the Company shall request the release under a Guarantee Agreement (x) of any Subsidiary to be sold or otherwise disposed of (including through the sale or disposition of any Subsidiary owning such Subsidiary) to a Person other than the Company or a Subsidiary in a transaction permitted under the terms of this Agreement or (y) of any Subsidiary because such Subsidiary has become an Excluded Subsidiary, and, in other case, shall deliver to the holders of the Notes a certificate of a Responsible Officer to the effect that (i) such sale, other disposition or such designation of such Subsidiary as an Excluded Subsidiary will comply with the terms of this Agreement, (ii) such Subsidiary shall not be a guarantor or obligor under a Primary Credit Agreement or any note purchase agreement of the Company from time to time ("**Note Purchase Agreement**" together with the Primary Credit Agreement, the "**Material Agreements**"), and (iii) (A) if such Subsidiary Guarantor is a guarantor or is otherwise liable for or in respect of any Material Agreement, then such Subsidiary Guarantor has been released and discharged (or will be released and discharged concurrently with the release of such Subsidiary Guarantor under its Subsidiary Guaranty) under the Material Agreements, (B) at the time of, and after giving effect to, such release and discharge, no Default or Event of Default shall be existing, (C) no amount is then due and payable under such Subsidiary Guaranty and (D) if in connection with such Subsidiary Guarantor being released and discharged under any Material Agreement any fee or other form of consideration is given to any holder of Indebtedness under such Material Agreement for such release, the holders of the Notes shall receive equivalent consideration substantially concurrently therewith. In the event of any such release, for purposes of Section 10.6, all Indebtedness of such Subsidiary shall be deemed to have been incurred concurrently with such release.

Section 1.4. Amendment to Defined Terms. Schedule B of the Agreement is hereby amended by added the following defined terms in alphabetic order to read as follows:

"**CFC**" means a controlled foreign corporation within the meaning of Section 957 of the Code.

"**CFC Holdco**" means a Subsidiary that has no material assets other than equity interests in one or more CFCs.

Section 1.5. Amendment to Defined Terms. The following definitions set forth in Schedule B of the Agreement are hereby amended by amending and restating in their entirety to read as follows:

"Excluded Subsidiary" means at any time (a) any Foreign Subsidiary, (b) any subsidiary of a Foreign Subsidiary (c) any Domestic Subsidiary that is a disregarded entity for United States Federal income tax purposes substantially all of the assets of which consist of equity interests in one or more Foreign Subsidiaries, (d) any Subsidiary that is prohibited or restricted by applicable law from providing a Guaranty or if such Guaranty would require governmental (including regulatory) consent, approval, license or authorization, (e) any special purpose securitization vehicle (or similar entity), (f) any Subsidiary that is not-for-profit organization, (g) any other Subsidiary with respect to which, in the reasonable judgment of the Required Holders (confirmed in writing by notice to the Company), the cost or other consequences (including adverse tax consequences) of providing the Guarantee Agreement shall be excessive in view of the benefits to be obtained by the holders of Notes therefrom, (h) any other Subsidiaries acquired or organized after the date of Closing that, together with their own subsidiaries on a combined consolidated basis, shall not, individually or in the aggregate for all such Subsidiaries under this clause (h), have accounted for more than 5% of Consolidated Total Assets or more than 5% of the consolidated total revenues of the Company and the Subsidiaries at the end of, or for the period of four fiscal quarters ended with, the most recent fiscal quarter of the Company for which financial statements shall have been delivered pursuant to Section 7.1(a) or (b) (or, prior to the delivery of any such financial statements, at the end of or for the period of four fiscal quarters ended March 31, 2016), and (i) any CFC Holdco.

"Guarantee Requirement" means, at any time, that the Guarantee Agreement (or a supplement referred to in Section 16 thereof) shall have been executed by each Subsidiary (other than any Excluded Subsidiary) existing at such time, shall have been delivered to the holders of the Notes and shall be in full force and effect; *provided, however,* that (a) in the case of a Subsidiary that becomes subject to the Guarantee Requirement after the date of Closing, the Guarantee Requirement shall be satisfied with respect to such Subsidiary if a supplement to the Guarantee Agreement is executed by such Subsidiary, delivered to the holders of the Notes and in full force and effect no later than (i) 30 days after the date on which such Subsidiary becomes subject to the Guarantee Requirement (or such later date as is permitted in the Primary Credit Agreement except that such later date shall in no event be more than 60 days after the date on which such Subsidiary becomes subject to the Guarantee Requirement) or (ii) such other date as the Required Holders may reasonably determine, but in any case no later than 60 days after the date on which such Subsidiary becomes subject to the Guarantee Requirement and (b) a Guarantor shall automatically be released from its obligations under the Guarantee Agreement (including any supplement referred to in Section 16 thereof) and no longer be subject to the Guarantee Requirement in the event that the Company complies with the requirements of Section 22.9 and delivers a written notice to the holders of the Notes certifying that such Guarantor is an Excluded Subsidiary.

"Guarantors" means each Person listed on Schedule C and each other Person that becomes party to a Guarantee Agreement as a Guarantor, and the permitted successors and assigns of each such Person; provided, however, that a Guarantor shall cease to be a Guarantor in the event such Person is released from its obligations under the Guarantee Agreement (including any supplement referred to in Section 16 thereof) as provided in clause (b) of the proviso of the definition of "Guarantee Requirement" or as provided in Section 6 of the Guarantee Agreement.

"Material Acquisition" means (a) the acquisition by the Company or a Subsidiary of assets of or an interest in another Person or (b) the merger or consolidation of the Company with another corporation; provided that, in each case, the aggregate consideration therefor involves cash in the amount of $400,000,000 or more.

SECTION 2. CONDITIONS PRECEDENT.

This Amendment shall not become effective until, and shall become effective on, the Business Day when each of the following conditions shall have been satisfied (the "*Effective Date*"):

(a) Each Noteholder shall have received this Amendment, duly executed by the Company.

(b) The Required Holders shall have consented to this Amendment as evidenced by their execution thereof.

(c) The representations and warranties of the Company set forth in Section 3 hereof shall be true and correct as of the date of the execution and delivery of this Amendment and as of the Effective Date.

(d) Any consents or approvals from any holder or holders of any outstanding security or indebtedness of the Company and any amendments of agreements pursuant to which any securities or indebtedness may have been issued which shall be necessary to permit the consummation of the transactions contemplated hereby shall have been obtained and all such consents or amendments shall be reasonably satisfactory in form and substance to the Required Holders and their special counsel.

(e) All corporate and other proceedings in connection with the transactions contemplated by this Amendment and all documents and instruments incident to such transactions shall be satisfactory to the Required Holders and their special counsel, and the Required Holders and their special counsel shall have received all such counterpart originals or certified or other copies of such documents as the Required Holders or such special counsel may reasonably request.

(f) The Company shall have paid the fees, charges and disbursements of the Noteholders' special counsel, Chapman and Cutler LLP, which fees, charges and disbursements are reflected in a statement of such special counsel delivered to the Company at the time of the execution and delivery of this Amendment.

(g) Simultaneous with the execution of this Amendment, the Company shall have enter into (i) that certain First Amendment to Note Purchase Agreement dated as of February 1, 2010 ("*2010 NPA Amendment*"), (ii) that certain First Amendment to Note Purchase Agreement dated as of June 30, 2014 ("*2014 NPA Amendment*"), (iii) that certain First Amendment to Note Purchase Agreement dated as of May 12, 2016 ("*2016 NPA Amendment*"; together with this Amendment, the 2010 NPA Amendment and 2014 NPA Amendment, collectively, the "*NPA Amendments*"), and (iv) that certain First Amendment to Credit Agreement dated as of November 30, 2017 among the Company, the lenders party thereto and JPMorgan Chase Bank, N.A., as Administrative Agent (the "*Credit Agreement Amendment*").

(h) each holder of a Note shall have received an amendment fee in an amount equal to 0.05% of the outstanding principal amount of its Notes.

SECTION 3. REPRESENTATIONS AND WARRANTIES.

The Company hereby represents and warrants that as of the date of execution and delivery of this Amendment and as of the Effective Date:

(a) The Company is duly incorporated, validly existing and in good standing under the laws of its jurisdiction of incorporation.

(b) The Company has the corporate power to own its property and to carry on its business as now being conducted.

(c) The Company is duly qualified and in good standing as a foreign corporation authorized to do business in each jurisdiction in which the failure to do so would, individually or in the aggregate, have a Material Adverse Effect.

(d) This Amendment and the Agreement, as amended hereby, and the transactions contemplated hereby are within the corporate powers of the Company, have been duly authorized by all necessary corporate action on the part of the Company, and this Amendment and the Agreement, as amended hereby, have been duly executed and delivered by the Company and constitute legal, valid and binding obligations of the Company enforceable in accordance with their respective terms.

(e) Before and after giving effect to this Amendment, there are no Defaults or Events of Default under the Agreement, as amended hereby.

(f) The execution, delivery and performance of this Amendment and the Agreement, as amended hereby, does not and will not result in a violation of or default under (A) the articles of incorporation or bylaws of the Company, (B) any agreement to which the Company is a party or by which it is bound or to which the Company or any of its properties is subject, (C) any order, writ, injunction or decree binding on the Company, or (D) any statute, regulation, rule or other law applicable to the Company.

(g) No consent, approval or authorization of, or registration, filing or declaration with, any Governmental Authority is required in connection with the execution, delivery or performance by the Company of this Amendment and the Agreement, as amended hereby.

(h) Other than this Amendment, there are no other amendments, modifications, supplements or waivers to the Agreement.

(i) The Noteholders listed on Schedule I to this Amendment are the holders of record of all outstanding Notes issued under the Agreement and set forth opposite their names in such Schedule is the correct outstanding principal amount of the Notes of such Noteholder.

(j) Other than the 0.05% amendment fee provided to the holders of Notes in connection with NPA Amendments, the Company or its affiliates have not paid or agreed to pay any fees or other consideration, or given any additional security or collateral, or shortened the maturity or average life of any indebtedness or permanently reduced any borrowing capacity, in each case, required in connection with the obtaining of any consents or approvals in connection with the transactions contemplated hereby including, in connection with the NPA Amendments or the Credit Agreement Amendment.

SECTION 4. MISCELLANEOUS.

Section 4.1. Except as amended herein, all terms and provisions of the Agreement and related agreements and instruments are hereby ratified, confirmed and approved in all respects.

Section 4.2. Each reference in the Agreement to “this Agreement,” “hereunder,” “hereof,” or words of similar import in instruments or documents provided for in the Agreement or delivered or to be delivered thereunder or in connection therewith, shall, except where the context otherwise requires, be deemed a reference to the Agreement, as amended hereby.

Section 4.3. The descriptive headings of the various Sections or parts of this Amendment are for convenience only and shall not affect the meaning or construction of any of the provisions hereof.

Section 4.4. This Amendment shall be construed and enforced in accordance with, and the rights of the parties shall be governed by, the law of the State of New York excluding choice-of-law principles of the law of such State that would permit the application of the laws of a jurisdiction other than such State.

Section 4.5. This Amendment is expressly subject to Section 22.8 (Jurisdiction and Process; Waiver of Jury Trial) of the Agreement, which Section is incorporated herein and made applicable hereto by this reference.

Section 4.6. All warranties, representations, and covenants made by the Company herein will be considered to have been relied upon by the Noteholders and will survive the execution and delivery of this Amendment.

Section 4.7. This Amendment will inure to the benefit of and be binding upon the successors and assigns of each of the parties. The provisions of this Amendment for the benefit of the Noteholders are intended in all cases, whether explicitly so stated or not, to be for the benefit of all holders, from time to time, of the Notes, and will be enforceable by any such holder, whether or not an express assignment to such holder of rights under this Amendment has been made by such Noteholder or its successors or assigns.

Section 4.8. This Amendment may be executed in any number of counterparts, each of which shall be deemed to be an original and all of which, taken together, shall constitute but one and the same Amendment. Delivery of an executed counterpart of this Amendment by facsimile or email shall be as effective as delivery of a manually executed counterpart of this Amendment.

[REMAINDER OF PAGE INTENTIONALLY BLANK]

The execution hereof by the holders shall constitute a contract among the Company and the holders for the uses and purposes hereinabove set forth. This Amendment may be executed in any number of counterparts, each executed counterpart constituting an original but all together only one agreement.

WATERS CORPORATION

By: ______________________________

Name: John E. Lynch
Title: Vice President, Corporate Treasurer

This foregoing Amendment is hereby accepted and agreed to as of the date aforesaid. The execution by each holder listed below shall constitute its respective several and not joint confirmation that it is the owner and holder of the Notes set opposite its name on Schedule I hereto.

THE NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY

By: Northwestern Mutual Investment
Management Company, LLC,
its investment adviser

By ______________________________
Name: Brian P. McDonald
Title: Managing Director

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY

By: Barings LLC as its Investment Adviser

By: ______________________________
Name: Steven J. Katz
Title: Managing Director & Senior Counsel

THE LINCOLN NATIONAL LIFE INSURANCE COMPANY

By: Macquarie Investment Management Advisers, a series of Macquarie Investment Management Business Trust, Attorney-In-Fact

By: ____________________________________
Name: Jamie Chiarieri
Title: Vice President

JACKSON NATIONAL LIFE INSURANCE COMPANY

By: PPM America, Inc., as attorney in fact, on behalf of
Jackson National Life Insurance Company

By: ______________________________
Name: Elena S. Unger
Title: Vice President

CMFG LIFE INSURANCE COMPANY
(F/K/A CUNA MUTUAL INSURANCE SOCIETY)

By: MEMBERS Capital Advisors, Inc., acting as Investment Advisor:

By: ______________________________
Name: Anne M. Finucane
Title: Managing Director, Investments

AMERITAS LIFE INSURANCE CORP.
AMERITAS LIFE INSURANCE CORP., SUCCESSOR BY MERGER TO THE UNION CENTRAL LIFE INSURANCE COMPANY
AMERITAS LIFE INSURANCE CORP., SUCCESSOR BY MERGER TO ACACIA LIFE INSURANCE COMPANY
AMERITAS LIFE INSURANCE CORP. OF NEW YORK, SUCCESSOR BY MERGER TO FIRST AMERITAS LIFE INSURANCE CORP. OF NEW YORK
AMERITAS LIFE INSURANCE CORP. OF NEW YORK

By: Ameritas Investment Partners Inc., as Agent

By: ______________________________
Tina Udell, VP & Managing Director

PRIVATE PLACEMENT NOTE PAYMENT GRID

$50,000,000 3.97% SENIOR GUARANTEED NOTES, SERIES E, DUE MARCH 15, 2021

NOTEHOLDER	OUTSTANDING PRINCIPAL BALANCE
The Northwestern Mutual Life Insurance Company	$12,000,000
The Lincoln National Life Insurance Company	$11,000,000
Massachusetts Mutual Life Insurance Company	$12,000,000
Jackson National Life Insurance Company	$ 9,000,000
Ameritas Life Insurance Corp.	$ 1,000,000
Ameritas Life Insurance Corp., successor by merger to The Union Central Life Insurance Company	$ 500,000
Ameritas Life Insurance Corp., successor by merger to Acacia Life Insurance Company	$ 750,000
Ameritas Life Insurance Corp. of New York, successor by merger to First Ameritas Life Insurance Corp. of New York	$ 250,000
Ameritas Life Insurance Corp. of New York	$ 500,000
CMFG Life Insurance Company	$ 3,000,000
	50,000,000

SCHEDULE I
(to First Amendment to note Purchase Agreement)

EXHIBIT 10.40

EXECUTION VERSION

WATERS CORPORATION

FIRST AMENDMENT TO NOTE PURCHASE AGREEMENT

RE:

Note Purchase Agreement Dated as of June 30, 2014

and

$100,000,000 3.40% Senior Guaranteed Notes, Series F, due June 30, 2021
$50,000,000 3.92% Senior Guaranteed Notes, Series G, due June 30, 2024
$50,000,000 Floating Rate Senior Guaranteed Notes, Series H, due June 30, 2024

DATED AS OF FEBRUARY 12, 2019

TABLE OF CONTENTS

(Not a part of this First Amendment to Note Purchase Agreement)

WATERS CORPORATION
34 MAPLE STREET
MILFORD, MA 01757

FIRST AMENDMENT TO NOTE PURCHASE AGREEMENT

RE: Note Purchase Agreement dated as of June 30, 2014
and
$100,000,000 3.40% Senior Guaranteed Notes, Series F, due June 30, 2021
$50,000,000 3.92% Senior Guaranteed Notes, Series G, due June 30, 2024
$50,000,000 Floating Rate Senior Guaranteed Notes, Series H, due June 30, 2024

Dated as of February 12, 2019

To each of the holders (the "*Noteholders*")
listed in Schedule I to this First
Amendment to Note Purchase Agreement

Ladies and Gentlemen:

Reference is made to (i) the Note Purchase Agreement dated as of June 30, 2014, by and among Waters Corporation, a Delaware corporation (the *"Company"*), and each of you (the *"Agreement"*), (ii) the $100,000,000 aggregate principal amount of its 3.40% Senior Guaranteed Notes, Series F, due June 30, 2021 of the Company of which $100,000,000 is currently outstanding, (iii) the $50,000,000 aggregate principal amount of its 3.92% Senior Guaranteed Notes, Series G, due June 30, 2024 of the Company of which $50,000,000 is currently outstanding, and (iv) the 50,000,000 aggregate principal amount of its Floating Rate Senior Guaranteed Notes, Series H, due June 30, 2024 of the Company of which $50,000,000 is currently outstanding (collectively, the *"Notes"*). Capitalized terms used in this First Amendment to Note Purchase Agreement (this *"Amendment"*) without definition shall have the meanings given such terms in the Agreement.

For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Company requests the amendment of certain provisions of the Agreement as hereinafter provided.

Upon your acceptance hereof in the manner hereinafter provided and upon satisfaction of all conditions to the effectiveness hereof and receipt by the Company of similar acceptances from the Noteholders, this Amendment shall be effective, but only in the respects hereinafter set forth:

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Section 1.1. Leverage Ratio. Section 10.9 of the Agreement is hereby amended and restated in its entirety to read as follows:

Section 10.9. Leverage Ratio.

(a) The Company will not permit the Leverage Ratio as of the end of any fiscal quarter to exceed 3.50:1.00; provided that, following the completion of a Material Acquisition that, on a pro forma basis, giving effect to any related incurrence or repayment of Debt, would result in an increase in the Company's Leverage Ratio, if the Company shall so elect by a notice delivered to the holders of Notes as of the last day of the fiscal quarter the Material Acquisition was consummated (a "**Leverage Ratio Increase Election**"), such maximum Leverage Ratio shall be increased to 4.00:1.00 at the end of and for the fiscal quarter during which such Material Acquisition shall have been consummated and at the end of and for each of the following three consecutive fiscal quarters (the period during which any such increase in the Leverage Ratio shall be in effect being called a "**Leverage Ratio Increase Period**"), and in which event, the Company shall be obligated to pay the Incremental Interest Payment provided for in Section 10.9(c). The Company may terminate any Leverage Ratio Increase Period by a notice delivered to the holders of Notes, whereupon, on the last day of the fiscal quarter during which such notice is given and on the last day of each fiscal quarter thereafter until another Leverage Ratio Increase Period has commenced as provided in this Section, the maximum Leverage Ratio shall be 3.50:1.00. If a Leverage Ratio Increase Election shall have been made under this Section, the Company may not make another Leverage Ratio Increase Election unless, following the termination or expiration of the most recent prior Leverage Ratio Increase Period, the Leverage Ratio as of the last day of at least two consecutive full fiscal quarters of the Company shall not have exceeded 3.50:1.00. Notwithstanding the foregoing, the Company shall not be permitted to make more than two Leverage Ratio Increase Elections during the term of this Agreement.

(b) If the Leverage Ratio exceeds 3.50 to 1.00 as permitted by Section 10.9(a), as evidenced by an Officer's Certificate delivered pursuant to Section 7.2(a), the interest rate payable on the Notes shall be increased by 0.50% (the "**Incremental Interest**"). Such Incremental Interest shall begin to accrue on the first day of the fiscal quarter following the fiscal quarter in respect of which such Officer's Certificate was delivered, and shall continue to accrue until the Company has provided an Officer's Certificate pursuant to Section 7.2(a) demonstrating that, as of the last day of the fiscal quarter in respect of which such Officer's Certificate is delivered, the Leverage Ratio is not more than 3.50 to 1.00. In the event such Officer's Certificate evidencing that the Leverage Ratio is not more than 3.50 to 1.00 is delivered, the Incremental Interest shall cease to accrue on the last day of the fiscal quarter in respect of which such Officer's Certificate is delivered.

(c) Within 10 Business Days of the delivery of an Officer's Certificate pursuant to Section 7.2(a) evidencing that the Leverage Ratio exceeds 3.50 to 1.00, the Company shall pay to each holder of a Note the amount attributable to the Incremental Interest (the "**Incremental Interest Payment**") which shall be the product of (i) the aggregate outstanding principal amount of Notes held by such holder (or its predecessor(s) in interest) as of the first day that Incremental Interest begins to accrue, (ii) 0.50% (to reflect the Incremental Interest) and (iii) 0.25% (to reflect that the Incremental Interest is payable quarterly). The Incremental Interest Payment, if any, shall be paid quarterly by wire transfer of immediately available funds to each holder of the Notes in accordance with the terms of this Agreement.

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(c) Without limiting the foregoing, leases shall continue to be classified and accounted for on a basis consistent with that reflected in the financial statements of the Company and its consolidated Subsidiaries for the fiscal year ended December 31, 2015 for all purposes of this Agreement, notwithstanding any change in GAAP relating thereto, unless the parties hereto shall enter into a mutually acceptable amendment addressing such changes, as provided for above. For the avoidance of doubt, the Company shall include relevant reconciliations in reasonable detail between GAAP in place at the applicable time to GAAP in place (related to such treatment of leases) for the fiscal year ended December 31, 2015 with respect to the applicable covenant compliance calculations contained in each certificate of Senior Financial Officer delivered pursuant to Section 7.2(a) during such period. Notwithstanding the foregoing, in the event that the Primary Credit Agreement is amended or modified with the effect that any provision (including but not limited to the leverage covenant contained therein) shall include a lease of property of a Person as lessee as debt for purposes of such provision (notwithstanding that such lease would not have been included as debt under GAAP as in effect on December 31, 2015), then such lease shall be included as a Capital Lease under this Agreement.

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Section 22.9. Release of Guarantors. Notwithstanding any contrary provision herein or in the Notes or in any Guarantee Agreement, if the Company shall request the release under a Guarantee Agreement (x) of any Subsidiary to be sold or otherwise disposed of (including through the sale or disposition of any Subsidiary owning such Subsidiary) to a Person other than the Company or a Subsidiary in a transaction permitted under the terms of this Agreement or (y) of any Subsidiary because such Subsidiary has become an Excluded Subsidiary, and, in other case, shall deliver to the holders of the Notes a certificate of a Responsible Officer to the effect that (i) such sale, other disposition or such designation of such Subsidiary as an Excluded Subsidiary will comply with the terms of this Agreement, (ii) such Subsidiary shall not be a guarantor or obligor under a Primary Credit Agreement or any note purchase agreement of the Company from time to time ("**Note Purchase Agreement**" together with the Primary Credit Agreement, the "**Material Agreements**"), and (iii) (A) if such Subsidiary Guarantor is a guarantor or is otherwise liable for or in respect of any Material Agreement, then such Subsidiary Guarantor has been released and discharged (or will be released and discharged concurrently with the release of such Subsidiary Guarantor under its Subsidiary Guaranty) under the Material Agreements, (B) at the time of, and after giving effect to, such release and discharge, no Default or Event of Default shall be existing, (C) no amount is then due and payable under such Subsidiary Guaranty and (D) if in connection with such Subsidiary Guarantor being released and discharged under any Material Agreement any fee or other form of consideration is given to any holder of Indebtedness under such Material Agreement for such release, the holders of the Notes shall receive equivalent consideration substantially concurrently therewith. In the event of any such release, for purposes of Section 10.6, all Indebtedness of such Subsidiary shall be deemed to have been incurred concurrently with such release.

Section 1.4. Amendment to Defined Terms. Schedule B of the Agreement is hereby amended by added the following defined terms in alphabetic order to read as follows:

"**CFC**" means a controlled foreign corporation within the meaning of Section 957 of the Code.

"**CFC Holdco**" means a Subsidiary that has no material assets other than equity interests in one or more CFCs.

Section 1.4. Amendment to Defined Terms. The following definitions set forth in Schedule B of the Agreement are hereby amended by amending and restating in their entirety to read as follows:

"Excluded Subsidiary" means at any time (a) any Foreign Subsidiary, (b) any subsidiary of a Foreign Subsidiary (c) any Domestic Subsidiary that is a disregarded entity for United States Federal income tax purposes substantially all of the assets of which consist of equity interests in one or more Foreign Subsidiaries, (d) any Subsidiary that is prohibited or restricted by applicable law from providing a Guaranty or if such Guaranty would require governmental (including regulatory) consent, approval, license or authorization, (e) any special purpose securitization vehicle (or similar entity), (f) any Subsidiary that is not-for-profit organization, (g) any other Subsidiary with respect to which, in the reasonable judgment of the Required Holders (confirmed in writing by notice to the Company), the cost or other consequences (including adverse tax consequences) of providing the Guarantee Agreement shall be excessive in view of the benefits to be obtained by the holders of Notes therefrom, (h) any other Subsidiaries acquired or organized after the date of Closing that, together with their own subsidiaries on a combined consolidated basis, shall not, individually or in the aggregate for all such Subsidiaries under this clause (h), have accounted for more than 5% of Consolidated Total Assets or more than 5% of the consolidated total revenues of the Company and the Subsidiaries at the end of, or for the period of four fiscal quarters ended with, the most recent fiscal quarter of the Company for which financial statements shall have been delivered pursuant to Section 7.1(a) or (b) (or, prior to the delivery of any such financial statements, at the end of or for the period of four fiscal quarters ended March 31, 2016), and (i) any CFC Holdco.

"Guarantee Requirement" means, at any time, that the Guarantee Agreement (or a supplement referred to in Section 16 thereof) shall have been executed by each Subsidiary (other than any Excluded Subsidiary) existing at such time, shall have been delivered to the holders of the Notes and shall be in full force and effect; *provided, however,* that (a) in the case of a Subsidiary that becomes subject to the Guarantee Requirement after the date of Closing, the Guarantee Requirement shall be satisfied with respect to such Subsidiary if a supplement to the Guarantee Agreement is executed by such Subsidiary, delivered to the holders of the Notes and in full force and effect no later than (i) 30 days after the date on which such Subsidiary becomes subject to the Guarantee Requirement (or such later date as is permitted in the Primary Credit Agreement except that such later date shall in no event be more than 60 days after the date on which such Subsidiary becomes subject to the Guarantee Requirement) or (ii) such other date as the Required Holders may reasonably determine, but in any case no later than 60 days after the date on which such Subsidiary becomes subject to the Guarantee Requirement and (b) a Guarantor shall automatically be released from its obligations under the Guarantee Agreement (including any supplement referred to in Section 16 thereof) and no longer be subject to the Guarantee Requirement in the event that the Company complies with the requirements of Section 22.9 and delivers a written notice to the holders of the Notes certifying that such Guarantor is an Excluded Subsidiary.

"Guarantors" means each Person listed on Schedule C and each other Person that becomes party to a Guarantee Agreement as a Guarantor, and the permitted successors and assigns of each such Person; provided, however, that a Guarantor shall cease to be a Guarantor in the event such Person is released from its obligations under the Guarantee Agreement (including any supplement referred to in Section 16 thereof) as provided in clause (b) of the proviso of the definition of "Guarantee Requirement" or as provided in Section 6 of the Guarantee Agreement.

"Material Acquisition" means (a) the acquisition by the Company or a Subsidiary of assets of or an interest in another Person or (b) the merger or consolidation of the Company with another corporation; provided that, in each case, the aggregate consideration therefor involves cash in the amount of $400,000,000 or more.

SECTION 2. CONDITIONS PRECEDENT.

This Amendment shall not become effective until, and shall become effective on, the Business Day when each of the following conditions shall have been satisfied (the "*Effective Date*"):

(a) Each Noteholder shall have received this Amendment, duly executed by the Company.

(b) The Required Holders shall have consented to this Amendment as evidenced by their execution thereof.

(c) The representations and warranties of the Company set forth in Section 3 hereof shall be true and correct as of the date of the execution and delivery of this Amendment and as of the Effective Date.

(d) Any consents or approvals from any holder or holders of any outstanding security or indebtedness of the Company and any amendments of agreements pursuant to which any securities or indebtedness may have been issued which shall be necessary to permit the consummation of the transactions contemplated hereby shall have been obtained and all such consents or amendments shall be reasonably satisfactory in form and substance to the Required Holders and their special counsel.

(e) All corporate and other proceedings in connection with the transactions contemplated by this Amendment and all documents and instruments incident to such transactions shall be satisfactory to the Required Holders and their special counsel, and the Required Holders and their special counsel shall have received all such counterpart originals or certified or other copies of such documents as the Required Holders or such special counsel may reasonably request.

(f) The Company shall have paid the fees, charges and disbursements of the Noteholders' special counsel, Chapman and Cutler LLP, which fees, charges and disbursements are reflected in a statement of such special counsel delivered to the Company at the time of the execution and delivery of this Amendment.

(g) Simultaneous with the execution of this Amendment, the Company shall have enter into (i) that certain First Amendment to Note Purchase Agreement dated as of February 1, 2010 ("*2010 NPA Amendment*"), (ii) that certain First Amendment to Note Purchase Agreement dated as of March 15, 2011 ("*2011 NPA Amendment*"), (iii) that certain First Amendment to Note Purchase Agreement dated as of May 12, 2016 ("*2016 NPA Amendment*"; together with this Amendment, the 2010 NPA Amendment and 2011 NPA Amendment, collectively, the "*NPA Amendments*"), and (iv) that certain First Amendment to Credit Agreement dated as of November 30, 2017 among the Company, the lenders party thereto and JPMorgan Chase Bank, N.A., as Administrative Agent (the "*Credit Agreement Amendment*").

(h) each holder of a Note shall have received an amendment fee in an amount equal to 0.05% of the outstanding principal amount of its Notes.

SECTION 3. REPRESENTATIONS AND WARRANTIES.

The Company hereby represents and warrants that as of the date of execution and delivery of this Amendment and as of the Effective Date:

(a) The Company is duly incorporated, validly existing and in good standing under the laws of its jurisdiction of incorporation.

(b) The Company has the corporate power to own its property and to carry on its business as now being conducted.

(c) The Company is duly qualified and in good standing as a foreign corporation authorized to do business in each jurisdiction in which the failure to do so would, individually or in the aggregate, have a Material Adverse Effect.

(d) This Amendment and the Agreement, as amended hereby, and the transactions contemplated hereby are within the corporate powers of the Company, have been duly authorized by all necessary corporate action on the part of the Company, and this Amendment and the Agreement, as amended hereby, have been duly executed and delivered by the Company and constitute legal, valid and binding obligations of the Company enforceable in accordance with their respective terms.

(e) Before and after giving effect to this Amendment, there are no Defaults or Events of Default under the Agreement, as amended hereby.

(f) The execution, delivery and performance of this Amendment and the Agreement, as amended hereby, does not and will not result in a violation of or default under (A) the articles of incorporation or bylaws of the Company, (B) any agreement to which the Company is a party or by which it is bound or to which the Company or any of its properties is subject, (C) any order, writ, injunction or decree binding on the Company, or (D) any statute, regulation, rule or other law applicable to the Company.

(g) No consent, approval or authorization of, or registration, filing or declaration with, any Governmental Authority is required in connection with the execution, delivery or performance by the Company of this Amendment and the Agreement, as amended hereby.

(h) Other than this Amendment, there are no other amendments, modifications, supplements or waivers to the Agreement.

(i) The Noteholders listed on Schedule I to this Amendment are the holders of record of all outstanding Notes issued under the Agreement and set forth opposite their names in such Schedule is the correct outstanding principal amount of the Notes of such Noteholder.

(j) Other than the 0.05% amendment fee provided to the holders of Notes in connection with NPA Amendments, the Company or its affiliates have not paid or agreed to pay any fees or other consideration, or given any additional security or collateral, or shortened the maturity or average life of any indebtedness or permanently reduced any borrowing capacity, in each case, required in connection with the obtaining of any consents or approvals in connection with the transactions contemplated hereby including, in connection with the NPA Amendments or the Credit Agreement Amendment.

SECTION 4. MISCELLANEOUS.

Section 4.1. Except as amended herein, all terms and provisions of the Agreement and related agreements and instruments are hereby ratified, confirmed and approved in all respects.

Section 4.2. Each reference in the Agreement to “this Agreement,” “hereunder,” “hereof,” or words of similar import in instruments or documents provided for in the Agreement or delivered or to be delivered thereunder or in connection therewith, shall, except where the context otherwise requires, be deemed a reference to the Agreement, as amended hereby.

Section 4.3. The descriptive headings of the various Sections or parts of this Amendment are for convenience only and shall not affect the meaning or construction of any of the provisions hereof.

Section 4.4. This Amendment shall be construed and enforced in accordance with, and the rights of the parties shall be governed by, the law of the State of New York excluding choice-of-law principles of the law of such State that would permit the application of the laws of a jurisdiction other than such State.

Section 4.5. This Amendment is expressly subject to Section 22.8 (Jurisdiction and Process; Waiver of Jury Trial) of the Agreement, which Section is incorporated herein and made applicable hereto by this reference.

Section 4.6. All warranties, representations, and covenants made by the Company herein will be considered to have been relied upon by the Noteholders and will survive the execution and delivery of this Amendment.

Section 4.7. This Amendment will inure to the benefit of and be binding upon the successors and assigns of each of the parties. The provisions of this Amendment for the benefit of the Noteholders are intended in all cases, whether explicitly so stated or not, to be for the benefit of all holders, from time to time, of the Notes, and will be enforceable by any such holder, whether or not an express assignment to such holder of rights under this Amendment has been made by such Noteholder or its successors or assigns.

Section 4.8. This Amendment may be executed in any number of counterparts, each of which shall be deemed to be an original and all of which, taken together, shall constitute but one and the same Amendment. Delivery of an executed counterpart of this Amendment by facsimile or email shall be as effective as delivery of a manually executed counterpart of this Amendment.

[REMAINDER OF PAGE INTENTIONALLY BLANK]

The execution hereof by the holders shall constitute a contract among the Company and the holders for the uses and purposes hereinabove set forth. This Amendment may be executed in any number of counterparts, each executed counterpart constituting an original but all together only one agreement.

WATERS CORPORATION

By; ______________________________

Name: John E. Lynch
Title: Vice President, Corporate Treasurer

This foregoing Amendment is hereby accepted and agreed to as of the date aforesaid. The execution by each holder listed below shall constitute its respective several and not joint confirmation that it is the owner and holder of the Notes set opposite its name on Schedule I hereto.

NEW YORK LIFE INSURANCE COMPANY

By ______________________________

Name: Clara Fagan
Title: Corporate Vice President

NEW YORK LIFE INSURANCE AND ANNUITY CORPORATION

By: NYL Investors LLC, Its Investment Manager

By ______________________________

Name: Clara Fagan
Title: Director

NEW YORK LIFE INSURANCE AND ANNUITY CORPORATION INSTITUTIONALLY OWNED LIFE INSURANCE SEPARATE ACCOUNT (BOLI 30C)

By: NYL Investors LLC, Its Investment Manager

By ______________________________

Name: Clara Fagan
Title: Director

NEW YORK LIFE INSURANCE AND ANNUITY CORPORATION INSTITUTIONALLY OWNED LIFE INSURANCE SEPARATE ACCOUNT (BOLI 3-2)

By: NYL Investors LLC, Its Investment Manager

By ______________________________

Name:

Title:

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY

By: Barings LLC as its Investment Adviser

By ______________________________
Name: Steven J. Katz
Title: Managing Director & Senior Counsel

BANNER LIFE INSURANCE COMPANY
By: Barings LLC as its Investment Adviser

By ______________________________
Name: Steven J. Katz
Title: Managing Director & Senior Counsel

MASSMUTUAL ASIA LIMITED
By: Barings LLC as its Investment Adviser

By ______________________________
Name: Steven J. Katz
Title: Managing Director & Senior Counsel

THE PRUDENTIAL INSURANCE COMPANY OF AMERICA

By ________________________________
Name: Engin Okaya
Title: Vice President

THE GIBRALTAR LIFE INSURANCE CO., LTD.

By: Prudential Investment Management Japan Co., Ltd., as Investment Manager

By: PGIM, Inc. as Sub-Adviser

By: ________________________________
Name: Engin Okaya
Title: Vice President

PICA HARTFORD LIFE & ANNUITY COMFORT TRUST

By: The Prudential Insurance Company of America, as Grantor

By: ________________________________
Name: Engin Okaya
Title: Vice President

PICA HARTFORD LIFE INSURANCE COMFORT TRUST

By: The Prudential Insurance Company of America, as Grantor

By: ________________________________
Name: Engin Okaya
Title: Vice President

ZURICH AMERICAN INSURANCE COMPANY

By: Prudential Private Placement Investors, L.P. (as Investment Advisor)

By: Prudential Private Placement Investors, Inc. (as its General Partner)

By: ______________________________
Name: Engin Okaya
Title: Vice President

BCBSM, INC. DBA BLUE CROSS AND BLUE SHIELD OF MINNESOTA

By: Prudential Private Placement Investors, L.P. (as Investment Advisor)

By: Prudential Private Placement Investors, Inc. (as its General Partner)

By: ______________________________
Name: Engin Okaya
Title: Vice President

PHYSICIANS MUTUAL INSURANCE COMPANY

By: Prudential Private Placement Investors, L.P. (as Investment Advisor)

By: Prudential Private Placement Investors, Inc. (as its General Partner)

By: ______________________________
Name: Engin Okaya
Title: Vice President

THE NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY

By: Northwestern Mutual Investment Management Company, LLC, its investment adviser

By ______________________________

Name: Brian P. McDonald

Title: Managing Director

THRIVENT FINANCIAL FOR LUTHERANS

By ____

Name: William Hochmuth
Title: Managing Director

PRIVATE PLACEMENT NOTE PAYMENT GRID

$100,000,000 3.40% SENIOR GUARANTEED NOTES, SERIES F, DUE JUNE 30, 2021

NOTEHOLDER	OUTSTANDING PRINCIPAL BALANCE
Thrivent Financial for Lutherans	$ 30,000,000
The Northwestern Mutual Life Insurance Company	$ 30,000,000
The Prudential Insurance Company of America	$ 9,500,000
The Gibraltar Life Insurance Co., Ltd.	$ 10,000,000
PICA Hartford Life & Annuity Comfort Trust	$ 6,600,000
PICA Hartford Life Insurance Comfort Trust	$ 3,400,000
Zurich American Insurance Company	$ 7,550,000
BCBSM, Inc. DBA Blue Cross and Blue Shield of Minnesota	$ 1,200,000
Physicians Mutual Insurance Company	$ 1,750,000
	100,000,000

SCHEDULE I
(to First Amendment to Note Purchase Agreement)

$50,000,000 3.92% Senior Guaranteed Notes, Series G, due June 30, 2024

Noteholder	Outstanding Principal Balance
The Northwestern Mutual Life Insurance Company	$10,000,000
New York Life Insurance Company	$ 4,100,000
New York Life Insurance and Annuity Corporation	$ 5,300,000
New York Life Insurance and Annuity Corporation Institutionally Owned Life Insurance Separate Account (BOLI 30C)	$ 500,000
New York Life Insurance and Annuity Corporation Institutionally Owned Life Insurance Separate Account (BOLI 3-2)	$ 100,000
Massachusetts Mutual Life Insurance Company	$26,000,000
Massachusetts Mutual Life Insurance Company	$ 700,000
Banner Life Insurance Company	$ 1,500,000
MassMutual Asia Limited	$ 1,800,000
	50,000,000

$50,000,000 FLOATING RATE SENIOR GUARANTEED NOTES, SERIES H, DUE JUNE 30, 2024

NOTEHOLDER	OUTSTANDING PRINCIPAL BALANCE
New York Life Insurance Company	$18,000,000
New York Life Insurance and Annuity Corporation	$22,000,000
Massachusetts Mutual Life Insurance Company	$ 9,100,000
MassMutual Asia Limited	$ 900,00
	50,000,000

EXHIBIT 10.41

EXECUTION VERSION

WATERS CORPORATION

FIRST AMENDMENT TO NOTE PURCHASE AGREEMENT

RE:

Note Purchase Agreement Dated as of May 12, 2016

and

$50,000,000 3.13% Senior Guaranteed Notes, Series I, due May 12, 2023
$160,000,000 3.44% Senior Guaranteed Notes, Series K due May 12, 2026

DATED AS OF FEBRUARY 12, 2019

TABLE OF CONTENTS

(Not a part of this First Amendment to Note Purchase Agreement)

WATERS CORPORATION
34 MAPLE STREET
MILFORD, MA 01757

FIRST AMENDMENT TO NOTE PURCHASE AGREEMENT

RE: Note Purchase Agreement dated as of May 12, 2016
and
$50,000,000 3.13% Senior Guaranteed Notes, Series I, due May 12, 2023
$160,000,000 3.44% Senior Guaranteed Notes, Series K due May 12, 2026

Dated as of February 12, 2019

To each of the holders (the "*Noteholders*")
listed in Schedule I to this First
Amendment to Note Purchase Agreement

Ladies and Gentlemen:

Reference is made to (i) the Note Purchase Agreement dated as of February 1, 2010, by and among Waters Corporation, a Delaware corporation (the *"Company"*), and each of you (the *"Agreement"*), (ii) the $50,000,000 aggregate principal amount of 3.13% Series I Senior Guaranteed Notes due May 12, 2023 of the Company of which $50,000,000 is currently outstanding and (iii) the $160,000,000 aggregate principal amount of 3.44% Series K Senior Guaranteed Notes due May 12, 2026 of the Company of which $160,000,000 is currently outstanding (collectively, the *"Notes"*). Capitalized terms used in this First Amendment to Note Purchase Agreement (this *"Amendment"*) without definition shall have the meanings given such terms in the Agreement.

For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Company requests the amendment of certain provisions of the Agreement as hereinafter provided.

Upon your acceptance hereof in the manner hereinafter provided and upon satisfaction of all conditions to the effectiveness hereof and receipt by the Company of similar acceptances from the Noteholders, this Amendment shall be effective, but only in the respects hereinafter set forth:

SECTION 1. AMENDMENTS TO AGREEMENT.

Section 1.1. Leverage Ratio. Section 10.9 of the Agreement is hereby amended and restated in its entirety to read as follows:

Section 10.9. Leverage Ratio.

(a) The Company will not permit the Leverage Ratio as of the end of any fiscal quarter to exceed 3.50:1.00; provided that, following the completion of a Material Acquisition that, on a pro forma basis, giving effect to any related incurrence or repayment of Debt, would result in an increase in the Company's Leverage Ratio, if the Company shall so elect by a notice delivered to the holders of Notes as of the last day of the fiscal quarter the Material Acquisition was consummated (a "Leverage Ratio Increase Election"), such maximum Leverage Ratio shall be increased to 4.00:1.00 at the end of and for the fiscal quarter during which such Material Acquisition shall have been consummated and at the end of and for each of the following three consecutive fiscal quarters (the period during which any such increase in the Leverage Ratio shall be in effect being called a "Leverage Ratio Increase Period"), and in which event, the Company shall be obligated to pay the Incremental Interest Payment provided for in Section 10.9(c). The Company may terminate any Leverage Ratio Increase Period by a notice delivered to the holders of Notes, whereupon, on the last day of the fiscal quarter during which such notice is given and on the last day of each fiscal quarter thereafter until another Leverage Ratio Increase Period has commenced as provided in this Section, the maximum Leverage Ratio shall be 3.50:1.00. If a Leverage Ratio Increase Election shall have been made under this Section, the Company may not make another Leverage Ratio Increase Election unless, following the termination or expiration of the most recent prior Leverage Ratio Increase Period, the Leverage Ratio as of the last day of at least two consecutive full fiscal quarters of the Company shall not have exceeded 3.50:1.00. Notwithstanding the foregoing, the Company shall not be permitted to make more than two Leverage Ratio Increase Elections during the term of this Agreement.

(b) If the Leverage Ratio exceeds 3.50 to 1.00 as permitted by Section 10.9(a), as evidenced by an Officer's Certificate delivered pursuant to Section 7.2(a), the interest rate payable on the Notes shall be increased by 0.50% (the "Incremental Interest"). Such Incremental Interest shall begin to accrue on the first day of the fiscal quarter following the fiscal quarter in respect of which such Officer's Certificate was delivered, and shall continue to accrue until the Company has provided an Officer's Certificate pursuant to Section 7.2(a) demonstrating that, as of the last day of the fiscal quarter in respect of which such Officer's Certificate is delivered, the Leverage Ratio is not more than 3.50 to 1.00. In the event such Officer's Certificate evidencing that the Leverage Ratio is not more than 3.50 to 1.00 is delivered, the Incremental Interest shall cease to accrue on the last day of the fiscal quarter in respect of which such Officer's Certificate is delivered.

(c) Within 10 Business Days of the delivery of an Officer's Certificate pursuant to Section 7.2(a) evidencing that the Leverage Ratio exceeds 3.50 to 1.00, the Company shall pay to each holder of a Note the amount attributable to the Incremental Interest (the "Incremental Interest Payment") which shall be the product of (i) the aggregate outstanding principal amount of Notes held by such holder (or its predecessor(s) in interest) as of the first day that Incremental Interest begins to accrue, (ii) 0.50% (to reflect the Incremental Interest) and (iii) 0.25% (to reflect that the Incremental Interest is payable quarterly). The Incremental Interest Payment, if any, shall be paid quarterly by wire transfer of immediately available funds to each holder of the Notes in accordance with the terms of this Agreement.

Section 1.2. Accounting Terms. Section 22.3(c) of the Agreement is amended and restated in its entirety to read as follows:

(c) Without limiting the foregoing, leases shall continue to be classified and accounted for on a basis consistent with that reflected in the financial statements of the Company and its consolidated Subsidiaries for the fiscal year ended December 31, 2015 for all purposes of this Agreement, notwithstanding any change in GAAP relating thereto, unless the parties hereto shall enter into a mutually acceptable amendment addressing such changes, as provided for above. For the avoidance of doubt, the Company shall include relevant reconciliations in reasonable detail between GAAP in place at the applicable time to GAAP in place (related to such treatment of leases) for the fiscal year ended December 31, 2015 with respect to the applicable covenant compliance calculations contained in each certificate of Senior Financial Officer delivered pursuant to Section 7.2(a) during such period. Notwithstanding the foregoing, in the event that the Primary Credit Agreement is amended or modified with the effect that any provision (including but not limited to the leverage covenant contained therein) shall include a lease of property of a Person as lessee as debt for purposes of such provision (notwithstanding that such lease would not have been included as debt under GAAP as in effect on December 31, 2015), then such lease shall be included as a Capital Lease under this Agreement.

Section 1.3. Release of Guarantors. Section 22.9 of the Agreement is hereby amended and restated in its entirety to read as follows:

Section 22.9. Release of Guarantors. Notwithstanding any contrary provision herein or in the Notes or in any Guarantee Agreement, if the Company shall request the release under a Guarantee Agreement (x) of any Subsidiary to be sold or otherwise disposed of (including through the sale or disposition of any Subsidiary owning such Subsidiary) to a Person other than the Company or a Subsidiary in a transaction permitted under the terms of this Agreement or (y) of any Subsidiary because such Subsidiary has become an Excluded Subsidiary, and, in other case, shall deliver to the holders of the Notes a certificate of a Responsible Officer to the effect that (i) such sale, other disposition or such designation of such Subsidiary as an Excluded Subsidiary will comply with the terms of this Agreement, (ii) such Subsidiary shall not be a guarantor or obligor under a Primary Credit Agreement or any note purchase agreement of the Company from time to time ("**Note Purchase Agreement**" together with the Primary Credit Agreement, the "**Material Agreements**"), and (iii) (A) if such Subsidiary Guarantor is a guarantor or is otherwise liable for or in respect of any Material Agreement, then such Subsidiary Guarantor has been released and discharged (or will be released and discharged concurrently with the release of such Subsidiary Guarantor under its Subsidiary Guaranty) under the Material Agreements, (B) at the time of, and after giving effect to, such release and discharge, no Default or Event of Default shall be existing, (C) no amount is then due and payable under such Subsidiary Guaranty and (D) if in connection with such Subsidiary Guarantor being released and discharged under any Material Agreement any fee or other form of consideration is given to any holder of Indebtedness under such Material Agreement for such release, the holders of the Notes shall receive equivalent consideration substantially concurrently therewith. In the event of any such release, for purposes of Section 10.6, all Indebtedness of such Subsidiary shall be deemed to have been incurred concurrently with such release.

Section 1.4. Amendment to Defined Terms. Schedule B of the Agreement is hereby amended by added the following defined terms in alphabetic order to read as follows:

"**CFC**" means a controlled foreign corporation within the meaning of Section 957 of the Code.

"**CFC Holdco**" means a Subsidiary that has no material assets other than equity interests in one or more CFCs.

Section 1.5. Amendment to Defined Terms. The following definitions set forth in Schedule B of the Agreement are hereby amended by amending and restating in their entirety to read as follows:

"Excluded Subsidiary" means at any time (a) any Foreign Subsidiary, (b) any subsidiary of a Foreign Subsidiary (c) any Domestic Subsidiary that is a disregarded entity for United States Federal income tax purposes substantially all of the assets of which consist of equity interests in one or more Foreign Subsidiaries, (d) any Subsidiary that is prohibited or restricted by applicable law from providing a Guaranty or if such Guaranty would require governmental (including regulatory) consent, approval, license or authorization, (e) any special purpose securitization vehicle (or similar entity), (f) any Subsidiary that is not-for-profit organization, (g) any other Subsidiary with respect to which, in the reasonable judgment of the Required Holders (confirmed in writing by notice to the Company), the cost or other consequences (including adverse tax consequences) of providing the Guarantee Agreement shall be excessive in view of the benefits to be obtained by the holders of Notes therefrom, (h) any other Subsidiaries acquired or organized after the date of Closing that, together with their own subsidiaries on a combined consolidated basis, shall not, individually or in the aggregate for all such Subsidiaries under this clause (h), have accounted for more than 5% of Consolidated Total Assets or more than 5% of the consolidated total revenues of the Company and the Subsidiaries at the end of, or for the period of four fiscal quarters ended with, the most recent fiscal quarter of the Company for which financial statements shall have been delivered pursuant to Section 7.1(a) or (b) (or, prior to the delivery of any such financial statements, at the end of or for the period of four fiscal quarters ended March 31, 2016), and (i) any CFC Holdco.

"Guarantee Requirement" means, at any time, that the Guarantee Agreement (or a supplement referred to in Section 16 thereof) shall have been executed by each Subsidiary (other than any Excluded Subsidiary) existing at such time, shall have been delivered to the holders of the Notes and shall be in full force and effect; *provided, however,* that (a) in the case of a Subsidiary that becomes subject to the Guarantee Requirement after the date of Closing, the Guarantee Requirement shall be satisfied with respect to such Subsidiary if a supplement to the Guarantee Agreement is executed by such Subsidiary, delivered to the holders of the Notes and in full force and effect no later than (i) 30 days after the date on which such Subsidiary becomes subject to the Guarantee Requirement (or such later date as is permitted in the Primary Credit Agreement except that such later date shall in no event be more than 60 days after the date on which such Subsidiary becomes subject to the Guarantee Requirement) or (ii) such other date as the Required Holders may reasonably determine, but in any case no later than 60 days after the date on which such Subsidiary becomes subject to the Guarantee Requirement and (b) a Guarantor shall automatically be released from its obligations under the Guarantee Agreement (including any supplement referred to in Section 16 thereof) and no longer be subject to the Guarantee Requirement in the event that the Company complies with the requirements of Section 22.9 and delivers a written notice to the holders of the Notes certifying that such Guarantor is an Excluded Subsidiary.

"Guarantors" means each Person listed on Schedule C and each other Person that becomes party to a Guarantee Agreement as a Guarantor, and the permitted successors and assigns of each such Person; provided, however, that a Guarantor shall cease to be a Guarantor in the event such Person is released from its obligations under the Guarantee Agreement (including any supplement referred to in Section 16 thereof) as provided in clause (b) of the proviso of the definition of "Guarantee Requirement" or as provided in Section 6 of the Guarantee Agreement.

"Material Acquisition" means (a) the acquisition by the Company or a Subsidiary of assets of or an interest in another Person or (b) the merger or consolidation of the Company with another corporation; provided that, in each case, the aggregate consideration therefor involves cash in the amount of $400,000,000 or more.

SECTION 2. CONDITIONS PRECEDENT.

This Amendment shall not become effective until, and shall become effective on, the Business Day when each of the following conditions shall have been satisfied (the "*Effective Date*"):

(a) Each Noteholder shall have received this Amendment, duly executed by the Company.

(b) The Required Holders shall have consented to this Amendment as evidenced by their execution thereof.

(c) The representations and warranties of the Company set forth in Section 3 hereof shall be true and correct as of the date of the execution and delivery of this Amendment and as of the Effective Date.

(d) Any consents or approvals from any holder or holders of any outstanding security or indebtedness of the Company and any amendments of agreements pursuant to which any securities or indebtedness may have been issued which shall be necessary to permit the consummation of the transactions contemplated hereby shall have been obtained and all such consents or amendments shall be reasonably satisfactory in form and substance to the Required Holders and their special counsel.

(e) All corporate and other proceedings in connection with the transactions contemplated by this Amendment and all documents and instruments incident to such transactions shall be satisfactory to the Required Holders and their special counsel, and the Required Holders and their special counsel shall have received all such counterpart originals or certified or other copies of such documents as the Required Holders or such special counsel may reasonably request.

(f) The Company shall have paid the fees, charges and disbursements of the Noteholders' special counsel, Chapman and Cutler LLP, which fees, charges and disbursements are reflected in a statement of such special counsel delivered to the Company at the time of the execution and delivery of this Amendment.

(g) Simultaneous with the execution of this Amendment, the Company shall have enter into (i) that certain First Amendment to Note Purchase Agreement dated as of February 1, 2010 ("*2010 NPA Amendment*"), (ii) that certain First Amendment to Note Purchase Agreement dated as of March 15, 2011 ("*2011 NPA Amendment*"), (iii) that certain First Amendment to Note Purchase Agreement dated as of June 30, 2014 ("*2014 NPA Amendment*"; together with this Amendment, the 2010 NPA Amendment and 2011 NPA Amendment, collectively, the "*NPA Amendments*"), and (iv) that certain First Amendment to Credit Agreement dated as of November 30, 2017 among the Company, the lenders party thereto and JPMorgan Chase Bank, N.A., as Administrative Agent (the "*Credit Agreement Amendment*").

(h) each holder of a Note shall have received an amendment fee in an amount equal to 0.05% of the outstanding principal amount of its Notes.

SECTION 3. REPRESENTATIONS AND WARRANTIES.

The Company hereby represents and warrants that as of the date of execution and delivery of this Amendment and as of the Effective Date:

(a) The Company is duly incorporated, validly existing and in good standing under the laws of its jurisdiction of incorporation.

(b) The Company has the corporate power to own its property and to carry on its business as now being conducted.

(c) The Company is duly qualified and in good standing as a foreign corporation authorized to do business in each jurisdiction in which the failure to do so would, individually or in the aggregate, have a Material Adverse Effect.

(d) This Amendment and the Agreement, as amended hereby, and the transactions contemplated hereby are within the corporate powers of the Company, have been duly authorized by all necessary corporate action on the part of the Company, and this Amendment and the Agreement, as amended hereby, have been duly executed and delivered by the Company and constitute legal, valid and binding obligations of the Company enforceable in accordance with their respective terms.

(e) Before and after giving effect to this Amendment, there are no Defaults or Events of Default under the Agreement, as amended hereby.

(f) The execution, delivery and performance of this Amendment and the Agreement, as amended hereby, does not and will not result in a violation of or default under (A) the articles of incorporation or bylaws of the Company, (B) any agreement to which the Company is a party or by which it is bound or to which the Company or any of its properties is subject, (C) any order, writ, injunction or decree binding on the Company, or (D) any statute, regulation, rule or other law applicable to the Company.

(g) No consent, approval or authorization of, or registration, filing or declaration with, any Governmental Authority is required in connection with the execution, delivery or performance by the Company of this Amendment and the Agreement, as amended hereby.

(h) Other than this Amendment, there are no other amendments, modifications, supplements or waivers to the Agreement.

(i) The Noteholders listed on Schedule I to this Amendment are the holders of record of all outstanding Notes issued under the Agreement and set forth opposite their names in such Schedule is the correct outstanding principal amount of the Notes of such Noteholder.

(j) Other than the 0.05% amendment fee provided to the holders of Notes in connection with NPA Amendments, the Company or its affiliates have not paid or agreed to pay any fees or other consideration, or given any additional security or collateral, or shortened the maturity or average life of any indebtedness or permanently reduced any borrowing capacity, in each case, required in connection with the obtaining of any consents or approvals in connection with the transactions contemplated hereby including, in connection with the NPA Amendments or the Credit Agreement Amendment.

SECTION 4. MISCELLANEOUS.

Section 4.1. Except as amended herein, all terms and provisions of the Agreement and related agreements and instruments are hereby ratified, confirmed and approved in all respects.

Section 4.2. Each reference in the Agreement to "this Agreement," "hereunder," "hereof," or words of similar import in instruments or documents provided for in the Agreement or delivered or to be delivered thereunder or in connection therewith, shall, except where the context otherwise requires, be deemed a reference to the Agreement, as amended hereby.

Section 4.3. The descriptive headings of the various Sections or parts of this Amendment are for convenience only and shall not affect the meaning or construction of any of the provisions hereof.

Section 4.4. This Amendment shall be construed and enforced in accordance with, and the rights of the parties shall be governed by, the law of the State of New York excluding choice-of-law principles of the law of such State that would permit the application of the laws of a jurisdiction other than such State.

Section 4.5. This Amendment is expressly subject to Section 22.8 (Jurisdiction and Process; Waiver of Jury Trial) of the Agreement, which Section is incorporated herein and made applicable hereto by this reference.

Section 4.6. All warranties, representations, and covenants made by the Company herein will be considered to have been relied upon by the Noteholders and will survive the execution and delivery of this Amendment.

Section 4.7. This Amendment will inure to the benefit of and be binding upon the successors and assigns of each of the parties. The provisions of this Amendment for the benefit of the Noteholders are intended in all cases, whether explicitly so stated or not, to be for the benefit of all holders, from time to time, of the Notes, and will be enforceable by any such holder, whether or not an express assignment to such holder of rights under this Amendment has been made by such Noteholder or its successors or assigns.

Section 4.8. This Amendment may be executed in any number of counterparts, each of which shall be deemed to be an original and all of which, taken together, shall constitute but one and the same Amendment. Delivery of an executed counterpart of this Amendment by facsimile or email shall be as effective as delivery of a manually executed counterpart of this Amendment.

[REMAINDER OF PAGE INTENTIONALLY BLANK]

The execution hereof by the holders shall constitute a contract among the Company and the holders for the uses and purposes hereinabove set forth. This Amendment may be executed in any number of counterparts, each executed counterpart constituting an original but all together only one agreement.

WATERS CORPORATION

By: ______________________________

Name: John E. Lynch
Title: Vice President, Corporate Treasurer

This foregoing Amendment is hereby accepted and agreed to as of the date aforesaid. The execution by each holder listed below shall constitute its respective several and not joint confirmation that it is the owner and holder of the Notes set opposite its name on Schedule I hereto.

THE NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY

By: Northwestern Mutual Investment Management Company, LLC, its investment adviser

By ______________________________
Name: Brian P. McDonald
Title: Managing Director

THE NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY for its Group Annuity Separate Account

By ______________________________
Name: Brian P. McDonald
Title: Managing Director

METROPOLITAN LIFE INSURANCE COMPANY

METLIFE INSURANCE COMPANY USA
By: MetLife Investment Advisors, LLC, Its Investment Manager

METROPOLITAN TOWER LIFE INSURANCE COMPANY, AS SUCCESSOR BY MERGER TO GENERAL AMERICAN LIFE INSURANCE COMPANY
By: MetLife Investment Advisors, LLC,
Its Investment Manager

METLIFE INSURANCE K.K.
By: MetLife Investment Advisors, LLC,
Its Investment Manager

By: ______________________________
Name: John Wills
Title: Managing Director

BRIGHTHOUSE LIFE INSURANCE COMPANY, F/K/A METLIFE INSURANCE COMPANY USA,
By: MetLife Investment Advisors, LLC,
Its Investment Manager

BRIGHTHOUSE LIFE INSURANCE COMPANY OF NY, F/K/A FIRST METLIFE INVESTORS INSURANCE COMPANY,
By: MetLife Investment Advisors, LLC,
Its Investment Manager

By: ______________________________
Name: Judith Gulotta
Title: Managing Director

UNION FIDELITY LIFE INSURANCE COMPANY
By: MetLife Investment Advisors, LLC,
Its Investment Adviser

By: ______________________________
Name: Frank Monfalcone
Title: Managing Director

THE PRUDENTIAL INSURANCE COMPANY OF AMERICA

By: ______________________________
Name: Engin Okaya
Title: Vice President

THE PRUDENTIAL LIFE INSURANCE COMPANY, LTD.

By: Prudential Investment Management Japan Co., Ltd., as Investment Manager

By: PGIM, Inc.,
as Sub-Adviser

By: ______________________________
Name: Engin Okaya
Title: Vice President

FARMERS NEW WORLD LIFE INSURANCE COMPANY

By: Prudential Private Placement Investors, L.P. (as Investment Advisor)

By: Prudential Private Placement Investors, Inc. (as its General Partner)

By: ______________________________
Name: Engin Okaya
Title: Vice President

TEACHERS INSURANCE AND ANNUITY ASSOCIATION OF AMERICA

By: Nuveen Alternatives Advisors, LLC, its investment manager

By: ______________________________
Name: Laura Parrott
Title: Senior Director

JACKSON NATIONAL LIFE INSURANCE COMPANY

By: PPM America, Inc., as attorney in fact, on behalf of Jackson National Life Insurance Company

By: ______________________________
Name: Elena S. Unger
Title: Vice President

JACKSON NATIONAL LIFE INSURANCE COMPANY OF NEW YORK

By: PPM America, Inc., as attorney in fact, on behalf of Jackson National Life Insurance Company of New York

By: ______________________________
Name: Elena S. Unger
Title: Vice President

THRIVENT FINANCIAL FOR LUTHERANS

By: ____________________________________

Name: William Hochmuth
Title: Managing Director

PRIVATE PLACEMENT NOTE PAYMENT GRID

$50,000,000 3.13% SENIOR GUARANTEED NOTES, SERIES I, DUE MAY 12, 2023

NOTEHOLDER	OUTSTANDING PRINCIPAL BALANCE
The Northwestern Mutual Life Insurance Company	$30,000,000
Metropolitan Life Insurance Company	$ 2,500,000
Metropolitan Life Insurance Company	$ 2,000,000
Metropolitan Life Insurance Company	$ 500,000
MetLife Insurance K.K.	$ 2,500,000
MetLife Insurance K.K.	$ 2,500,000
Brighthouse Life Insurance Company	$ 3,000,000
Brighthouse Life Insurance Company	$ 5,000,000
Brighthouse Life Insurance Company of NY	$ 2,000,000
	$50,000,000

$160,000,000 3.44% SENIOR GUARANTEED NOTES, SERIES K DUE MAY 12, 2026

NOTEHOLDER	OUTSTANDING PRINCIPAL BALANCE
Thrivent Financial for Lutherans	$ 25,000,000
The Northwestern Mutual Life Insurance Company	$ 9,200,000
The Northwestern Mutual Life Insurance Company for its Group Annuity Separate Account	$ 800,000
Union Fidelity Life Insurance Company	$ 5,700,000
Metropolitan Life Insurance Company	$ 8,000,000
Metropolitan Life Insurance Company	$ 1,000,000
Metropolitan Tower Life Insurance Company	$ 700,000
MetLife Insurance K.K.	$ 1,000,000
MetLife Insurance K.K.	$ 1,000,000
Brighthouse Life Insurance Company	$ 2,100,000
Brighthouse Life Insurance Company	$ 500,000
The Prudential Insurance Company of America	$ 15,450,000
The Prudential Life Insurance Company, LTD	$ 19,000,000
Farmers New World Life Insurance Company	$ 5,500,000
Teachers Insurance and Annuity Association of America	$ 40,000,000
Jackson National Life Insurance Company	$ 11,250,000
Jackson National Life Insurance Company	$ 11,250,000
Jackson National Life Insurance Company of New York	$ 2,500,000
	$160,000,000

Exhibit 21.1

Waters Corporation and Subsidiaries

12/31/2018

- Waters Corporation (Delaware)
    - Waters Technologies Corporation (Delaware)
        - Environmental Resource Associates, Inc. (Colorado)
        - TA Instruments-Waters LLC (Delaware)
        - Waters AG (Switzerland)
        - Waters Australia PTY LTD. (Australia)
        - Waters India Pvt. Ltd.
        - Waters Limited (Canada)
        - Waters SA de CV (Mexico)
        - Waters SAS (France)
        - Waters Sverige AB (Sweden)
        - Waters Technologies do Brasil Ltda (Brazil)
        - Milford International Limited (UK) (1)
        - Waters Global International Limited (Cayman) (1)
        - Waters Global Limited (UK) (1)
        - Waters Global Technologies Limited (UK) (1)
        - Waters Milford Limited (UK) (1)
        - Waters Technologies International Limited (Cayman) (1)
        - Waters Asia Limited (Delaware)
            - Waters A/S (Denmark)
            - Waters China Ltd. (Hong Kong)
            - Waters Cromatografia SA (Spain)
            - Waters Korea Limited (Korea)
            - Waters NV (Belgium)
            - Waters Technologies (Shanghai) Ltd (China)
            - Waters Ges.MBH (Austria)
                - Waters Kft (Hungary)
                - Waters O.O.O. (Russia)
                - Waters Sp.Zo.o (Poland)
            - Waters Pacific Pte Ltd. (Singapore)
                - Waters Analytical Instruments Sdn Bhd (Malaysia)
            - Waters Holdings LLC (Delaware)
                - Nihon Waters K.K. (Japan)
                - TA Instruments Japan, Inc. (Japan)
                - Waters SpA (Italy)
                - Waters European Investments LLC
                    - Manchester International Limited
                    - Melbourne International Limited
                    - Milford International Limited
                    - MM European Holdings LLP (UK) (1)
                    - Waters Celtic Holdings Ltd. (Ireland)
                        - Waters Chromatography Ireland Ltd. (Ireland)
                        - Waters Technologies Ireland Ltd. (Ireland)
                            - Waters Romania Srl
                            - Waters GmbH (Germany)
                                - Expert Systems Solutions Srl (Italy) (1)
                    - Waters Luxembourg SARL (Luxembourg)
                        - Waters (TC) Israel Ltd. (Israel)
                        - Micromass Holdings Ltd. (UK)
                            - ULSP BV (Netherlands)

Waters Chromatography BV (Netherlands)
Waters Chromatography Europe BV (Netherlands)
Waters Tech. LC-MS Unapessol Lda (Portugal)
Micromass Ltd. (UK)
  PRA Europe Limited (UK) (1)
  Waters Limited (UK)
  Micromass UK Ltd. (UK)
    Waters Research Center Kft (Hungary)
    MPE Orbur Group Ltd. (UK)
      Midland Precision Equipment Co. Ltd. (UK)

All Subsidiaries are 100% owned unless otherwise indicated

(1) Dormant

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-8 (Nos. 333-18371, 333-81723, 333-60054, 333-92332, 333-110613, 333-137990, 333-160507, 333-183721) of Waters Corporation of our report dated February 26, 2019 relating to the financial statements and financial statement schedule and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
February 26, 2019

Exhibit 31.1

CHIEF EXECUTIVE OFFICER CERTIFICATION PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Christopher J. O'Connell, certify that:

1. I have reviewed this annual report on Form 10-K of Waters Corporation;

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(s) 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(s) 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 the 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 26, 2019

/s/ Christopher J. O'Connell
Christopher J. O'Connell
Chief Executive Officer

Exhibit 31.2

**CHIEF FINANCIAL OFFICER CERTIFICATION PURSUANT TO SECTION 302
OF THE SARBANES-OXLEY ACT OF 2002**

I, Sherry L. Buck, certify that:

1. I have reviewed this annual report on Form 10-K of Waters Corporation;

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(s) 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(s) 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 the 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 26, 2019

/s/ Sherry L. Buck
Sherry L. Buck
Chief Financial Officer

Exhibit 32.1

CHIEF EXECUTIVE OFFICER CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

The certification set forth below is hereby made solely for the purpose of satisfying the requirements of Section 906 of the Sarbanes-Oxley Act of 2002 and may not be relied upon or used for any other purposes.

In connection with the Annual Report of Waters Corporation (the “Company”) on Form 10-K for the period ended December 31, 2018, as filed with the Securities and Exchange Commission on the date hereof (the “Report”), I, Christopher J. O’Connell, 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 to my knowledge: (1) the Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and (2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

A signed original of this written statement required by Section 906 or other document authenticating, acknowledging or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.

Date: February 26, 2019

By: /s/ Christopher J. O’Connell

Christopher J. O’Connell
Chief Executive Officer

Exhibit 32.2

CHIEF FINANCIAL OFFICER CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

The certification set forth below is hereby made solely for the purpose of satisfying the requirements of Section 906 of the Sarbanes-Oxley Act of 2002 and may not be relied upon or used for any other purposes.

In connection with the Annual Report of Waters Corporation (the "Company") on Form 10-K for the period ended December 31, 2018, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Sherry L. Buck, 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 to my knowledge: (1) the Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and (2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

A signed original of this written statement required by Section 906 or other document authenticating, acknowledging or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.

Date: February 26, 2019

By: /s/ Sherry L. Buck

Sherry L. Buck

Chief Financial Officer