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

FORM 10-K

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

(Mark One)

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

For the fiscal year ended October 31, 2019

OR

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

For the transition period from _____ to _____

Commission file number 0-7977

NORDSON CORPORATION

(Exact name of Registrant as specified in its charter)

Ohio	**34-0590250**
(State of incorporation)	(I.R.S. Employer Identification No.)
28601 Clemens Road Westlake, Ohio	**44145**
(Address of principal executive offices)	(Zip Code)

(440) 892-1580
(Registrant's Telephone Number, including area code)

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

Title of Each class	Trading Symbol(s)	Name of Each Exchange on which Registered
Common Shares, without par value	**NDSN**	**Nasdaq Stock Market LLC**

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, and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

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

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

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

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

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

The aggregate market value of Common Shares, no par value per share, held by nonaffiliates (based on the closing sale price on the Nasdaq Stock Market) as of April 30, 2019 was approximately $8,347,622,072.

There were 57,708,386 Common Shares outstanding as of November 30, 2019.

Documents incorporated by reference: Portions of the Proxy Statement for the 2020 Annual Meeting - Part III of the Form 10-K

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PART I

NOTE REGARDING AMOUNTS AND FISCAL YEAR REFERENCES

In this annual report, all amounts related to United States dollars and foreign currency and to the number of Nordson Corporation's common shares, except for per share earnings and dividend amounts, are expressed in thousands. Unless the context otherwise indicates, all references to "we," "us," "our," or the "Company" mean Nordson Corporation.

Unless otherwise noted, all references to years relate to our fiscal year ending October 31.

Item 1. Business

General Description of Business

Nordson engineers, manufactures and markets differentiated products and systems used for precision dispensing, applying and controlling of adhesives, coatings, polymers, sealants, biomaterials, and other fluids, to test and inspect for quality, and to treat and cure surfaces. These products are supported with extensive application expertise and direct global sales and service. We serve a wide variety of consumer non-durable, consumer durable and technology end markets including packaging, nonwovens, electronics, medical, appliances, energy, transportation, building and construction, and general product assembly and finishing.

Our strategy for long-term growth is based on solving customers' needs globally. We were incorporated in the State of Ohio in 1954 and are headquartered in Westlake, Ohio. Our products are marketed through a network of direct operations in more than 35 countries. Consistent with this global strategy, approximately 65 percent of our revenues were generated outside the United States in 2019.

We have 7,579 employees worldwide. Principal manufacturing facilities are located in the United States, the People's Republic of China, Germany, Ireland, Israel, Mexico, the Netherlands, Thailand, and the United Kingdom.

New Chief Executive Officer

On June 14, 2019, we announced the appointment of Sundaram Nagarajan as our President and Chief Executive Officer, effective August 1, 2019. Mr. Nagarajan succeeds Michael F. Hilton, who previously announced his plans to retire. On Mr. Nagarajan's start date, Mr. Hilton became Senior Advisor to the Company and will remain as an Executive Officer and Senior Advisor, and as a member of our Board of Directors until he retires on December 31, 2019.

Corporate Purpose and Goals

We strive to be a vital, self-renewing, worldwide organization that, within the framework of ethical behavior and enlightened citizenship, grows and produces wealth for our customers, employees, shareholders, and communities.

We operate for the purpose of creating balanced, long-term benefits for all of our constituencies.

Although every quarter may not produce increased sales, net income, or earnings per share, or exceed the comparative prior year's quarter, we expect to produce long-term gains. When short-term swings occur, we do not intend to alter our basic objectives in efforts to mitigate the impact of these temporary occurrences.

We drive organic growth by continually introducing new products and technology, providing high levels of customer service and support, capturing rapidly expanding opportunities in emerging geographies, and by leveraging existing technology into new applications. Additional growth comes through the acquisition of companies that serve international growth markets, share our business model characteristics and can leverage our global infrastructure. The primary goals of our acquisition strategy are to complement our current capabilities, diversify our business into new industry sectors and with new customers and expand the scope of the solutions we can offer to our customers.

We create benefits for our customers through a Package of Values®, which includes carefully engineered, durable products; strong service support; the backing of a well-established, worldwide company with financial and technical strengths; and a corporate commitment to deliver what was promised.

We strive to provide genuine customer satisfaction – it is the foundation upon which we continue to build our business.

Complementing our business strategy is the objective to provide opportunities for employee self-fulfillment, growth, security, recognition and equitable compensation. This goal is met through the Human Resources department's facilitation of employee training, leadership training and the creation of on-the-job growth opportunities. The result is a highly qualified and professional global team capable of meeting corporate objectives.

We recognize the value of employee participation in the planning process. Strategic and operating plans are developed by all business units, resulting in a sense of ownership and commitment on the part of employees in accomplishing our objectives.

We drive continuous improvement in all areas of the company through the Nordson Business System (NBS), our collected set of tools and best practices. Rooted in Lean Six Sigma methodologies, the NBS is applied throughout all business units and corporate functions. Closely tied to the NBS are a set of key performance indicators that help define and measure progress toward corporate goals. The NBS is underpinned by our timeless corporate values of customer passion, energy, excellence, integrity and respect for people.

We are an equal opportunity employer.

We are committed to contributing approximately five percent of domestic pretax earnings to human welfare services, education and other charitable activities, particularly in communities where we have significant operations.

Principal Products and Uses

We engineer, manufacture and market differentiated products and systems used to dispense, apply and control adhesives, coatings, polymers, sealants, biomaterials, medical components, and other fluids, to test and inspect for quality, and to treat and cure surfaces. Our technology-based systems can be found in manufacturing facilities around the world producing a wide range of goods for consumer durable, consumer non-durable and technology end markets. Equipment ranges from single-use components to manual, stand-alone units for low-volume operations to microprocessor-based automated systems for high-speed, high-volume production lines.

We market our products globally, primarily through a direct sales force, and also through qualified distributors and sales representatives. We have built a worldwide reputation for creativity and expertise in the design and engineering of high-technology application equipment that meets the specific needs of our customers. We create value for our customers by developing solutions that increase uptime, enable faster line speeds and reduce consumption of materials.

The following is a summary of the product lines and markets served by our operating segments:

1. Adhesive Dispensing Systems

This segment delivers our proprietary precision dispensing and processing technology to diverse markets for applications that commonly reduce material consumption, increase line efficiency and enhance product strength, durability, brand and appearance.

- ***Nonwovens*** – Dispensing, coating and laminating systems for applying adhesives, lotions, liquids and fibers to disposable products and continuous roll goods. Key strategic markets include adult incontinence products, baby diapers and child-training pants, feminine hygiene products and surgical drapes, gowns, shoe covers and face masks.
- ***Packaging*** – Automated adhesive dispensing systems used in the rigid packaged goods industries. Key strategic markets include food and beverage packaging, pharmaceutical packaging, and other consumer goods packaging.
- ***Polymer Processing*** – Components and systems used in the thermoplastic melt stream in plastic extrusion, injection molding, compounding, polymerization and recycling processes. Key strategic markets include flexible packaging, electronics, medical, building and construction, transportation and aerospace, and general consumer goods.
- ***Product Assembly*** – Dispensing, coating and laminating systems for the assembly of plastic, metal and wood products, for paper and paperboard converting applications and for the manufacturing of continuous roll goods. Key strategic markets include appliances, automotive components, building and construction materials, electronics, furniture, solar energy, and the manufacturing of bags, sacks, books, envelopes and folding cartons.

2. Advanced Technology Systems

This segment integrates our proprietary product technologies found in progressive stages of a customer's production process, such as surface treatment, precisely controlled automated, semi-automated or manual dispensing of material, and post-dispense bond testing, optical inspection and x-ray inspection to ensure quality. Related single-use plastic molded syringes, cartridges, tips, tubing and fluid connection components are used to dispense or control fluids in production processes or within customers' end products. This segment primarily serves the specific needs of electronics, medical and related high-tech industries.

- ***Electronics Systems –*** Automated dispensing systems for high-speed, accurate application of a broad range of attachment, protection and coating fluids, and related gas plasma treatment systems for cleaning and conditioning surfaces prior to dispense. Key strategic markets include the breadth of the electronics industry manufacturing supply chain that produces semiconductor, printed circuit board assemblies and electronic components.
- ***Fluid Management*** – Precision manual and semi-automated dispensers, minimally invasive interventional delivery devices, and highly engineered single-use plastic molded syringes, cartridges, tips, fluid connection components, tubing, balloons, and catheters. Products are used for applying and controlling the flow of adhesives, sealants, lubricants, and biomaterials in critical industrial production processes and within medical equipment and related surgical procedures. Key strategic markets include consumer goods, electronics, industrial assembly, and medical.
- ***Test and Inspection –*** Bond testing and automated optical, acoustic microscopy and x-ray inspection systems used in the semiconductor and printed circuit board industries. Key strategic markets include mobile phones, tablets, personal computers, wearable technology, liquid crystal displays, micro hard drives, microprocessors, printed circuit boards, flexible circuits, MEMS, and semiconductor packaging.

3. Industrial Coating Systems

This segment provides both standard and highly-customized equipment used primarily for applying coatings, paint, finishes, sealants and other materials, and for curing and drying of dispensed material. This segment primarily serves the industrial capital equipment and consumer durables markets.

- ***Cold Materials*** – Automated and manual dispensing products and systems used to apply multiple component adhesive and sealant materials in the general industrial and transportation manufacturing industries. Key strategic markets include aerospace, electric battery, appliances, automotive, building and construction, composites, electronics and medical.
- ***Container Coating*** – Automated and manual dispensing and curing systems used to coat and cure containers. Key strategic markets include beverage containers and food cans.
- ***Curing and Drying Systems*** – Ultraviolet equipment used primarily in curing and drying operations for specialty coatings, semiconductor materials and paints. Key strategic markets include electronics, containers, and durable goods products.
- ***Liquid Finishing*** – Automated and manual dispensing systems used to apply liquid paints and coatings to consumer and industrial products. Key strategic markets include automotive components, agriculture, construction, metal shelving and drums.
- ***Powder Coating*** – Automated and manual dispensing systems used to apply powder paints and coatings to a variety of metal, plastic and wood products. Key strategic markets include agriculture and construction equipment, appliances, automotive components, home and office furniture, lawn and garden equipment, pipe coating, and wood and metal shelving.

Manufacturing and Raw Materials

Our production operations include machining, molding and assembly. We manufacture specially designed parts and assemble components into finished equipment. Many components are made in standard modules that can be used in more than one product or in combination with other components for a variety of models. We have principal manufacturing operations and sources of supply in the United States in Ohio, Georgia, California, Colorado, Connecticut, Illinois, Massachusetts, Michigan, Minnesota, New Jersey, Rhode Island, Tennessee, and Wisconsin; as well as in the People's Republic of China, Germany, Ireland, Israel, Mexico, the Netherlands, Thailand and the United Kingdom.

Principal materials used to make our products are metals and plastics, typically in sheets, bar stock, castings, forgings, tubing and pellets. We also purchase many electrical and electronic components, fabricated metal parts, high-pressure fluid hoses, packings, seals and other items integral to our products. Suppliers are competitively selected based on cost, quality and service. All significant raw materials that we use are available through multiple sources. We purchase most raw materials and other components on the open market and rely on third parties to provide certain finished goods. While these items are generally available from multiple sources, the cost of products sold may be affected by changes in the market price of raw materials and tariffs on certain raw materials, particularly imports from China, as well as disruptions in availability of raw materials, components, and sourced finished goods.

We monitor and investigate alternative suppliers and materials based on numerous attributes including quality, service, and price. We currently source raw materials and components from a number of suppliers, but our ongoing efforts to improve the cost effectiveness of our products and services may result in a reduction in the number of our suppliers.

Senior operating management supervises an extensive quality control program for our equipment, machinery and systems, and manufacturing processes.

Natural gas and other fuels are our primary energy sources. However, standby capacity for alternative sources is available if needed.

Intellectual Property

We maintain procedures to protect our intellectual property (including patents, trademarks and copyrights) both domestically and internationally. Risk factors associated with our intellectual property are discussed in Item 1A, Risk Factors.

Our intellectual property portfolios include valuable patents, trade secrets, know-how, domain names, trademarks and trade names. As of October 31, 2019, we held 598 United States patents and 1,449 foreign patents and had 160 United States patent applications pending and 778 foreign patent applications pending, but there is no assurance that any patent application will be issued. We continue to apply for and obtain patent protection for new products on an ongoing basis.

Patents covering individual products extend for varying periods according to the date of filing or grant and the legal term of patents in various countries where a patent is obtained. Our patent portfolio as of October 31, 2019 had expiration dates ranging from November 2019 to August 2038. The actual protection a patent provides, which can vary from country to country, depends upon the type of patent, the scope of its coverage, and the availability of legal remedies in each country. We believe, however, that the duration of our patents generally exceeds the life cycles of the technologies disclosed and claimed in the patents.

We believe our trademarks are important assets and we aggressively manage our brands. We also own a number of trademarks in the United States and foreign countries, including registered trademarks for Nordson, Asymtek, Avalon, Dage, EFD, Value Plastics and Xaloy and various common law trademarks which are important to our business, inasmuch as they identify Nordson and our products to our customers. As of October 31, 2019, we had a total of 987 trademark registrations in the United States and in various foreign countries.

We rely upon a combination of nondisclosure and other contractual arrangements and trade secret laws to protect our proprietary rights and also enter into confidentiality and intellectual property agreements with our employees that require them to disclose any inventions created during employment, convey all rights to inventions to us, and restrict the distribution of proprietary information.

We protect and promote our intellectual property portfolio and take those actions we deem appropriate to enforce our intellectual property rights and to defend our right to sell our products. Although in aggregate our intellectual property is important to our operations, we do not believe that the loss of any one patent, trademark, or group of related patents or trademarks would have a material adverse effect on our results of operations or financial position of our overall business.

Seasonal Variation in Business

Generally, the highest volume of sales occurs in the second half of the year due in large part to the timing of customers' capital spending programs. Accordingly, first quarter sales volume is typically the lowest of the year due to timing of customers' capital spending programs and customer holiday shutdowns.

Working Capital Practices

No special or unusual practices affect our working capital. We generally require advance payments as deposits on customized equipment and systems and, in certain cases, require progress payments during the manufacturing of these products. We continue to initiate new processes focused on reduction of manufacturing lead times, resulting in lower investment in inventory while maintaining the capability to respond promptly to customer needs.

Customers

We serve a broad customer base, both in terms of industries and geographic regions. In 2019, no single customer accounted for ten percent or more of sales.

Backlog

Our backlog of open orders was approximately $385,000 at October 31, 2019, compared to approximately $390,000 at October 31, 2018. The amounts for both years were calculated based upon exchange rates in effect at October 31, 2019. All orders in the 2019 year-end backlog are expected to be shipped to customers in 2020.

Government Contracts

Our business neither includes nor depends upon a significant amount of governmental contracts or subcontracts. Therefore, no material part of our business is subject to renegotiation or termination at the option of the government.

Competitive Conditions

Our equipment is sold in competition with a wide variety of alternative bonding, sealing, finishing, coating, processing, testing, inspecting, and fluid control techniques. Potential uses for our equipment include any production processes that require preparation, modification or curing of surfaces; dispensing, application, processing or control of fluids and materials; or testing and inspecting for quality.

Many factors influence our competitive position, including pricing, product quality and service. We maintain a leadership position in our business segments by delivering high-quality, innovative products and technologies, as well as service and technical support. Working with customers to understand their processes and developing the application solutions that help them meet their production requirements also contributes to our leadership position. Our worldwide network of direct sales and technical resources also is a competitive advantage. The impact of tariffs over our end markets in Asia could negatively affect our long-term market position in that region.

Environmental Compliance

We are subject to federal, state, local and foreign environmental, safety and health laws and regulations concerning, among other things, emissions to the air, discharges to land and water and the generation, handling, treatment and disposal of hazardous waste and other materials. Under certain of these laws, we can be held strictly liable for hazardous substance contamination of any real property we have ever owned, operated or used as a disposal site or for natural resource damages associated with such contamination. We are also required to maintain various related permits and licenses, many of which require periodic modification and renewal. The operation of manufacturing plants unavoidably entails environmental, safety and health risks, and we could incur material unanticipated costs or liabilities in the future if any of these risks were realized in ways or to an extent that we did not anticipate.

We believe that we operate in compliance, in all material respects, with applicable environmental laws and regulations. Compliance with environmental laws and regulations requires continuing management effort and expenditures. We have incurred, and will continue to incur, costs and capital expenditures to comply with these laws and regulations and to obtain and maintain the necessary permits and licenses. We believe that the cost of complying with environmental laws and regulations will not have a material effect on our earnings, liquidity or competitive position but cannot assure that material compliance-related costs and expenses may not arise in the future. For example, future adoption of new or amended environmental laws, regulations or requirements or newly discovered contamination or other circumstances could require us to incur costs and expenses that may have a material effect, but cannot be presently anticipated.

We believe that policies, practices and procedures have been properly designed to prevent unreasonable risk of material environmental damage arising from our operations. We accrue for estimated environmental liabilities with charges to expense and believe our environmental accrual is adequate to provide for our portion of the costs of all such known environmental liabilities. Compliance with federal, state, local and foreign environmental protection laws during 2019 had no material effect on our capital expenditures, earnings or competitive position. Based upon consideration of currently available information, we believe liabilities for environmental matters will not have a material adverse effect on our financial position, operating results or liquidity, but we cannot assure that material environmental liabilities may not arise in the future.

Employees

As of October 31, 2019, we had 7,579 full-time and part-time employees, including 138 at our Amherst, Ohio, facility who are represented by a collective bargaining agreement that expires on November 13, 2022.

Available Information

Our annual report to the Securities and Exchange Commission (Form 10-K), quarterly reports (Form 10-Q) and current reports (Form 8-K) and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934 are available free of charge at https://investors.nordson.com as soon as reasonably practical after such material is electronically filed with, or furnished to, the SEC. Copies of these reports may also be obtained free of charge by sending written requests to Corporate Communications, Nordson Corporation, 28601 Clemens Road, Westlake, Ohio 44145. The contents of our website are not incorporated by reference herein and are not deemed to be a part of this report.

Item 1A. Risk Factors

In an enterprise as diverse as ours, a wide range of factors could affect future performance. We discuss in this section some of the risk factors that, if they actually occurred, could materially and adversely affect our business, financial condition, value and results of operations. You should consider these risk factors in connection with evaluating the forward-looking statements contained in this Annual Report on Form 10-K because these factors could cause our actual results and financial condition to differ materially from those projected in forward-looking statements.

The significant risk factors affecting our operations include the following:

Changes in United States or international economic conditions, including declines in the industries we serve, could adversely affect the profitability of any of our operations.

In 2019, approximately 35 percent of our revenue was generated in the United States, while approximately 65 percent was generated outside the United States. A general slowdown in the global economy or in a particular region or industry or an increase in trade tensions with U.S. trading partners could negatively impact our business, financial condition or liquidity. Our largest markets include consumer non-durable, industrial, medical, electronics, consumer durable and automotive. A slowdown in any of these specific end markets could directly affect our revenue stream and profitability.

A portion of our product sales is attributable to industries and markets, such as the electronics, polymer processing and metal finishing industries, which historically have been cyclical and sensitive to relative changes in supply and demand and general economic conditions. The demand for our products depends, in part, on the general economic conditions of the industries or national economies of our customers. Downward economic cycles in our customers' industries or countries may reduce sales of some of our products. It is not possible to predict accurately the factors that will affect demand for our products in the future.

Any significant downturn in the health of the general economy, globally, regionally or in the markets in which we sell products, could have an adverse effect on our revenues and financial performance, resulting in impairment of assets. We cannot predict the timing, strength or duration of any economic slowdown, instability or recovery, generally or within any particular region or industry in which we operate.

If we fail to develop new products or enhance existing products, or our customers do not accept the new or enhanced products we develop, our revenue and profitability could be adversely impacted.

Innovation is critical to our success. We believe that we must continue to enhance our existing products and to develop and manufacture new products with improved capabilities in order to continue to be a leading provider of precision technology solutions. We also believe that we must continue to make improvements in our productivity in order to maintain our competitive position. Difficulties or delays in research, development or production of new or enhanced products or failure to gain market acceptance of new or enhanced products and technologies may reduce future sales and adversely affect our competitive position. We continue to invest in the development and marketing of new or enhanced products. There can be no assurance that we will have sufficient resources to make such investments, that we will be able to make the technological advances necessary to maintain competitive advantages or that we can recover major research and development expenses. If we fail to make innovations, launch products with quality problems or the market does not accept our new products, our financial condition, results of operations, cash flows and liquidity could be adversely affected. In addition, as new or enhanced products are introduced, we must successfully manage the transition from older products to minimize disruption in customers' ordering patterns, avoid excessive levels of older product inventories and ensure that we can deliver sufficient supplies of new products to meet customers' demands.

Increased IT security threats and more sophisticated and targeted computer crime could pose a risk to our systems, networks, products, solutions and services.

We have experienced and expect to continue to experience cyber-attacks to our systems and networks. To date, we have not experienced any material breaches or material losses related to cyber-attacks. To conduct our business, we rely extensively on information technology systems, networks and services, some of which are managed, hosted and provided by third-party service providers. Increased global IT security threats and more sophisticated and targeted computer crime pose a risk to the security of our systems and networks and those of our third-party service providers and the confidentiality, availability and integrity of our data. Depending on their nature and scope, such threats could potentially lead to the compromising of confidential information, including but not limited to confidential information relating to customer or employee data, improper use of our systems and networks, manipulation and destruction of data, defective products, production downtimes and operational disruptions, which in turn could adversely affect our reputation, competitiveness and results of operations. A cyber-attack or other disruption may also result in financial loss, including potential fines for failure to safeguard data or losses in connection with any litigation that may result from a cyber-attack. Our insurance coverage may not be adequate to cover all the costs arising from such events.

We have taken steps and incurred costs to further strengthen the security of our computer systems and continue to assess, maintain and enhance the ongoing effectiveness of our information security systems. While we attempt to mitigate these risks by employing a number of measures, including employee training, comprehensive monitoring of our networks and systems, and maintenance of backup and protective systems, our systems, networks, products, solutions and services remain potentially vulnerable to advanced persistent threats. The techniques used by criminals to obtain unauthorized access to sensitive data change frequently and often are not recognizable until launched against a target. Accordingly, we may be unable to anticipate these techniques or implement adequate preventative measures. It is therefore possible that in the future we may suffer a criminal attack, unauthorized parties may gain access to personal information in our possession and we may not be able to identify any such incident in a timely manner.

The interpretation and application of data protection laws, including federal, state and international laws, relating to the collection, use, retention, disclosure, security and transfer of personally identifiable data in the U.S., Europe (including but not limited to the European Union's General Data Protection Regulation), and elsewhere, are uncertain and evolving. It is possible that these laws may be interpreted and applied in a manner that is inconsistent with our data practices. In addition, as a result of existing or new data protection requirements, we incur and expect to continue to incur significant ongoing operating costs as part of our significant efforts to protect and safeguard our sensitive data and personal information. These efforts also may divert management and employee attention from other business and growth initiatives. A breach in information privacy could result in legal or reputational risks and could have a negative impact on our revenues and results of operations.

Our results have been and could continue to be impacted by uncertainty in U.S. trade policy, including uncertainty surrounding changes in tariffs, trade agreements or other trade restrictions imposed by the U.S. or other governments.

Our ability to conduct business can be significantly impacted by changes in tariffs, changes or repeals of trade agreements, including withdrawal from or material modifications to the North American Free Trade Agreement, which the U.S. government has renegotiated into the "United States-Mexico-Canada Agreement" with Mexico and Canada and has yet to ratify, or the imposition of other trade restrictions or retaliatory actions imposed by various governments. Other effects of these changes, including impacts on the price of raw materials, responsive actions from governments and the opportunity for competitors to establish a presence in markets where we participate, could also have significant impacts on our results. We cannot predict what further action may be taken with respect to tariffs or trade relations between the U.S. and other governments, and any further changes in U.S. or international trade policy could have an adverse impact on our business.

Our growth strategy includes acquisitions, and we may not be able to execute on our acquisition strategy or integrate acquisitions successfully.

Our recent historical growth has depended, and our future growth is likely to continue to depend, in part on our acquisition strategy and the successful integration of acquired businesses into our existing operations. We intend to continue to seek additional acquisition opportunities both to expand into new markets and to enhance our position in existing markets throughout the world. We cannot assure we will be able to successfully identify suitable acquisition opportunities, prevail against competing potential acquirers, negotiate appropriate acquisition terms, obtain financing that may be needed to consummate such acquisitions, complete proposed acquisitions, successfully integrate acquired businesses into our existing operations or expand into new markets. In addition, we cannot assure that any acquisition, once successfully integrated, will perform as planned, be accretive to earnings, or prove to be beneficial to our operations and cash flow.

The success of our acquisition strategy is subject to other risks and uncertainties, including:

- our ability to realize operating efficiencies, synergies or other benefits expected from an acquisition, and possible delays in realizing the benefits of the acquired company or products;
- diversion of management's time and attention from other business concerns;
- difficulties in retaining key employees, customers or suppliers of the acquired business;
- difficulties in maintaining uniform standards, controls, procedures and policies throughout acquired companies;
- adverse effects on existing business relationships with suppliers or customers;
- the risks associated with the assumption of product liabilities, contingent or undisclosed liabilities of acquisition targets; and
- the ability to generate future cash flows or the availability of financing.

In addition, an acquisition could adversely impact our operating performance as a result of the incurrence of acquisition-related debt, pre-acquisition potential tax liabilities, acquisition expenses, the amortization of acquisition-acquired assets, or possible future impairments of goodwill or intangible assets associated with the acquisition.

We may also face liability with respect to acquired businesses for violations of environmental laws occurring prior to the date of our acquisition, and some or all of these liabilities may not be covered by environmental insurance secured to mitigate the risk or by indemnification from the sellers from which we acquired these businesses. We could also incur significant costs, including, but not limited to, remediation costs, natural resources damages, civil or criminal fines and sanctions and third-party claims, as a result of past or future violations of, or liabilities, associated with environmental laws.

Significant movements in foreign currency exchange rates or change in monetary policy may harm our financial results.

We are exposed to fluctuations in foreign currency exchange rates, particularly with respect to the euro, the yen, the pound sterling and the Chinese yuan. Any significant change in the value of the currencies of the countries in which we do business against the United States dollar could affect our ability to sell products competitively and control our cost structure, which could have a material adverse effect on our business, financial condition and results of operations. For additional detail related to this risk, see Item 7A, Quantitative and Qualitative Disclosure About Market Risk.

A significant portion of our consolidated revenues in 2019 were generated in currencies other than the United States dollar, which is our reporting currency. We recognize foreign currency transaction gains and losses arising from our operations in the period incurred. As a result, currency fluctuations between the United States dollar and the currencies in which we do business have caused and will continue to cause foreign currency transaction and translation gains and losses, which historically have been material and could continue to be material. We cannot predict the effects of exchange rate fluctuations upon our future operating results because of the number of currencies involved, the variability of currency exposures and the potential volatility of currency exchange rates. We take actions to manage our foreign currency exposure, such as entering into hedging transactions, where available, but we cannot assure that our strategies will adequately protect our consolidated operating results from the effects of exchange rate fluctuations. For example, uncertainty surrounding the effects and timing of Brexit have caused increased volatility in global currency exchange rates that have resulted in the strengthening of the United States dollar against the foreign currencies in which we conduct business. Future adverse consequences arising from Brexit may include continued volatility in exchange rates. Any significant fluctuation in exchange rates may be harmful to our financial condition and results of operations. We also face risks arising from the imposition of exchange controls and currency devaluations. Exchange controls may limit our ability to convert foreign currencies into United States dollars or to remit dividends and other payments by our foreign subsidiaries or customers located in or conducting business in a country imposing controls. Currency devaluations diminish the United States dollar value of the currency of the country instituting the devaluation and, if they occur or continue for significant periods, could adversely affect our earnings or cash flow.

Any impairment in the value of our intangible assets, including goodwill, would negatively affect our operating results and total capitalization.

Our total assets reflect substantial intangible assets, primarily goodwill. The goodwill results from our acquisitions and represents the excess of cost over the fair value of the identifiable net assets we acquired. We assess at least annually whether there has been any impairment in the value of our intangible assets. If future operating performance at one or more of our business units were to fall significantly below current levels, if competing or alternative technologies emerge, if market conditions for acquired businesses decline, if significant and prolonged negative industry or economic trends exist, if our stock price and market capitalization declines, or if future cash flow estimates decline, we could incur, under current applicable accounting rules, a non-cash charge to operating earnings for goodwill impairment. Any determination requiring the write-off of a significant portion of unamortized intangible assets would negatively affect our results of operations and equity book value, the effect of which could be material.

Changes in United States and international tax law may have a material adverse effect on our business, financial condition and results of operations.

We are subject to income taxes in the United States and various foreign jurisdictions. Changes in applicable domestic or foreign tax laws and regulations, or their interpretation and application, including the possibility of retroactive effect, could affect our business, financial condition and profitability by increasing our tax liabilities. Our future results of operations could be adversely affected by changes in our effective tax rate as a result of a change in the mix of earnings in jurisdictions with differing statutory tax rates, changes in our overall profitability, changes in tax legislation and rates, changes in generally accepted accounting principles and changes in the valuation of deferred tax assets and liabilities. The U.S. federal government may adopt changes to international trade agreements, tariffs, taxes and other government rules and regulations. While we cannot predict what changes will actually occur with respect to any of these items, such changes could affect our business and results of operations.

If our intellectual property protection is inadequate, others may be able to use our technologies and tradenames and thereby reduce our ability to compete, which could have a material adverse effect on us, our financial condition and results of operations.

We regard much of the technology underlying our products and the trademarks under which we market our products as proprietary. The steps we take to protect our proprietary technology may be inadequate to prevent misappropriation of our technology, or third parties may independently develop similar technology. We rely on a combination of patents, trademark, copyright and trade secret laws, employee and third-party non-disclosure agreements and other contracts to establish and protect our technology and other intellectual property rights. The agreements may be breached or terminated, and we may not have adequate remedies for any breach, and existing trade secrets, patent and copyright law afford us limited protection. Policing unauthorized use of our intellectual property is difficult. A third party could copy or otherwise obtain and use our products or technology without authorization. Litigation may be necessary for us to defend against claims of infringement or to protect our intellectual property rights and could result in substantial cost to us and diversion of our efforts. Further, we might not prevail in such litigation, which could harm our business.

Our products could infringe on the intellectual property of others, which may cause us to engage in costly litigation and, if we are not successful, could cause us to pay substantial damages and prohibit us from selling our products.

Third parties may assert infringement or other intellectual property claims against us based on their patents or other intellectual property claims, and we may have to pay substantial damages, possibly including treble damages, if it is ultimately determined our products infringe. We may have to obtain a license to sell our products if it is determined that our products infringe upon another party's intellectual property. We might be prohibited from selling our products before we obtain a license, which, if available at all, may require us to pay substantial royalties. Even if infringement claims against us are without merit, defending these types of lawsuits takes significant time, may be expensive and may divert management attention from other business concerns.

We may be exposed to liabilities under the Foreign Corrupt Practices Act (FCPA), which could have a material adverse effect on our business.

We are subject to compliance with various laws and regulations, including the FCPA and similar worldwide anti-bribery and anti-corruption laws, which generally prohibit companies and their intermediaries from engaging in bribery or making other improper payments to private or public parties for the purpose of obtaining or retaining business or gaining an unfair business advantage. The FCPA also requires proper record keeping and characterization of such payments in our reports filed with the SEC. Our employees are trained and required to comply with these laws, and we are committed to legal compliance and corporate ethics. Violations of these laws could result in severe criminal or civil sanctions and financial penalties and other consequences that may have a material adverse effect on our business, reputation, financial condition or results of operations.

Our inability to comply with our existing credit facilities' restrictive covenants or to access additional sources of capital could impede growth or the repayment or refinancing of existing indebtedness.

The limits imposed on us by the restrictive covenants contained in our credit facilities could prevent us from making acquisitions or cause us to lose access to these facilities.

Our existing credit facilities contain restrictive covenants that limit our ability to, among other things:

- borrow money or guarantee the debts of others;
- use assets as security in other transactions;
- make restricted payments or distributions; and
- sell or acquire assets or merge with or into other companies.

In addition, our credit facilities require us to meet financial ratios, including a "Leverage Ratio" and an "Interest Coverage Ratio," both as defined in the credit facilities.

These restrictions could limit our ability to plan for or react to market conditions or meet extraordinary capital needs and could otherwise restrict our financing activities.

Our ability to comply with the covenants and other terms of our credit facilities will depend on our future operating performance. If we fail to comply with such covenants and terms, we may be in default and the maturity of the related debt could be accelerated and become immediately due and payable. We may be required to obtain waivers from our lenders in order to maintain compliance under our credit facilities, including waivers with respect to our compliance with certain financial covenants. If we are unable to obtain necessary waivers and the debt under our credit facilities is accelerated, we would be required to obtain replacement financing at prevailing market rates.

We may need new or additional financing in the future to expand our business or refinance existing indebtedness. If we are unable to access capital on satisfactory terms and conditions, we may not be able to expand our business or meet our payment requirements under our existing credit facilities. Our ability to obtain new or additional financing will depend on a variety of factors, many of which are beyond our control. We may not be able to obtain new or additional financing because we have substantial debt or because we may not have sufficient cash flow to service or repay our existing or future debt. In addition, depending on market conditions and our financial performance, neither debt nor equity financing may be available on satisfactory terms or at all. Finally, as a consequence of worsening financial market conditions, our credit facility providers may not provide the agreed credit if they become undercapitalized.

Changes in interest rates could adversely affect us.

Any period of interest rate increases may adversely affect our profitability. At October 31, 2019, we had $1,244,142 of total debt and notes payable outstanding, of which 51 percent was priced at interest rates that float with the market. A one percentage point increase in the interest rate on the floating rate debt in 2019 would have resulted in approximately $7,236 of additional interest expense. A higher level of floating rate debt would increase the exposure to changes in interest rates. For additional detail related to this risk, see Item 7A, Quantitative and Qualitative Disclosure About Market Risk. Additionally, the interest rates on some of our debt is tied to LIBOR. In July 2017, the head of the United Kingdom's Financial Conduct Authority announced its intention to phase out the use of LIBOR by the end of 2021. The uncertainty regarding the future of LIBOR, as well as the transition from LIBOR to another benchmark rate or rates could have adverse impacts on our outstanding debt and notes payable that currently use LIBOR as a benchmark rate, and ultimately, adversely affect our financial condition and results of operations.

Failure to retain our existing senior management team or the inability to attract and retain qualified personnel could hurt our business and inhibit our ability to operate and grow successfully.

During 2019, we experienced a leadership change with the appointment of a new President and Chief Executive Officer. Our success will continue to depend to a significant extent on the continued service of our executive management team and the ability to recruit, hire and retain other key management personnel to support our growth and operational initiatives and replace executives who retire or resign. Failure to retain our leadership team and attract and retain other important management and technical personnel could place a constraint on our global growth and operational initiatives, possibly resulting in inefficient and ineffective management and operations, which would likely harm our revenues, operations and product development efforts and eventually result in a decrease in profitability.

The level of returns on pension plan assets and changes in the actuarial assumptions used could adversely affect us.

Our operating results may be positively or negatively impacted by the amount of expense we record for our defined benefit pension plans. U.S. GAAP requires that we calculate pension expense using actuarial valuations, which are dependent upon our various assumptions including estimates of expected long-term rate of return on plan assets, discount rates for future payment obligations, and the expected rate of increase in future compensation levels. Our pension expense and funding requirements may also be affected by our actual return on plan assets and by legislation and other government regulatory actions. Changes in assumptions, laws or regulations could lead to variability in operating results and could have a material adverse impact on liquidity.

Political conditions in the U.S. and foreign countries in which we operate could adversely affect us.

We conduct our manufacturing, sales and distribution operations on a worldwide basis and are subject to risks associated with doing business outside the United States. In 2019, approximately 65 percent of our total sales were generated outside the United States. We expect that international operations and United States export sales will continue to be important to our business for the foreseeable future. Both sales from international operations and export sales are subject in varying degrees to risks inherent in doing business outside the United States. Such risks include, but are not limited to, the following:

- risks of political or economic instability, such as Brexit;
- unanticipated or unfavorable circumstances arising from host country laws or regulations;
- threats of war, terrorism or governmental instability;
- changes in tax rates, adoption of new tax laws or other additional tax policies, and other proposals to reform United States and foreign tax laws that impact how United States multinational corporations are taxed on foreign earnings;
- restrictions on the transfer of funds into or out of a country;
- potential negative consequences from changes to taxation policies;
- the disruption of operations from labor and political disturbances;
- the imposition of tariffs, import or export licensing requirements and other potential changes in trade policies and relations arising from policy initiatives implemented by the current U.S. presidential administration; and
- exchange controls or other trade restrictions including transfer pricing restrictions when products produced in one country are sold to an affiliated entity in another country.

Any of these events could reduce the demand for our products, limit the prices at which we can sell our products, interrupt our supply chain, or otherwise have an adverse effect on our operating performance.

Our international operations also depend upon favorable trade relations between the U.S. and those foreign countries in which our customers, subcontractors and materials suppliers have operations. A protectionist trade environment in either the U.S. or those foreign countries in which we do business, such as a change in the current tariff structures, export compliance or other trade policies, may materially and adversely affect our ability to sell our products in foreign markets. The current U.S. presidential administration has criticized existing trade agreements, and while it remains unclear what actions the administration may take with respect to existing and proposed trade agreements, or restrictions on trade generally, more stringent export and import controls may be ultimately imposed in the future.

Our business and operating results may be adversely affected by natural disasters or other catastrophic events beyond our control.

While we have taken precautions to prevent production and service interruptions at our global facilities, severe weather conditions such as hurricanes or tornadoes, as well as major earthquakes, wildfires and other natural disasters, as well as cyberterrorism, in areas in which we have manufacturing facilities or from which we obtain products may cause physical damage to our properties, closure of one or more of our manufacturing or distribution facilities, lack of an adequate work force in a market, temporary disruption in the supply of inventory, disruption in the transport of products and utilities, and delays in the delivery of products to our customers. Any of these factors may disrupt our operations and adversely affect our financial condition and results of operations.

The insurance that we maintain may not fully cover all potential exposures.

We maintain property, business interruption and casualty insurance but such insurance may not cover all risks associated with the hazards of our business and is subject to limitations, including deductibles and maximum liabilities covered. We are potentially at risk if one or more of our insurance carriers fail. Additionally, severe disruptions in the domestic and global financial markets could adversely impact the ratings and survival of some insurers. In the future, we may not be able to obtain coverage at current levels, and our premiums may increase significantly on coverage that we maintain.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our principal owned and leased properties (defined as greater than 20,000 square feet or related to a principal operation) as of October 31, 2019 are as follows:

Location	Description of Property	Approximate Square Feet
Amherst, Ohio [2, 3]	A manufacturing, laboratory and office complex	521,000
Austintown, Ohio [1]	A manufacturing, warehouse and office building (leased)	207,000
Carlsbad, California [2]	Three manufacturing and office buildings (leased)	181,000
Duluth, Georgia [1]	A manufacturing, laboratory and office building	176,000
Norwich, Connecticut [2]	A manufacturing, laboratory and office building	159,000
Chippewa Falls, Wisconsin [1]	A manufacturing, warehouse and office building (leased)	145,000
Swainsboro, Georgia [1]	A manufacturing building (leased)	136,000
East Providence, Rhode Island [2]	A manufacturing, warehouse and office building	116,000
Loveland, Colorado [2]	A manufacturing, warehouse and office building	115,000
Robbinsville, New Jersey [2]	A manufacturing, warehouse and office building (leased)	88,000
Salem, New Hampshire [2]	Two manufacturing, warehouse and office buildings (leased)	83,000
Minneapolis, Minnesota [2]	Two office, laboratory and warehouse buildings (leased)	69,000
Wixom, Michigan [3]	A manufacturing, warehouse and office building (leased)	64,000
Vista, California [2]	A manufacturing building (leased)	41,000
Hickory, North Carolina [1]	A manufacturing, warehouse and office building (leased)	41,000
Marlborough, Massachusetts [2]	An office, laboratory and warehouse building (leased)	30,000
Westlake, Ohio	Corporate headquarters	28,000
Spokane, Washington [2]	A manufacturing, warehouse and office building (leased)	27,000
Chattanooga, Tennessee [2]	A manufacturing, warehouse and office building (leased)	25,000
Sunnyvale, California [2]	Two office, laboratory and warehouse buildings (leased)	24,000
Huntington Beach, California [2]	An office, laboratory and warehouse building (leased)	21,000
Münster, Germany [1]	Two manufacturing, warehouse and office buildings (leased)	488,000
Shanghai, China [1, 2, 3]	Three manufacturing, warehouse, laboratory and office buildings	178,000
Lüneburg, Germany [1]	A manufacturing and laboratory building	129,000
Guaymas, Mexico [2]	Three manufacturing, warehouse and office buildings (leased)	89,000
Tokyo, Japan [1, 2, 3]	Four office, laboratory and warehouse buildings (leased)	75,700
Bangalore, India [1, 2, 3]	A manufacturing, warehouse and office building	56,000
Maastricht, Netherlands [1, 2, 3]	A manufacturing, warehouse and office building	54,000
Chonburi, Thailand [1]	A manufacturing, warehouse and office building	52,000
Erkrath, Germany [1, 2, 3]	An office, laboratory and warehouse building (leased)	50,000
Boyle, Ireland [2]	A manufacturing, warehouse and office building (leased)	47,000
Deurne, Netherlands [2]	A manufacturing, warehouse and office building (leased)	46,000
Munich, Germany [2]	An office, laboratory and warehouse buildings (leased)	43,000
Suzhou, China [2]	A manufacturing, warehouse and office building (leased)	42,000
Aylesbury, U.K. [1, 2]	A manufacturing, warehouse and office building (leased)	36,000
Galway, Ireland [2]	An office, laboratory and warehouse building (leased)	36,000
Seongnam-City, South Korea [1, 2, 3]	An office, laboratory and warehouse building (leased)	35,000
Shanghai, China [1,2, 3]	Three manufacturing, warehouse and office buildings (leased)	33,000
Pirmasens, Germany [1]	A manufacturing, warehouse and office building (leased)	32,000
Sao Paulo, Brazil [1, 2, 3]	An office, laboratory and warehouse building (leased)	23,000
El Marques, Mexico [1, 2, 3]	A warehouse and office building (leased)	22,000
Singapore [1, 2, 3]	Two warehouse and office buildings (leased)	22,000
Katzrin, Israel [2]	An office, laboratory and warehouse building (leased)	20,000

Business Segment - Property Identification Legend

1 - Adhesive Dispensing Systems

2 - Advanced Technology Systems

3 - Industrial Coating Systems

The facilities listed have adequate, suitable and sufficient capacity (production and nonproduction) to meet present and foreseeable demand for our products.

Other properties at international subsidiary locations and at branch locations within the United States are leased. Lease terms do not exceed 25 years and generally contain a provision for cancellation with some penalty at an earlier date. Information about leases is reported in Note 10 of Notes to Consolidated Financial Statements that can be found in Part II, Item 8 of this document.

Item 3. Legal Proceedings

We are involved in pending or potential litigation regarding environmental, product liability, patent, contract, employee and other matters arising from the normal course of business. Including the litigation and environmental matters discussed below, after consultation with legal counsel, we do not believe that losses in excess of the amounts we have accrued would have a material adverse effect on our financial condition, quarterly or annual operating results or cash flows.

Class Action Litigation

On February 22, 2019, a former employee, Mr. Ortiz, filed a purported class action lawsuit in the San Diego County Superior Court, California, against Nordson Asymtek, Inc. and Nordson Corporation, alleging various violations of the California Labor Code. Plaintiff seeks, among other things, an unspecified amount for unpaid wages, actual, consequential and incidental losses, penalties, and attorneys' fees and costs. Management believes, based on currently available information, that the ultimate outcome of the proceeding described above will not have a material adverse effect on the Company's financial condition or results of operations.

Environmental

We have voluntarily agreed with the City of New Richmond, Wisconsin and other Potentially Responsible Parties to share costs associated with the remediation of the City of New Richmond municipal landfill (the "Site") and constructing a potable water delivery system serving the impacted area down gradient of the Site. At October 31, 2019 and 2018, our accrual for the ongoing operation, maintenance and monitoring obligation at the Site was $401 and $439, respectively.

The liability for environmental remediation represents management's best estimate of the probable and reasonably estimable undiscounted costs related to known remediation obligations. The accuracy of our estimate of environmental liability is affected by several uncertainties such as additional requirements that may be identified in connection with remedial activities, the complexity and evolution of environmental laws and regulations, and the identification of presently unknown remediation requirements. Consequently, our liability could be different than our current estimate. However, we do not expect that the costs associated with remediation will have a material adverse effect on our financial condition or results of operations.

Item 4. Mine Safety Disclosures

None.

Information About Our Executive Officers

Our executive officers as of October 31, 2019, were as follows:

Name	Age	Officer Since	Position or Office with The Company and Business Experience During the Past Five (5) Year Period
Sundaram Nagarajan	57	2019	President and Chief Executive Officer, 2019
Gregory A. Thaxton	58	2007	Executive Vice President, Chief Financial Officer, 2012
Gina A. Beredo	45	2018	Executive Vice President, General Counsel and Secretary, 2018
James E. DeVries	60	2012	Executive Vice President, 2012
John J. Keane	58	2003	Executive Vice President, 2005
Stephen P. Lovass	50	2017	Executive Vice President, 2017
Gregory P. Merk	48	2006	Executive Vice President, 2013
Shelly M. Peet	54	2007	Executive Vice President, 2009
Jeffrey A. Pembroke	52	2015	Executive Vice President, 2015
Joseph Stockunas	59	2015	Executive Vice President, 2015

On June 14, 2019, we announced the appointment of Sundaram Nagarajan as President and Chief Executive Officer and as a member of the Board of Directors of the Company, effective August 1, 2019. Michael Hilton (age 65) ceased as President and Chief Executive Officer effective August 1, 2019 and has since been employed as Senior Advisor to the Company. Mr. Hilton will continue to serve as an Executive Officer and Senior Advisor, and as a member of the Company's Board of Directors until his retirement effective December 31, 2019.

Prior to becoming our President and Chief Executive Officer, Mr. Nagarajan served as Executive Vice President, Automotive OEM Segment, with Illinois Tool Works Inc. (NYSE: ITW), a global manufacturer of a diversified range of industrial products and equipment, since 2015. Prior to that, Mr. Nagarajan served as Executive Vice President, Welding Segment, with Illinois Tool Works from 2010 to 2015. Mr. Nagarajan has served as a member of the Board of Directors of Sonoco Products Company (NYSE: SON) since 2015.

Effective January 1, 2018, Ms. Beredo was appointed Executive Vice President, General Counsel and Secretary. Ms. Beredo served as Deputy General Counsel and Assistant Secretary since joining the Company in 2013. Prior to joining the Company, Ms. Beredo served as Chief Litigation Counsel and Director of Compliance & Ethics at American Greetings Corporation, formerly traded on the NYSE. Prior to joining American Greetings, Ms. Beredo was an associate at BakerHostetler LLP.

On November 28, 2016, Mr. Lovass was elected as Corporate Vice President. Prior to joining the Company, Mr. Lovass served as President for one of the global sensors and controls businesses for Danaher Corporation, a publicly-traded, international Fortune 200, diversified science and technology company from 2012 to 2016. Prior to joining Danaher, Mr. Lovass served as a Senior Vice President and Corporate Officer for Gerber Scientific.

PART II

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

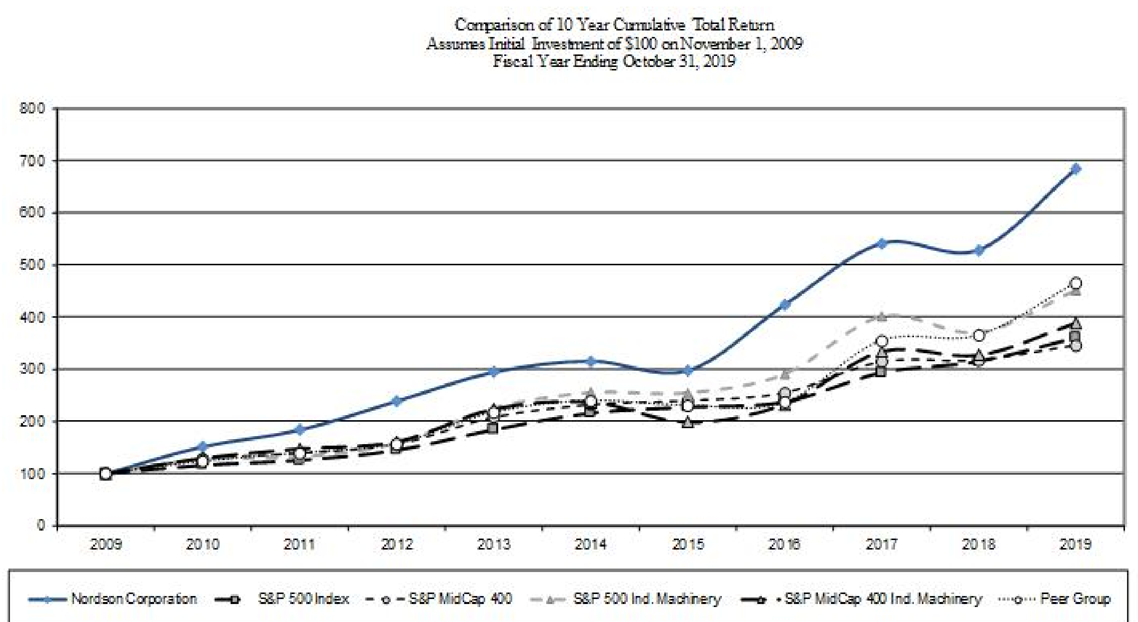
Market Information and Dividends

(a) Our common shares are listed on the Nasdaq Global Select Market under the symbol NDSN. As of November 30, 2019, there were 1,366 record shareholders.

While we have historically paid dividends to shareholders of our common stock on a quarterly basis, the declaration and payment of future dividends will depend on many factors, including but not limited to, our earnings, financial condition, business development needs and regulatory considerations, and are at the discretion of our board of directors.

Performance Graph

The following is a graph that compares the 10-year cumulative return, calculated on a dividend-reinvested basis, from investing $100 on November 1, 2009 in Nordson common shares, the S&P 500 Index, the S&P MidCap 400 Index, the S&P 500 Industrial Machinery Index, the S&P MidCap 400 Industrial Machinery Index and our Proxy Peer Group, which includes: AIN, AME, B, DCI, ENTG, EPAC, ESL, FLIR, GDI, GGG, GTLS, IEX, ITT, KEYS, LECO, NATI, ROP, TER, WTS, and WWD.



Company/Market/Peer Group	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Nordson Corporation	$100.00	$151.62	$183.67	$238.70	$294.28	$315.68	$297.38	$423.52	$540.90	$528.58	$683.29
S&P 500 Index	$100.00	$116.52	$125.94	$145.09	$184.52	$216.38	$227.64	$237.90	$294.12	$315.73	$360.96
S&P MidCap 400	$100.00	$127.64	$138.55	$155.32	$207.33	$231.49	$239.42	$254.39	$314.12	$317.33	$345.94
S&P 500 Ind. Machinery	$100.00	$127.95	$132.38	$158.43	$226.22	$255.10	$254.71	$290.84	$400.96	$369.97	$451.20
S&P MidCap 400 Ind. Machinery	$100.00	$129.97	$147.82	$161.44	$224.14	$237.52	$198.82	$233.34	$334.67	$327.62	$389.31
Peer Group	$100.00	$123.63	$139.16	$157.09	$217.28	$239.51	$230.50	$235.93	$354.82	$364.75	$464.87

Source: Zack's Investment Research

(b) Use of Proceeds. Not applicable.

(c) Issuer Purchases of Equity Securities

	Total Number of Shares Repurchased	Average Price Paid per Share	Total Number of Shares Repurchased as Part of Publicly Announced Plans or Programs(1)	Maximum Value of Shares That May Yet Be Purchased Under the Plans or Programs(1)
August 1, 2019 to August 31, 2019	—	$ —	—	$ 487,628
September 1, 2019 to September 30, 2019	—	$ —	—	$ 487,628
October 1, 2019 to October 31, 2019	17	$ 138.38	17	$ 485,242
Total	17		17	

(1) In December 2014, the board of directors authorized a $300,000 common share repurchase program. In August 2015, the board of directors authorized the repurchase of up to an additional $200,000 of the Company's common shares. In August 2018, the board of directors authorized the repurchase of an additional $500,000 of the Company's common shares. Approximately $485,242 of the total $1,000,000 authorized remained available for share repurchases at October 31, 2019. Uses for repurchased shares include the funding of benefit programs including stock options and restricted stock. Shares purchased are treated as treasury shares until used for such purposes. The repurchase program is being funded using cash from operations and proceeds from borrowings under our credit facilities.

Item 6. Selected Financial Data

	2019	2018	2017	2016	2015
(In thousands except for per-share amounts)					
Operating Data (a) (e)					
Sales	**$ 2,194,226**	$ 2,254,668	$ 2,066,982	$ 1,808,994	$ 1,688,666
Cost of sales	**1,002,123**	1,018,340	927,692	813,792	772,225
% of sales	**46**	45	45	45	46
Selling and administrative expenses	**708,990**	733,749	672,888	597,076	582,848
% of sales	**32**	33	33	33	35
Operating profit	**483,113**	502,579	466,402	398,126	333,593
% of sales	**22**	22	23	22	20
Net income	**337,091**	377,375	295,802	271,843	211,111
% of sales	**15**	17	14	15	13
Financial Data (a) (f)					
Working capital	**$ 533,569**	$ 533,822	$ 240,626	$ 414,032	$ 420,815
Net property, plant and equipment and other non-current assets	**2,505,252**	2,536,910	2,526,167	1,675,008	1,646,723
Total capital (b)	**2,674,023**	2,669,154	2,648,094	1,767,369	1,724,211
Total assets	**3,516,447**	3,421,012	3,414,539	2,420,583	2,358,314
Long-term liabilities	**1,457,776**	1,619,991	1,611,300	1,237,437	1,407,522
Shareholders' equity	**1,581,045**	1,450,741	1,155,493	851,603	660,016
Return on average total capital — % (c)	**14**	15	14	16	13
Return on average shareholders' equity — % (d)	**23**	28	30	37	26
Per-Share Data (a)					
Average number of common shares	**57,462**	57,970	57,533	57,060	60,652
Average number of common shares and common share equivalents	**58,202**	58,931	58,204	57,530	61,151
Basic earnings per share	**$ 5.87**	$ 6.51	$ 5.14	$ 4.76	$ 3.48
Diluted earnings per share	**5.79**	6.40	5.08	4.73	3.45
Dividends per common share	**1.43**	1.25	1.11	0.99	0.90
Book value per common share	**27.45**	25.00	20.02	14.86	11.51

(a) See accompanying Notes to Consolidated Financial Statements.

(b) Notes payable, plus current portion of long-term debt, plus long-term debt, minus cash and marketable securities, plus shareholders' equity.

(c) Net income plus after-tax interest expense on borrowings as a percentage of the average of quarterly borrowings (net of cash) plus shareholders' equity over the last five quarterly accounting periods.

(d) Net income as a percentage of average quarterly shareholders' equity over the last five quarterly accounting periods.

(e) Certain amounts for the years 2015 through 2018 have been adjusted to reflect the retrospective application of our reclassification of certain pension costs upon the adoption of a new accounting standard in 2019.

(f) Certain amounts for the years 2015 and 2016 have been adjusted to reflect the retrospective application of our reclassification of debt issuance costs upon the adoption of a new accounting standard in 2017.

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

NOTE REGARDING AMOUNTS AND FISCAL YEAR REFERENCES

In this annual report, all amounts related to United States dollars and foreign currency and to the number of Nordson Corporation's common shares, except for per share earnings and dividend amounts, are expressed in thousands. Unless the context otherwise indicates, all references to "we," "us," "our," or the "Company" mean Nordson Corporation.

Unless otherwise noted, all references to years relate to our fiscal year ending October 31.

Critical Accounting Policies and Estimates

Our Consolidated Financial Statements and accompanying notes have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements requires management to make estimates, judgments and assumptions that affect reported amounts of assets, liabilities, revenues and expenses. On an ongoing basis, we evaluate the accounting policies and estimates that are used to prepare financial statements. We base our estimates on historical experience and assumptions believed to be reasonable under current facts and circumstances. Actual amounts and results could differ from these estimates used by management.

Certain accounting policies that require significant management estimates and are deemed critical to our results of operations or financial position are discussed below. On a regular basis, critical accounting policies are reviewed with the Audit Committee of the board of directors.

Revenue recognition – A contract exists when it has approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance and collectability of the consideration is probable. Revenue is recognized when performance obligations under the terms of the contract with a customer are satisfied. Generally, our revenue results from short-term, fixed-price contracts and is recognized as of a point in time when the product is shipped or at a later point when the control of the product transfers to the customer. Refer to Note 1 to the Consolidated Financial Statements for further discussion around the Company's revenue recognition policy.

Business combinations – The acquisitions of our businesses are accounted for under the acquisition method of accounting. The amounts assigned to the identifiable assets acquired and liabilities assumed in connection with acquisitions are based on estimated fair values as of the date of the acquisition, with the remainder, if any, recorded as goodwill. The fair values are determined by management, taking into consideration information supplied by the management of the acquired entities, and other relevant information. Such information typically includes valuations obtained from independent appraisal experts, which management reviews and considers in its estimates of fair values. The valuations are generally based upon future cash flow projections for the acquired assets, discounted to present value. The determination of fair values requires significant judgment by management, particularly with respect to the value of identifiable intangible assets. This judgment could result in either a higher or lower value assigned to amortizable or depreciable assets. The impact could result in either higher or lower amortization and/or depreciation expense.

Goodwill – Goodwill is the excess of purchase price over the fair value of tangible and identifiable intangible net assets acquired in various business combinations. Goodwill is not amortized but is tested for impairment annually at the reporting unit level, or more often if indications of impairment exist. Our reporting units are the Adhesive Dispensing Systems segment, the Industrial Coating Systems segment and one level below the Advanced Technology Systems segment.

We test goodwill in accordance with Accounting Standards Codification (ASC) 350. Goodwill impairment charge is recorded for the amount by which the carrying value of the reporting unit exceeds the fair value of the reporting unit, as calculated in the quantitative analysis described below. We did not record any goodwill impairment charges in 2019. We use an independent valuation specialist to assist with refining our assumptions and methods used to determine fair values using these methods. To test for goodwill impairment, we estimate the fair value of each of our reporting units using a combination of the Income Approach and the Market Approach.

The discounted cash flow method (Income Approach) uses assumptions for revenue growth, operating margin, and working capital turnover that are based on management's strategic plans tempered by performance trends and reasonable expectations about those trends. Terminal value calculations employ a published formula known as the Gordon Growth Model Method that essentially captures the present value of perpetual cash flows beyond the last projected period assuming a constant Weighted Average Cost of Capital (WACC) methodology and growth rate. For each reporting unit, a sensitivity analysis is performed to vary the discount and terminal growth rates in order to provide a range of reasonableness for detecting impairment. Discount rates are developed using a WACC methodology. The WACC represents the blended average required rate of return for equity and debt capital based on observed market return data and company specific risk factors. For 2019, the discount rates used ranged from 9 percent to 12 percent depending upon the reporting unit's size, end market volatility, and projection risk.

In the application of the guideline public company method (Market Approach), fair value is determined using transactional evidence for similar publicly traded equity. The comparable company guideline group is determined based on relative similarities to each reporting unit since exact correlations are not available. An indication of fair value for each reporting unit is based on the placement of each reporting unit within a range of multiples determined for its comparable guideline company group. Valuation multiples are derived by dividing latest twelve-month performance for revenues and EBITDA into total invested capital, which is the sum of traded equity plus interest bearing debt less cash. These multiples are applied against the revenue and EBITDA of each reporting unit. While the implied indications of fair value using the guideline public company method yield meaningful results, the discounted cash flow method of the income approach includes management's thoughtful projections and insights as to what the reporting units will accomplish in the near future. Accordingly, the reasonable, implied fair value of each reporting unit is a blend based on the consideration of both the Income and Market approaches.

In 2019, 2018, and 2017, the results of our annual impairment tests indicated no impairment.

The excess of fair value (FV) over carrying value (CV) was compared to the carrying value for each reporting unit. Based on the results shown in the table below and based on our measurement date of August 1, 2019, our conclusion is that no goodwill was impaired in 2019. Potential events or circumstances, such as a sustained downturn in global economies, could have a negative effect on estimated fair values.

	WACC	Excess of FV over CV	Goodwill
Adhesive Dispensing Systems Segment	9.0%	564%	$ 386,713
Industrial Coating Systems Segment	10.5%	550%	$ 24,058
Advanced Technology Systems Segment - Electronics Systems	10.0%	295%	$ 27,581
Advanced Technology Systems Segment - Fluid Management	10.0%	127%	$ 1,098,006
Advanced Technology Systems Segment - Test & Inspection	12.0%	178%	$ 77,118

Pension plans and postretirement medical plans - The measurement of liabilities related to our pension plans and postretirement medical plans is based on management's assumptions related to future factors, including interest rates, return on pension plan assets, compensation increases, mortality and turnover assumptions, and health care cost trend rates.

The weighted-average discount rate used to determine the present value of our domestic pension plan obligations was 3.25 percent at October 31, 2019 and 4.53 percent at October 31, 2018. The weighted-average discount rate used to determine the present value of our various international pension plan obligations was 1.26 percent at October 31, 2019, compared to 2.14 percent at October 31, 2018. The discount rates used for all plans were determined by using quality fixed income investments with a duration period approximately equal to the period over which pension obligations are expected to be settled.

In determining the expected return on plan assets, we consider both historical performance and an estimate of future long-term rates of return on assets similar to those in our plans. We consult with and consider the opinions of financial and actuarial experts in developing appropriate return assumptions. The expected rate of return (long-term investment rate) on domestic pension assets used to determine net benefit costs was 6.00 percent in both 2019 and 2018. The average expected rate of return on international pension assets used to determine net benefit costs was 3.96 percent in 2019 and 3.91 percent in 2018.

The assumed rate of compensation increases used to determine the present value of our domestic pension plan obligations was 4.00 percent at October 31, 2019, compared to 3.90 percent at October 31, 2018. The assumed rate of compensation increases used to determine the present value of our international pension plan obligations was 3.12 percent at both October 31, 2019, and October 31, 2018.

Annual expense amounts are determined based on the discount rate used at the end of the prior year. Differences between actual and assumed investment returns on pension plan assets result in actuarial gains or losses that are amortized into expense over a period of years.

Economic assumptions have a significant effect on the amounts reported. The effect of a one percent change in the discount rate, expected return on assets and compensation increase is shown in the table below. Bracketed numbers represent decreases in expense and obligation amounts.

	United States		International	
	1% Point Increase	1% Point Decrease	1% Point Increase	1% Point Decrease
Discount rate:				
Effect on total net periodic pension cost in 2019	$ (5,413)	$ 7,862	$ (1,184)	$ 1,333
Effect on pension obligation as of October 31, 2019	$ (74,804)	$ 94,969	$ (13,823)	$ 16,523
Expected return on assets:				
Effect on total net periodic pension cost in 2019	$ (3,890)	$ 3,890	$ (407)	$ 407
Compensation increase:				
Effect on total net periodic pension cost in 2019	$ 4,625	$ (4,046)	$ 522	$ (461)
Effect on pension obligation as of October 31, 2019	$ 28,775	$ (25,955)	$ 3,186	$ (2,955)

With respect to the domestic postretirement medical plan, the discount rate used to value the benefit obligation was 3.27 percent at October 31, 2019 and 4.56 percent at October 31, 2018. The annual rate of increase in the per capita cost of covered benefits (the health care cost trend rate) is assumed to be 3.62 percent in 2020, decreasing gradually to 3.24 percent in 2026.

For the international postretirement plan, the discount rate used to value the benefit obligation was 3.03 percent at October 31, 2019 and 3.88 percent at October 31, 2018. The annual rate of increase in the per capita cost of covered benefits (the health care cost trend rate) is assumed to be 4.00 percent in 2020 to 4.05 percent in 2040.

The discount rate and the health care cost trend rate assumptions have a significant effect on the amounts reported. For example, a one-percentage point change in the discount rate and the assumed health care cost trend rate would have the following effects. Bracketed numbers represent decreases in expense and obligation amounts.

	United States		International	
	1% Point Increase	1% Point Decrease	1% Point Increase	1% Point Decrease
Discount rate:				
Effect on total net postretirement benefit cost components in 2019	$ (535)	$ 681	$ (3)	$ 3
Effect on postretirement obligation as of October 31, 2019	$ (12,237)	$ 15,551	$ (87)	$ 116
Health care trend rate:				
Effect on total net postretirement benefit cost components in 2019	$ 494	$ (400)	$ 9	$ (7)
Effect on postretirement obligation as of October 31, 2019	$ 11,984	$ (9,800)	$ 108	$ (84)

Employees hired after January 1, 2002, are not eligible to participate in the domestic postretirement medical plan.

Pension and postretirement expenses in 2020 are expected to be approximately $9,900 higher than 2019.

Income taxes – Income taxes are estimated based on income for financial reporting purposes. Deferred income taxes reflect the net tax effect of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes and certain changes in valuation allowances. We provide valuation allowances against deferred tax assets if, based on available evidence, it is more likely than not that some portion or all of the deferred tax assets will not be realized.

Management believes the valuation allowances are adequate after considering future taxable income, allowable carryforward periods and ongoing prudent and feasible tax planning strategies. In the event we were to determine that we would be able to realize the deferred tax assets in the future in excess of the net recorded amount (including the valuation allowance), an adjustment to the valuation allowance would increase income in the period such determination was made. Conversely, should we determine that we would not be able to realize all or part of the net deferred tax asset in the future, an adjustment to the valuation allowance would be expensed in the period such determination was made.

Further, at each interim reporting period, we estimate an effective income tax rate that is expected to be applicable for the full year. Significant judgment is involved regarding the application of global income tax laws and regulations and when projecting the jurisdictional mix of income. Additionally, interpretation of tax laws, court decisions or other guidance provided by taxing authorities influences our estimate of the effective income tax rates. As a result, our actual effective income tax rates and related income tax liabilities may differ materially from our estimated effective tax rates and related income tax liabilities. Any resulting differences are recorded in the period they become known.

2019 compared to 2018

Sales – Worldwide sales for 2019 were $2,194,226, a decrease of 2.7 percent from 2018 sales of $2,254,668. Sales volume decreased 0.7 percent and unfavorable currency translation effects decreased sales by 2.0 percent. The volume decrease consisted of 1.1 percent organic decline and 0.4 percent growth from acquisitions.

We had one acquisition during 2019, Optical Control GmbH & Co. KG ("Optical"), which is included within the Advanced Technology Systems segment. As used throughout this Form 10-K, geographic regions include the Americas (Canada, Mexico and Central and South America), Asia Pacific (excluding Japan), Europe, Japan, and the United States.

Sales of the Adhesive Dispensing Systems segment were $950,917 in 2019, a decrease of $4,275, or 0.4 percent, from 2018 sales of $955,192. The decrease was the result of unfavorable currency effects that decreased sales by 2.8 percent, offset by a sales volume increase of 2.4 percent. Within this segment, sales volume increased in all geographic regions with the exception of Europe. Growth in product lines serving packaging, product assembly, and polymer processing end markets was offset by softness in product lines serving nonwoven end markets.

Sales of the Advanced Technology Systems segment were $985,850 in 2019, a decrease of $53,516, or 5.1 percent, from 2018 sales of $1,039,366. The decrease was the result of a sales volume decrease of 3.7 percent and unfavorable currency effects that decreased sales by 1.4 percent. The sales volume decrease consisted of 4.6 percent from organic volume offset by a 0.9 percent increase from the first-year effect of acquisitions. Within this segment, sales volume, inclusive of acquisitions, increased in the United States and Americas geographic regions, and was offset by softness in all other regions. Growth in our fluid management product lines serving medical end markets was offset by lower demand in our dispensing product lines serving electronics end markets.

Sales of the Industrial Coating Systems segment were $257,459 in 2019, a decrease of $2,651, or 1.0 percent, from 2018 sales of $260,110. The decrease was the result of unfavorable currency effects that decreased sales by 1.5 percent, offset by a sales volume increase of 0.5 percent. Within this segment, sales volume increased in the United States, Americas and Japan regions, and was offset by softness in the Europe and Asia Pacific regions. Growth in cold materials product lines serving automotive end markets was offset by softness in the liquid and container product lines serving industrial end markets.

Sales outside the United States accounted for 65.4 percent of total sales in 2019, as compared to 68.0 percent in 2018. On a geographic basis, sales in the United States were $758,383, an increase of 5.2 percent from 2018. The increase in sales volume consisted of 4.9 percent from organic volume and 0.3 percent from acquisitions. In the Americas region, sales were $167,661, an increase of 5.6 percent over 2018, with volume increasing 7.4 percent partially offset by unfavorable currency effects of 1.8 percent. The increase in sales volume consisted of 7.2 percent from organic volume and 0.2 percent from acquisitions. Sales in Europe were $571,596, a decrease of 8.1 percent from 2018, with volume decreasing 3.3 percent and unfavorable currency effects of 4.8 percent. The decrease in sales volume consisted of 3.8 percent from organic volume offset by a 0.5 percent increase from acquisitions. Sales in Japan were $126,756, a decrease of 21.6 percent from 2018, with volume decreasing 22.2 percent offset by favorable currency effects of 0.6 percent. The decrease in sales volume consisted of 22.9 percent from organic volume offset by a 0.7 percent increase from acquisitions. Sales in the Asia Pacific region were $569,830, a decrease of 3.6 percent from 2018, with volume decreasing 1.3 percent and unfavorable currency effects of 2.3 percent. The decrease in sales volume consisted of lower organic volume of 1.9 percent, offset by a 0.6 percent increase from acquisitions.

It is estimated that the effect of pricing on 2019 total sales was not material relative to 2018.

Operating profit – Cost of sales were $1,002,123 in 2019, down 1.6 percent from $1,018,340 in 2018. Gross profit, expressed as a percentage of sales, decreased to 54.3 percent in 2019 from 54.8 percent in 2018. Of the 0.5 percentage point decrease in gross margin, unfavorable currency translation effects contributed 0.4 percentage points and unfavorable product mix contributed 0.1 percentage points.

Selling and administrative expenses were $708,990 in 2019, compared to $733,749 in 2018. The 3.4 percent decrease includes 1.6 percentage points due to lower base business costs and 1.8 percentage points due to unfavorable currency translation effects.

Selling and administrative expenses as a percentage of sales decreased to 32.3 percent in 2019 from 32.5 percent in 2018. The 0.2 percentage point improvement is due to lower base business costs.

Operating capacity for each of our segments can support fluctuations in order activity without significant changes in operating costs. Also, currency translation affects reported operating margins. Operating margins for each segment were unfavorably impacted by a stronger dollar primarily against the Euro and British Pound during 2019 as compared to 2018.

Operating profit as a percentage of sales decreased to 22.0 percent in 2019 compared to 22.3 percent in 2018. Of the 0.3 percentage point decline in operating margin, unfavorable leverage of our selling and administrative expenses contributed 1.2 percentage points, and unfavorable foreign currency translation effects contributed 0.4 percentage points. This decline was offset by 1.2 percentage points due to the first-year effect of acquisitions and 0.1 percentage points due to lower severance costs.

For the Adhesive Dispensing Systems segment, operating profit as a percentage of sales increased to 28.9 percent in 2019 compared to 27.5 percent in 2018. Of the 1.4 percentage point improvement in operating margin, favorable product mix contributed 1.5 percentage points, lower severance and restructuring contributed 0.4 percentage points and favorable leverage of our selling and administrative expense contributed 0.1 percentage points. These improvements were offset by 0.6 percentage points related to unfavorable foreign currency translation effects.

For the Advanced Technology Systems segment, operating profit as a percentage of sales decreased to 20.9 percent in 2019 compared to 23.6 percent in 2018. Of the 2.7 percentage point decline in operating margin, unfavorable product mix contributed 2.8 percentage points, unfavorable foreign currency translation effects contributed 0.4 percentage points and higher severance and restructuring expenses contributed 0.1 percentage points. This decline was partially offset by 0.6 percentage points due to favorable leverage of our selling and administrative expenses.

For the Industrial Coating Systems segment, operating profit as a percentage of sales increased to 20.9 percent in 2019 compared to 20.2 percent in 2018. Of the 0.7 percentage point improvement in operating margin, 2.1 percentage points were due to favorable leverage of our selling and administrative expenses, offset by 1.1 percentage points related to unfavorable product mix and 0.3 percentage points related to unfavorable foreign currency translation effects.

Interest and other income (expense) - Interest expense in 2019 was $47,145, a decrease of $2,432, or 4.9 percent, from 2018. The decrease was due to lower average debt levels than the prior year. Other expense in 2019 was $6,708 compared to other expense of $5,868 in 2018. Included in the current year's other expense were pension costs related to the adoption of a new accounting standard of $7,136. Included in the prior year's other expense were pension costs related to the adoption of a new accounting standard, as noted above, of $8,022, foreign currency gains of $1,133 and a non-recurring gain of $2,512.

Income taxes – Income tax expense in 2019 was $94,013, or 21.8 percent of pre-tax income, as compared to $71,144, or 15.9 percent of pre-tax income in 2018.

On December 22, 2017 the U.S. Tax Cuts and Jobs Act ("the Act") was enacted. It reduces the U.S. federal corporate income tax rate from 35 percent to 21 percent. We have an October 31 fiscal year end, therefore the lower corporate income tax rate was phased in, resulting in a U.S. statutory federal rate of 23.34 percent for our fiscal year ended October 31, 2018, and 21.00 percent for subsequent fiscal years. The statutory tax rate of 21.00percent was applied to earnings in the current year.

Our income tax provision for 2018 included a provisional tax benefit of $49,082 to reflect the revaluation of our tax assets and liabilities at the reduced corporate tax rate. We also recorded a provisional tax expense of $27,618 to reflect the transition tax on previously deferred foreign earnings. The net tax effect of these discrete items resulted in a decrease of $21,464 in income tax expense for 2018.

Subsequent to the enactment of the Act, the SEC staff issued SAB 118, which provided a measurement period of up to one year after the enactment date for companies to finalize the recognition of the income tax effects of the Act. As of January 31, 2019, our provisional accounting for the effects of the Act was complete. As a result, during 2019, and within the one year measurement period provided by SAB 118, we recorded tax expense of $4,866 to the provisional amounts recognized in 2018 due to changes in interpretations and assumptions and the finalizations of estimates. We are paying the transition tax in installments over the eight-year period allowable under the Act. The remaining transition tax is included in other long-term liabilities in the Consolidated Balance Sheet at October 31, 201 9 and 2018.

Other provisions of the U.S. Tax Act became effective for us in 2019. The Foreign-Derived Intangible Income provision generates a deduction against our U.S. taxable income for U.S. earnings derived offshore that utilize intangibles held in the U.S. Conversely, the Global Intangible Low-Taxed Income ("GILTI") provision requires us to subject to U.S. taxation a portion of our foreign subsidiary earnings that exceed an allowable return. We elected to treat any GILTI inclusion as a period expense in the year incurred.

Net income – Net income was $337,091, or $5.79 per diluted share, in 2019, compared to net income of $377,375, or $6.40 per diluted share, in 2018. This represents a 10.7 percent decrease in net income and a 9.5 percent decrease in diluted earnings per share.

2018 compared to 2017

Sales – Worldwide sales for 2018 were $2,254,668, an increase of 9.1 percent from 2017 sales of $2,066,982. Sales volume increased 7.1 percent and favorable currency translation effects increased sales by 2.0 percent. The volume increase consisted of 2.5 percent from organic growth and 4.6 percent from acquisitions. We had two acquisitions during 2018, Sonoscan, Inc. ("Sonoscan"), and Cladach Nua Teoranta ("Clada"), which are both included within the Advanced Technology Systems segment. We had four acquisitions during 2017, ACE Production Technologies, Inc. ("ACE"), Plas-Pak Industries, Inc. ("Plas-Pak), InterSelect GmbH ("InterSelect"), and Vention Medical's Advanced Technologies business ("Vention"), which are also included within the Advanced Technology Systems segment.

Sales of the Adhesive Dispensing Systems segment were $955,192 in 2018, an increase of $39,173, or 4.3 percent, from 2017 sales of $916,019. The increase was the result of a sales volume increase of 1.5 percent and favorable currency effects that increased sales by 2.8 percent. Within this segment, sales volume increased in all geographic regions with the exception of the United States. Growth in packaging and product assembly product lines was offset by softness in product lines serving polymer processing end markets.

Sales of the Advanced Technology Systems segment were $1,039,366 in 2018, an increase of $141,743 or 15.8 percent, from 2017 sales of $897,623. The increase was the result of a sales volume increase of 14.5 percent and favorable currency effects that increased sales by 1.3 percent. The sales volume increase consisted of 3.8 percent from organic volume and 10.7 percent from the first-year effect of acquisitions. Within this segment, sales volume, inclusive of acquisitions, increased in all geographic regions with the exception of the Asia Pacific region. Organic volume was driven by demand in our fluid management product lines serving industrial and medical end markets.

Sales of the Industrial Coating Systems segment were $260,110 in 2018, an increase of $6,770, or 2.7 percent, from 2017 sales of $253,340. The increase was the result of a sales volume increase of 1.1 percent and favorable currency effects that increased sales by 1.6 percent. Within this segment, sales volume increased in Europe, Japan and the Asia Pacific regions. Growth in powder, liquid and container product lines serving industrial end markets was offset by softness in cold materials product lines serving automotive end markets.

Sales outside the United States accounted for 68.0 percent of our sales in 2018, as compared to 68.7 percent in 2017. On a geographic basis, sales in the United States were $720,832, an increase of 11.3 percent from 2017. The increase in sales volume consisted of 1.9 percent from organic volume and 9.4 percent from acquisitions. In the Americas region, sales were $158,837, an increase of 8.0 percent from 2017, with volume increasing 8.8 percent partially offset by unfavorable currency effects of 0.8 percent. The increase in sales volume consisted of 3.5 percent from organic volume and 5.3 percent from acquisitions. Sales in Europe were $622,108, an increase of 17.2 percent from 2017, with volume increasing 11.4 percent and favorable currency effects of 5.8 percent. The increase in sales volume consisted of 9.2 percent from organic volume and 2.2 percent from acquisitions. Sales in Japan were $161,771, an increase of 9.9 percent from 2017, with volume increasing 8.6 percent and favorable currency effects of 1.3 percent. The increase in sales volume consisted of 7.0 percent from organic volume and 1.6 percent from acquisitions. Sales in the Asia Pacific region were $591,120, a decrease of 0.5 percent from 2017, with volume decreasing 2.2 percent partially offset by favorable currency effects of 1.7 percent. The decrease in sales volume consisted of lower organic volume of 4.4 percent, offset by 2.2 percent growth from acquisitions.

It is estimated that the effect of pricing on 2018 total sales was not material relative to 2017.

Operating profit – Cost of sales were $1,018,340 in 2018, up 9.8 percent from $927,692 in 2017. Gross profit, expressed as a percentage of sales, decreased to 54.8 percent in 2018 from 55.1 percent in 2017. Of the 0.3 percentage point decrease in gross margin, unfavorable product mix contributed 0.7 percentage points offset by 0.4 percentage points due to favorable currency translation effects.

Selling and administrative expenses were $733,749 in 2018, compared to $672,888 in 2017. The 9.0 percent increase includes 9.4 percent primarily in support of higher sales growth and 1.8 percent due to unfavorable currency translation effects, offset by 2.2 percent due to lower acquisition transaction costs in 2018.

Selling and administrative expenses as a percentage of sales decreased to 32.5 percent in 2018 from 32.6 percent in 2017. Of the 0.1 percentage point improvement, 0.7 percentage points is due to lower acquisition transaction costs, offset by 0.6 percentage points due to higher base business costs.

Operating capacity for each of our segments can support fluctuations in order activity without significant changes in operating costs. Also, currency translation affects reported operating margins. Operating margins for each segment were favorably impacted by a weaker dollar primarily against the Euro during 2018 as compared to 2017.

Operating profit as a percentage of sales decreased to 22.3 percent in 2018 compared to 22.6 percent in 2017. Of the 0.3 percentage point decline in operating margin, unfavorable leverage of our selling and administrative expenses contributed 1.1 percentage points, higher severance and restructuring expenses contributed 0.2 percentage points and unfavorable product mix contributed 0.5 percentage points. This decline was offset by 0.3 percentage points due to the first-year effect of acquisitions, 0.7 percentage points due to lower acquisition transaction costs and 0.5 percentage points due to favorable foreign currency translation effects.

For the Adhesive Dispensing Systems segment, operating profit as a percentage of sales decreased to 27.5 percent in 2018 compared to 28.0 percent in 2017. Of the 0.5 percentage point decline in operating margin, dilution in gross margin of 0.8 percentage points was due to the consolidation of certain facilities in the U.S. and higher severance and restructuring expenses contributed 0.3 percentage points, offset by favorable foreign currency translation effects of 0.6 percentage points.

For the Advanced Technology Systems segment, operating profit as a percentage of sales decreased to 23.6 percent in 2018 compared to 25.6 percent in 2017. Of the 2.0 percentage point decline in operating margin, unfavorable product mix contributed 1.2 percentage points, incremental amortization expense contributed 1.1 percentage points, and higher severance and restructuring expenses contributed 0.1 percentage points. This decline was partially offset by 0.4 percentage points due to favorable foreign currency translation effects.

For the Industrial Coating Systems segment, operating profit as a percentage of sales increased to 20.2 percent in 2018 compared to 18.0 percent in 2017. Of the 2.2 percentage point improvement in operating margin, 1.9 percentage points related to favorable product mix and 0.4 percentage points related to favorable foreign currency translation effects. This improvement was partially offset by 0.1 percentage points due to unfavorable leverage of our selling and administrative expenses .

Interest and other income (expense) - Interest expense in 2018 was $49,576, an increase of $12,975, or 35.4 percent, from 2017. The increase was due to higher average borrowing levels between periods. Other expense in 2018 was $5,868 compared to other expense of $10,634 in 2017. Included in other expense for 2018 were pension costs related to the adoption of a new accounting standard of $8,022, foreign currency gains of $1,133 and a non-recurring gain of $2,512. Included in other expense for 2017 were pension costs related to the adoption of a new accounting standard, as noted above, of $8,670 and foreign currency losses of $686.

Income taxes – Income tax expense in 2018 was $71,144, or 15.9 percent of pre-tax income, as compared to $124,489, or 29.6 percent of pre-tax income in 2017.

On December 22, 2017, the U.S. Tax Cuts and Jobs Act ("the Act") was enacted. It reduced the U.S. federal corporate income tax rate from 35 percent to 21 percent. We have an October 31 fiscal year end, therefore the lower corporate income tax rate will be phased in, resulting in a U.S. statutory federal rate of 23.34 percent for our fiscal year ended October 31, 2018, and 21.00 percent for subsequent fiscal years. The statutory tax rate of 23.34 percent was applied to earnings in 2018.

The Act requires us to revalue our existing U.S. deferred tax balance to reflect the lower statutory tax rate and pay a one-time transition tax on earnings of certain foreign subsidiaries that were previously deferred from U.S. taxes. As a result, during 2018, we recorded a provisional tax benefit of $49,082 to reflect the revaluation of our tax assets and liabilities at the reduced corporate tax rate. We also recorded a provisional tax expense of $27,618 to reflect the transition tax on previously deferred foreign earnings. The net tax effect of these discrete items resulted in a decrease of $21,464 in income tax expense for 2018. We intend to pay the transition tax in installments over the eight-year period allowable under the Act. The transition tax is primarily included in other long-term liabilities in the Consolidated Balance Sheet at October 31, 2018. Incremental adjustments have been made to these estimates during the three months ended October 31, 2018 based on availability of additional information. The amounts recorded are considered a provisional estimate under the U.S. Securities and Exchange Commission Staff Accounting Bulletin No. 118. The provisional calculations may change after various components of the computation are finalized. Furthermore, we are still analyzing certain aspects of the Act and related interpretive guidance and refining our calculations, which could potentially affect the measurement of these balances or give rise to new or additional deferred tax amounts. Certain provisions of the Act will impact the Company starting in 2019. These provisions include, but are not limited to, the creation of the base erosion anti-abuse tax, a general limitation of U.S. federal income taxes on dividends from foreign subsidiaries, a new provision designed to tax global intangible low-taxed income and the repeal of the domestic production activities deduction. We continue to evaluate the future impacts of these provisions and, as of October 31, 2018, have not recorded any impact of any of these future provisions.

In March 2016, the FASB issued a new standard which simplifies the accounting for share-based payment transactions, which we adopted in the first quarter of 2018. This guidance requires that excess tax benefits and tax deficiencies be recognized as income tax expense or benefit in the Consolidated Statements of Income rather than as additional paid-in capital. Our income tax provision for 2018 also includes a favorable adjustment to unrecognized tax benefits of $1,120 related to the lapse of the statute of limitations.

Our income tax provision for 2017 includes a discrete tax expense of $1,070 related to nondeductible acquisition costs.

Net income – Net income was $377,375, or $6.40 per diluted share, in 2018, compared to net income of $295,802, or $5.08 per diluted share, in 2017. This represents a 27.6 percent increase in net income and a 26.0 percent increase in diluted earnings per share.

Liquidity and Capital Resources

Cash and cash equivalents increased $55,486 in 2019. Cash provided by operating activities was $382,893 in 2019, compared to $504,638 in 2018. The primary sources were net income adjusted for non-cash income and expenses (consisting of depreciation and amortization, non-cash stock compensation, provision for losses on receivables, deferred income taxes, other non-cash expense, and loss on sale of property, plant and equipment), which was $466,941 in 2019, compared to $476,757 in 2018. The decrease in cash provided by operating activities was primarily due to lower net income and the change in operating assets and liabilities, which used $84,048 of cash in 2019, compared to $27,881 provided in 2018.

Cash used in investing activities was $76,289 in 2019, compared to $139,918 in 2018. In the current year, cash of $12,486 was used for the Optical acquisition compared to $50,856 used in the prior year for the Clada and Sonoscan acquisitions. Capital expenditures were $64,244 in 2019 compared to $89,790 in 2018. Capital expenditures were higher in the prior year due to the purchase of a new production and development manufacturing facility in China for product lines within our Adhesives Dispensing Systems segment.

Cash used in financing activities was $251,074 in 2019, compared to cash of $353,690 used in 2018. Net repayment of long-term debt and short-term borrowings used $67,838 of cash in 2019, compared to $268,887 used in 2018. In 2019, cash of $120,510 was used for the purchase of treasury shares, up from $24,012 in 2018. Dividend payments were $82,145 in 2019, up from $72,443 in 2018 due to an increase in the annual dividend to $1.43 per share from $1.25 per share. Issuance of common shares related to employee benefit plans generated $26,020 of cash in 2019, up from $18,811 in 2018.

The following is a summary of significant changes by balance sheet caption from October 31, 2018 to October 31, 2019. Receivables increased $39,342 primarily due to higher sales volume activity in the fourth quarter. Current maturities of long-term debt increased $140,004 primarily due to a $125,000 reclass of our notes issued under our agreement with New York Life and a $15,000 reclass of our Private Placement Notes. Long-term debt decreased $209,953 primarily due to the reclasses to current maturities noted above, payments on our Term Loan Agreement with PNC Bank, revolving credit facility and private shelf facility of $180,800, offset by $111,300 of borrowings on the Euro loan.

In December 2014, the board of directors authorized a $300,000 common share repurchase program. In August 2015, the board of directors authorized the repurchase of up to an additional $200,000 of the Company’s common shares. In August 2018, the board of directors authorized the repurchase of an additional $500,000 of the Company’s common shares, bringing the aggregate total of common shares authorized for repurchase to $1,000,000. Approximately $485,242 of the total $1,000,000 authorized remained available for share repurchases at October 31, 2019. Uses for repurchased shares include the funding of benefit programs including stock options and restricted stock. Shares purchased are treated as treasury shares until used for such purposes. The repurchase program is being funded using cash from operations and proceeds from borrowings under our credit facilities.

As of October 31, 2019, approximately 94 percent of our consolidated cash and cash equivalents were held at various foreign subsidiaries. Deferred income taxes are not provided on undistributed earnings of international subsidiaries that are intended to be permanently invested in those operations. These undistributed earnings represent the post-income tax earnings under U.S. GAAP not adjusted for previously taxed income which aggregated approximately $1,101,736 and $1,088,183 at October 31, 2019 and 2018, respectively. Should these earnings be distributed, applicable foreign tax credits, distributions of previously taxed income, and utilization of other attributes would substantially offset taxes due upon the distribution. It is not practical to estimate the amount of additional taxes that might be payable on such undistributed earnings.

Contractual Obligations

The following table summarizes contractual obligations as of October 31, 2019:

	Payments Due by Period				
	Total	Less than 1 Year	1-3 Years	4-5 Years	After 5 Years
Debt (1)	$ 1,248,383	$ 168,738	$ 397,197	$ 446,597	$ 235,851
Interest payments on long-term debt (1)	110,254	21,849	37,694	27,786	22,925
Capital lease obligations (2)	16,571	5,685	5,725	1,599	3,562
Operating leases (2)	140,148	20,194	33,817	25,465	60,672
Contributions related to pension and postretirement benefits (3)	43,900	43,900	—	—	—
Purchase obligations (4)	81,240	78,443	2,797	—	—
Total obligations	$ 1,640,496	$ 338,809	$ 477,230	$ 501,447	$ 323,010

(1) In April 2019, we amended, restated and extended the term of our existing $605,000 term loan facility with a group of banks. The unsecured Term Loan Agreement provides for the following three tranches: $100,000 due in March 2020, $200,000 due in September 2022, and $305,000 due in March 2024. The weighted average interest rate for borrowings under this agreement was 2.52 percent at October 31, 2019. For the portion that is due in March 2024, $100,000 of this tranche was paid down in 2019. We were in compliance with all covenants at October 31, 2019.

In April 2019, we entered into a $850,000 unsecured, multicurrency credit facility with a group of banks, which amended, restated and extended our existing syndicated revolving credit agreement that was scheduled to expire in February 2020. This facility has a five-year term expiring April 2024, and includes a $75,000 subfacility for swing-line loans. At October 31, 2019, we had no balances outstanding under this facility, compared to $52,200 outstanding at October 31, 2018. We were in compliance with all covenants at October 31, 2019, and the amount we could borrow under the facility would not have been limited by any debt covenants.

In October 2018, we entered into a €150,000 unsecured Term Loan Agreement with Bank of America Merrill Lynch International Limited. The interest rate is variable based on the EUR LIBOR rate. The weighted average interest rate at October 31, 2019 was 1.00 percent. The balance outstanding at October 31, 2019 and October 31, 2018 was €115,000 ($128,219) and €15,000 ($16,967), respectively. We were in compliance with all covenants at October 31, 2019.

In June 2018, we entered into a Note Purchase Agreement with a group of insurance companies under which we sold $350,000 of unsecured Senior Notes to the insurance companies and their affiliates. The notes mature in June 2023 through June 2030 and bear interest at fixed rates between 3.71 percent and 4.17 percent. We used the proceeds from the sale of the notes to repay approximately $315,000 of the outstanding balance under our existing syndicated revolving credit facility at that time, and the remainder for general corporate purposes. We were in compliance with all covenants at October 31, 2019.

We entered into a $150,000 three-year Note Purchase and Private Shelf agreement with New York Life Investment Management LLC in 2011. In 2015, the amount of the facility was increased to $180,000, and in 2016 it was increased to $200,000. Senior Notes issued under the agreement can have a maturity of up to 12 years, with an average life of up to 10 years, and are unsecured. At October 31, 2019 and October 31, 2018, there was $30,556 and $36,111, respectively, outstanding under this facility. Existing notes mature between January 2020 and September 2020. The interest rate on each borrowing is fixed. At October 31, 2019, the amounts outstanding under this facility bear interest at fixed rates between 2.21 percent and 2.56 percent. We were in compliance with all covenants at October 31, 2019, and the amount we could borrow would not have been limited by any debt covenants.

In 2012, we entered into a Note Purchase Agreement with a group of insurance companies under which we sold $2 00,000 of unsecured Senior Notes. At October 31, 2019 and October 31, 2018, $140,800 and $156,700, respectively, was outstanding under this agreement. Existing notes mature between July 2020 and July 2025 and bear interest at fixed rates between 2.62 percent and 3.13 percent. We were in compliance with all covenants at October 31, 2019.

In July 2015, we entered into a Note Purchase Agreement under which $100,000 of unsecured Senior Notes were purchased primarily by a group of insurance companies. At October 31, 2019 and October 31, 2018, $92,857 and $100,000, respectively, was outstanding under this agreement. Existing notes mature between July 2020 and July 2027 and bear interest at fixed rates of 2.89 percent and 3.19 percent. We were in compliance with all covenants at October 31, 2019.

Refer to Note 9 to the Consolidated Financial Statements for further discussion.

(2) Refer to Note 10 to the Consolidated Financial Statements for further discussion.

(3) Pension and postretirement plan funding amounts after 2020 will be determined based on the future funded status of the plans and therefore cannot be estimated at this time. Refer to Note 6 to the Consolidated Financial Statements for further discussion.

(4) Purchase obligations primarily represent commitments for materials used in our manufacturing processes that are not recorded in our Consolidated Balance Sheet.

We believe that the combination of present capital resources, cash from operations and unused financing sources are more than adequate to meet cash requirements for 2020. There are no significant restrictions limiting the transfer of funds from international subsidiaries to the parent company.

Outlook

Our operating performance, balance sheet position, and financial ratios for 2019 remained strong, although uncertainties persist in global financial markets and the general economic environment. Going forward, we are well-positioned to manage our liquidity needs that arise from working capital requirements, capital expenditures, and contributions related to pension and postretirement obligations as well as principal and interest payments on our outstanding debt. Primary sources of capital to meet these needs, as well as other opportunistic investments, are a combination of cash provided by operations and borrowings under our loan agreements. In 2019, cash from operations was 17 percent of revenue. With respect to borrowings, as of October 31, 2019, we had full available capacity under our five-year term, $850,000 unsecured, multicurrency credit facility. This credit facility expires in February 2024.

Respective to all of these loans are two primary covenants: the leverage ratio that generally restricts indebtedness (net of cash) to a maximum 3.75 times consolidated four-quarter trailing EBITDA and the interest coverage ratio that requires four-quarter trailing EBITDA to be a minimum of 2.5 times consolidated trailing four-quarter interest expense. (Debt, EBITDA, and Interest Expense are as defined in the respective credit agreements.)

We are optimistic about our longer-term growth opportunities in the diverse consumer non-durable, industrial, medical, electronics, consumer durable and automotive end markets we serve. We also support our customers with parts and consumables, so a significant percentage of our revenue is recurring. For 2020, organic sales are expected to increase 1 to 3 percent compared to the prior year, offset by an unfavorable currency effect of less than 1 percent, based on the current exchange rate environment as compared to the prior year. Based on this 2020 sales outlook, we are forecasting earnings per share growth of 2 percent to 6 percent compared to the prior year

We move forward with caution given the potential for a lower-growth macroeconomic environment, continued trade negotiations and the marketplace effects of political instability in certain areas of the world. Though the status of the global economy remains unclear, our growth potential has been demonstrated over time through our ability to build and enhance our core businesses by entering emerging markets, pursuing market adjacencies and driving growth initiatives. We drive value for our customers through our application expertise, differentiated technology, and direct sales and service support. Our priorities also are focused on operational efficiencies by employing continuous improvement methodologies in our business processes. We expect our efforts will continue to provide more than sufficient cash from operations to meet our liquidity needs, pay dividends to common shareholders and enable us to invest in the development of new applications and markets for our technologies. We intend to focus capital expenditures in 2020 on continued investments in our information systems and projects that improve both the capacity and efficiency of manufacturing and distribution operations. Cash from operations has been 16 to 22 percent of revenues over the past five years, which when combined with our available borrowing capacity and ready access to capital markets, is more than adequate to fund our liquidity needs over the next year.

With respect to contractual spending, the table above presents our financial obligations as $1,640,496, of which $338,809 is payable in 2020. In December 2014, the board of directors authorized a $300,000 common share repurchase program. In August 2015, the board of directors authorized the repurchase of up to an additional $200,000 of the Company's common shares. In August 2018, the board of directors authorized the repurchase of an additional $500,000 of the Company's common shares, bringing the aggregate total of common shares authorized for repurchase to $1,000,000. Approximately $485,242 of the total $1,000,000 authorized remained available for share repurchases at October 31, 2019. The repurchase program is funded using cash from operations and proceeds from borrowings under our credit facilities. Timing and actual number of shares subject to repurchase are contingent on a number of factors including the level of cash generated from operations, cash requirements for acquisitions, repayment of debt and our share price.

New Accounting Standards

Refer to Note 2 for further discussion of recently issued accounting standards.

Effects of Foreign Currency

The impact of changes in foreign currency exchange rates on sales and operating results cannot be precisely measured due to fluctuating selling prices, sales volume, product mix and cost structures in each country where we operate. As a general rule, a weakening of the United States dollar relative to foreign currencies has a favorable effect on sales and net income, while a strengthening of the dollar has a detrimental effect.

In 2019, as compared with 2018, the United States dollar was generally stronger against foreign currencies. If 2018 exchange rates had been in effect during 2019, sales would have been approximately $45,600 higher and third party costs would have been approximately $23,500 higher. In 2018, as compared with 2017, the United States dollar was generally weaker against foreign currencies. If 2017 exchange rates had been in effect during 2018, sales would have been approximately $41,800 lower and third-party costs would have been approximately $21,700 higher. These effects on reported sales do not include the impact of local price adjustments made in response to changes in currency exchange rates.

Inflation

Inflation affects profit margins as the ability to pass cost increases on to customers is restricted by the need for competitive pricing. Although inflation has been modest in recent years and has had no material effect on the years covered by the financial statements included in this report, we continue to seek ways to minimize the impact of inflation through focused efforts to increase productivity.

Trends

The Five-Year Summary in Item 6 documents our historical financial trends. Over this period, the world's economic conditions fluctuated significantly. Our solid performance is attributed to our participation in diverse geographic and industrial markets and our long-term commitment to develop and provide quality products and worldwide service to meet our customers' changing needs.

Safe Harbor Statements Under the Private Securities Litigation Reform Act of 1995

This Form 10-K, particularly "Management's Discussion and Analysis," contains forward-looking statements within the meaning of the Securities Act of 1933, as amended, the Securities Exchange Act of 1934, as amended, and the Private Securities Litigation Reform Act of 1995. Such statements relate to, among other things, income, earnings, cash flows, changes in operations, operating improvements, businesses in which we operate and the United States and global economies. Statements in this 10-K that are not historical are hereby identified as "forward-looking statements" and may be indicated by words or phrases such as "anticipates," "supports," "plans," "projects," "expects," "believes," "should," "would," "could," "hope," "forecast," "management is of the opinion," use of the future tense and similar words or phrases.

In light of these risks and uncertainties, actual events and results may vary significantly from those included in or contemplated or implied by such statements. Readers are cautioned not to place undue reliance on such forward-looking statements. These forward-looking statements speak only as of the date made. We undertake no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law. Factors that could cause our actual results to differ materially from the expected results are discussed in Item 1A, Risk Factors.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

We operate internationally and enter into intercompany transactions denominated in foreign currencies. Consequently, we are subject to market risk arising from exchange rate movements between the dates foreign currencies are recorded and the dates they are settled. We regularly use foreign exchange contracts to reduce our risks related to most of these transactions. These contracts, primarily associated with the euro, yen and pound sterling, typically have maturities of 90 days or less, and generally require the exchange of foreign currencies for United States dollars at rates stated in the contracts. Gains and losses from changes in the market value of these contracts offset foreign exchange losses and gains, respectively, on the underlying transactions. Other transactions denominated in foreign currencies are designated as hedges of our net investments in foreign subsidiaries or are intercompany transactions of a long-term investment nature. As a result of the use of foreign exchange contracts on a routine basis to reduce the risks related to most of our transactions denominated in foreign currencies, as of October 31, 2019, we did not have material foreign currency exposure.

Refer to Note 12 to the Consolidated Financial Statements for further discussion about our foreign currency transactions and the methods and assumptions used to record these transactions.

A portion of our operations is financed with short-term and long-term borrowings and is subject to market risk arising from changes in interest rates.

The tables that follow present principal repayments and weighted-average interest rates on outstanding borrowings of fixed-rate debt.

At October 31, 2019	**2020**	**2021**	**2022**	**2023**	**2024**	**Thereafter**	**Total Value**	**Fair Value**
Annual repayments of long-term debt	**$ 68,738**	**$ 38,187**	**$ 30,791**	**$130,796**	**$110,801**	**$235,851**	**$615,164**	**$647,982**
Average interest rate on total borrowings outstanding during the year	**3.5%**	**3.6%**	**3.7%**	**3.7%**	**3.8%**	**3.9%**	**3.5%**	

At October 31, 2018	**2019**	**2020**	**2021**	**2022**	**2023**	**Thereafter**	**Total Value**	**Fair Value**
Annual repayments of long-term debt	$ 28,734	$ 68,738	$ 38,187	$ 30,791	$130,796	$346,652	$643,898	$622,283
Average interest rate on total borrowings outstanding during the year	3.5%	3.5%	3.6%	3.7%	3.7%	3.8%	3.5%	

We also have variable-rate notes payable and long-term debt. The weighted average interest rate of this debt was 3.0 percent at October 31, 2019 and 3.2 percent at October 31, 2018. A one percent increase in interest rates would have resulted in additional interest expense of approximately $7,236 on the variable rate notes payable and long-term debt in 2019.

Item 8. Financial Statements and Supplementary Data

Consolidated Statements of Income

Years ended October 31, 2019, 2018 and 2017 (In thousands except for per-share amounts)	2019	2018	2017
Sales	**$ 2,194,226**	$ 2,254,668	$ 2,066,982
Operating costs and expenses:			
Cost of sales	**1,002,123**	1,018,340	927,692
Selling and administrative expenses	**708,990**	733,749	672,888
	1,711,113	1,752,089	1,600,580
Operating profit	**483,113**	502,579	466,402
Other income (expense):			
Interest expense	**(47,145)**	(49,576)	(36,601)
Interest and investment income	**1,844**	1,384	1,124
Other - net	**(6,708)**	(5,868)	(10,634)
	(52,009)	(54,060)	(46,111)
Income before income taxes	**431,104**	448,519	420,291
Income tax provision:			
Current	**95,031**	105,093	124,961
Deferred	**(1,018)**	(33,949)	(472)
	94,013	71,144	124,489
Net income	**$ 337,091**	$ 377,375	$ 295,802
Average common shares	**57,462**	57,970	57,533
Incremental common shares attributable to outstanding stock options, restricted stock and deferred stock-based compensation	**740**	961	671
Average common shares and common share equivalents	**58,202**	58,931	58,204
Basic earnings per share	**$ 5.87**	$ 6.51	$ 5.14
Diluted earnings per share	**$ 5.79**	$ 6.40	$ 5.08
Dividends declared per common share	**$ 1.43**	$ 1.25	$ 1.11

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

Consolidated Statements of Comprehensive Income

Years ended October 31, 2019, 2018 and 2017	2019	2018	2017
(In thousands)			
Net income	**$ 337,091**	$ 377,375	$ 295,802
Components of other comprehensive income (loss), net of tax:			
Foreign currency translation adjustments	**3,710**	(28,619)	22,697
Pension and postretirement benefit plans:			
Prior service (cost) credit arising during the year	**(148)**	(45)	—
Net actuarial gain (loss) arising during the year	**(63,138)**	(7,783)	2,641
Amortization of prior service (cost) credit	**(322)**	(322)	(210)
Amortization of actuarial loss	**6,946**	10,536	7,972
Settlement loss recognized	**385**	200	712
Total pension and postretirement benefit plans	**(56,277)**	2,586	11,115
Total other comprehensive income (loss)	**(52,567)**	(26,033)	33,812
Reclassification due to adoption of ASU 2018-02	—	(18,846)	—
Total comprehensive income	**$ 284,524**	$ 332,496	$ 329,614

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

Consolidated Balance Sheets

October 31, 2019 and 2018 (In thousands)	2019	2018
Assets		
Current assets:		
Cash and cash equivalents	**$ 151,164**	$ 95,678
Receivables - net	**530,765**	491,423
Inventories - net	**283,399**	264,477
Prepaid expenses and other current assets	**45,867**	32,524
Total current assets	**1,011,195**	884,102
Property, plant and equipment - net	**398,895**	386,666
Goodwill	**1,614,739**	1,608,018
Intangible assets - net	**445,575**	499,741
Deferred income taxes	**11,261**	9,780
Other assets	**34,782**	32,705
	$ 3,516,447	$ 3,421,012
Liabilities and shareholders' equity		
Current liabilities:		
Accounts payable	**$ 85,139**	$ 83,590
Income taxes payable	**15,601**	19,319
Accrued liabilities	**161,655**	175,085
Customer advance payments	**41,131**	38,997
Current maturities of long-term debt	**168,738**	28,734
Current obligations under capital leases	**5,362**	4,555
Total current liabilities	**477,626**	350,280
Long-term debt	**1,075,404**	1,285,357
Obligations under capital leases	**9,513**	8,850
Pension obligations	**158,506**	113,222
Postretirement obligations	**86,368**	70,154
Deferred income taxes	**83,564**	100,704
Other liabilities	**44,421**	41,704
Shareholders' equity:		
Preferred shares, no par value; 10,000 shares authorized; none issued	**—**	—
Common shares, no par value; 160,000 shares authorized; 98,023 shares issued at October 31, 2019 and 2018	**12,253**	12,253
Capital in excess of stated value	**483,116**	446,555
Retained earnings	**2,747,650**	2,488,375
Accumulated other comprehensive loss	**(231,881)**	(179,314)
Common shares in treasury, at cost	**(1,430,093)**	(1,317,128)
Total shareholders' equity	**1,581,045**	1,450,741
	$ 3,516,447	$ 3,421,012

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

Condensed Consolidated Statements of Shareholders' Equity

(In thousands, except for per share data)	Common Shares	Additional Paid-in-Capital	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Common Shares in Treasury, at cost	TOTAL
	Years ended October 31, 2019, 2018 and 2017					
October 31, 2016	**$ 12,253**	**$ 376,625**	**$ 1,932,635**	**$ (168,247)**	**$ (1,301,663)**	**$ 851,603**
Shares issued under company stock and employee benefit plans	—	8,913	—	—	5,342	**14,255**
Tax benefit from stock option and restricted stock transactions	—	7,079	—	—	—	**7,079**
Stock-based compensation	—	20,168	—	—	—	**20,168**
Purchase of treasury shares (30,148 shares)	—	—	—	—	(3,386)	**(3,386)**
Dividends declared ($1.11 per share)	—	—	(63,840)	—	—	**(63,840)**
Net income	—	—	295,802	—	—	**295,802**
Other comprehensive income:						
Foreign currency translation adjustments	—	—	—	22,697	—	**22,697**
Defined benefit pension and post-retirement plans adjustment	—	—	—	11,115	—	**11,115**
October 31, 2017	**$ 12,253**	**$ 412,785**	**$ 2,164,597**	**$ (134,435)**	**$ (1,299,707)**	**$ 1,155,493**
Shares issued under company stock and employee benefit plans	—	12,220	—	—	6,591	**18,811**
Stock-based compensation	—	21,550	—	—	—	**21,550**
Purchase of treasury shares (180,735 shares)	—	—	—	—	(24,012)	**(24,012)**
Dividends declared ($1.25 per share)	—	—	(72,443)	—	—	**(72,443)**
Net income	—	—	377,375	—	—	**377,375**
Reclassification due to adoption of ASU 2018-02	—	—	18,846	(18,846)	—	—
Other comprehensive income (loss):						
Foreign currency translation adjustments	—	—	—	(28,619)	—	**(28,619)**
Defined benefit pension and post-retirement plans adjustment	—	—	—	2,586	—	**2,586**
October 31, 2018	**$ 12,253**	**$ 446,555**	**$ 2,488,375**	**$ (179,314)**	**$ (1,317,128)**	**$ 1,450,741**
Shares issued under company stock and employee benefit plans	—	18,475	—	—	7,545	**26,020**
Stock-based compensation	—	18,086	—	—	—	**18,086**
Purchase of treasury shares (998,004 shares)	—	—	—	—	(120,510)	**(120,510)**
Dividends declared ($1.43 per share)	—	—	(82,145)	—	—	**(82,145)**
Net income	—	—	337,091	—	—	**337,091**
Impact of adoption of ASU 2014-09	—	—	4,329	—	—	**4,329**
Other comprehensive income (loss):						
Foreign currency translation adjustments	—	—	—	3,710	—	**3,710**
Defined benefit pension and post-retirement plans adjustment	—	—	—	(56,277)	—	**(56,277)**
October 31, 2019	**$ 12,253**	**$ 483,116**	**$ 2,747,650**	**$ (231,881)**	**$ (1,430,093)**	**$ 1,581,045**

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

Consolidated Statements of Cash Flows

Years ended October 31, 2019, 2018 and 2017	2019	2018	2017
(In thousands)			
Cash flows from operating activities:			
Net income	**$ 337,091**	$ 377,375	$ 295,802
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation	**55,454**	52,959	45,947
Amortization	**54,790**	55,448	44,907
Provision for losses on receivables	**2,254**	1,185	4,030
Deferred income taxes	**(1,018)**	(33,949)	(472)
Non-cash stock compensation	**18,086**	21,550	20,168
Loss on sale of property, plant and equipment	**953**	830	188
Other non-cash	**(669)**	1,359	2,770
Changes in operating assets and liabilities:			
Receivables	**(39,992)**	10,236	(46,152)
Inventories	**(23,117)**	5,532	(19,667)
Prepaid expenses	**(2,024)**	(4,046)	4,737
Other assets	**(74)**	320	(3,429)
Accounts payable	**654**	(2,671)	4,805
Income taxes payable	**(3,832)**	(2,718)	7,522
Accrued liabilities	**(14,027)**	2,134	(5,629)
Customer advance payments	**2,193**	5,047	5,163
Other liabilities	**(4,325)**	18,402	2,266
Other	**496**	(4,355)	(6,204)
Net cash provided by operating activities	**382,893**	504,638	356,752
Cash flows from investing activities:			
Additions to property, plant and equipment	**(64,244)**	(89,790)	(71,558)
Proceeds from sale of property, plant and equipment	**1,285**	458	4,007
Acquisition of businesses, net of cash acquired	**(12,486)**	(50,586)	(805,943)
Equity investments	**(844)**	—	(4,470)
Net cash used in investing activities	**(76,289)**	(139,918)	(877,964)
Cash flows from financing activities:			
Proceeds from short-term borrowings	**—**	996	6,017
Repayment of short-term borrowings	**—**	(1,006)	(8,149)
Proceeds from long-term debt	**186,635**	585,661	841,536
Repayment of long-term debt	**(254,473)**	(854,538)	(237,183)
Repayment of capital lease obligations	**(4,859)**	(5,333)	(5,287)
Payment of debt issuance costs	**(1,742)**	(1,826)	(3,214)
Issuance of common shares	**26,020**	18,811	14,086
Purchase of treasury shares	**(120,510)**	(24,012)	(3,216)
Dividends paid	**(82,145)**	(72,443)	(63,840)
Net cash provided by (used in) financing activities	**(251,074)**	(353,690)	540,750
Effect of exchange rate changes on cash	**(44)**	(5,735)	3,606
Increase in cash and cash equivalents	**55,486**	5,295	23,144
Cash and cash equivalents at beginning of year	**95,678**	90,383	67,239
Cash and cash equivalents at end of year	**$ 151,164**	$ 95,678	$ 90,383

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

Notes to Consolidated Financial Statements

NOTE REGARDING AMOUNTS AND FISCAL YEAR REFERENCES

In this annual report, all amounts related to United States dollars and foreign currency and to the number of Nordson Corporation's common shares, except for per share earnings and dividend amounts, are expressed in thousands. Unless the context otherwise indicates, all references to "we" or the "Company" mean Nordson Corporation.

Unless otherwise noted, all references to years relate to our fiscal year.

Note 1 — Significant accounting policies

Consolidation — The consolidated financial statements include the accounts of Nordson Corporation and its majority-owned and controlled subsidiaries. Investments in affiliates and joint ventures in which our ownership is 50 percent or less or in which we do not have control but have the ability to exercise significant influence, are accounted for under the equity method. All significant intercompany accounts and transactions have been eliminated in consolidation.

Use of estimates — The preparation of financial statements in conformity with generally accepted accounting principles in the United States requires management to make estimates and assumptions that affect the amounts reported in the Consolidated Financial Statements and notes. Actual amounts could differ from these estimates.

Fiscal year — Our fiscal year is November 1 through October 31.

Revenue recognition — A contract exists when it has approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance and collectability of the consideration is probable. Revenue is recognized when performance obligations under the terms of the contract with a customer are satisfied. Generally, our revenue results from short-term, fixed-price contracts and primarily is recognized as of a point in time when the product is shipped or at a later point when the control of the product transfers to the customer. Revenue for undelivered items is deferred and included within Accrued liabilities in our Consolidated Balance Sheets. Revenues deferred as of October 31, 2019 and 2018 were not material.

However, for certain contracts related to the sale of customer-specific products within our Advanced Technology Systems segment, there was a change in revenue recognition upon adoption of the new revenue standard. Previously, these contracts were recognized at the point in time when the shipping terms were satisfied. Under the new revenue standard, we now recognize revenue for these contracts over time as we satisfy performance obligations because of the continuous transfer of control to the customer. The continuous transfer of control to the customer occurs as we enhance assets that are customer controlled and we are contractually entitled to payment for work performed to date plus a reasonable margin.

As control transfers over time for these products or services, revenue is recognized based on progress toward completion of the performance obligations. The selection method to measure progress towards completion requires judgment and is based on the nature of the products or services to be provided. We have elected to use the input method – costs incurred for these contracts because it best depicts the transfer of products or services to the customer based on incurring costs on the contract. Under this method, revenues are recorded proportionally as costs are incurred. Contract assets recognized are recorded in Prepaid expenses and other current assets and contract liabilities are recorded in Accrued liabilities in our Consolidated Balance Sheets and were not material at October 31, 2019. Revenue recognized over time is not material to our overall Consolidated Financial Statements.

Revenue is measured as the amount of consideration we expect to receive in exchange for transferring products or services. Sales, value add, and other taxes we collect concurrently with revenue-producing activities are excluded from revenue. As a practical expedient, we may exclude the assessment of whether goods or services are performance obligations, if they are immaterial in the context of the contract, and combine these with other performance obligations. While payment terms and conditions vary by contract type, we have determined that our contracts generally do not include a significant financing component. We have elected to apply the practical expedient to treat all shipping and handling costs as fulfillment costs as a significant portion of these costs are incurred prior to transfer of control to the customer. We have also elected to apply the practical expedient to expense sales commissions as they are incurred as the amortization period resulting from capitalizing the costs is one year or less. These costs are recorded within Selling, general and administrative expenses in our Consolidated Statements of Income.

We offer assurance type warranties on our products as well as separately sold warranty contracts. Revenue related to warranty contracts that are sold separately is recognized over the life of the warranty term.

Certain arrangements may include installation, installation supervision, training, and spare parts, which tend to be completed in a short period of time, at an insignificant cost, and utilizing skills not unique to us, therefore, are typically regarded as inconsequential or not material.

We disclose disaggregated revenues by operating segment and geography in accordance with the revenue standard and on the same basis used internally by the chief operating decision maker for evaluating performance of operating segments and for allocating resources. Refer to Note 15 for details on our operating segments.

Shipping and handling costs — Amounts billed to customers for shipping and handling are recorded as revenue. Shipping and handling expenses are included in cost of sales.

Advertising costs — Advertising costs are expensed as incurred and were $ 10,479, $12,451 and $11,296 in 2019, 2018 and 2017, respectively.

Research and development — Investments in research and development are important to our long-term growth, enabling us to keep pace with changing customer and marketplace needs through the development of new products and new applications for existing products. We place strong emphasis on technology developments and improvements through internal engineering and research teams. Research and development costs are expensed as incurred and were $60,018, $58,806 and $52,462 in 2019, 2018 and 2017, respectively. As a percentage of sales, research and development expenses were 2.7, 2.6 and 2.5 percent in 2019, 2018 and 2017, respectively.

Earnings per share — Basic earnings per share are computed based on the weighted-average number of common shares outstanding during each year, while diluted earnings per share are based on the weighted-average number of common shares and common share equivalents outstanding. Common share equivalents consist of shares issuable upon exercise of stock options computed using the treasury stock method, as well as restricted stock and deferred stock-based compensation. Options whose exercise price is higher than the average market price are excluded from the calculation of diluted earnings per share because the effect would be anti-dilutive. Options for 176 common shares were excluded from the diluted earnings per share calculation in 2019, because their effect would have been anti-dilutive. No options were excluded from the calculation of diluted earnings per share in 2018 and 2017. Under the Amended & Restated 2012 Stock Incentive and Award Plan, executive officers and selected other key employees receive common share awards based on corporate performance measures over three-year performance periods. Awards for which performance measures have not been met were excluded from the calculation of diluted earnings per share.

Cash — Highly liquid instruments with maturities of 90 days or less at date of purchase are considered to be cash equivalents.

Allowance for doubtful accounts — An allowance for doubtful accounts is maintained for estimated losses resulting from the inability of customers to make required payments. The amount of the allowance is determined principally on the basis of past collection experience and known factors regarding specific customers. Accounts are written off against the allowance when it becomes evident that collection will not occur. Credit is extended to customers satisfying pre-defined credit criteria. We believe we have limited concentration of credit risk due to the diversity of our customer base.

Inventories — Inventories are valued at the lower of cost or net realizable value. Cost was determined using the last-in, first-out (LIFO) method for 19 percent of consolidated inventories at October 31, 2019 and 15 percent of consolidated inventories at October 31, 2018. The first-in, first-out (FIFO) method is used for all other inventories. Consolidated inventories would have been $6,145 and $6,545 higher than reported at October 31, 2019 and 2018, respectively, had the FIFO method, which approximates current cost, been used for valuation of all inventories.

Property, plant and equipment and depreciation — Property, plant and equipment are carried at cost. Additions and improvements that extend the lives of assets are capitalized, while expenditures for repairs and maintenance are expensed as incurred. Plant and equipment are depreciated for financial reporting purposes using the straight-line method over the estimated useful lives of the assets or, in the case of property under capital leases, over the terms of the leases. Leasehold improvements are depreciated over the shorter of the lease term or their useful lives. Useful lives are as follows:

Land improvements	15-25 years
Buildings	20-40 years
Machinery and equipment	3-18 years
Enterprise management systems	5-13 years

Depreciation expense is included in cost of sales and selling and administrative expenses.

Internal use software costs are expensed or capitalized depending on whether they are incurred in the preliminary project stage, application development stage or the post-implementation stage. Amounts capitalized are amortized over the estimated useful lives of the software beginning with the project's completion. All re-engineering costs are expensed as incurred. Interest costs on significant capital projects are capitalized. No interest was capitalized in 2019, 2018 or 2017.

Goodwill and intangible assets — Goodwill is the excess of cost of an acquired entity over the amounts assigned to assets acquired and liabilities assumed in a business combination. Goodwill relates to and is assigned directly to specific reporting units. Goodwill is not amortized but is subject to annual impairment testing. Our annual impairment testing is performed as of August 1. Testing is done more frequently if an event occurs or circumstances change that would indicate the fair value of a reporting unit is less than the carrying amount of those assets.

Other amortizable intangible assets, which consist primarily of patent/technology costs, customer relationships, noncompete agreements, and trade names, are amortized over their useful lives on a straight-line basis. At October 31, 2019, the weighted-average useful lives for each major category of amortizable intangible assets were:

Patent/technology costs	13 years
Customer relationships	14 years
Noncompete agreements	3 years
Trade names	15 years

Foreign currency translation — The financial statements of subsidiaries outside the United States are generally measured using the local currency as the functional currency. Assets and liabilities of these subsidiaries are translated at the rates of exchange at the balance sheet dates. Income and expense items are translated at average monthly rates of exchange. The resulting translation adjustments are included in accumulated other comprehensive income (loss), a separate component of shareholders' equity. Generally, gains and losses from foreign currency transactions, including forward contracts, of these subsidiaries and the United States parent are included in net income. Gains and losses from intercompany foreign currency transactions of a long-term investment nature are included in accumulated other comprehensive income (loss).

Accumulated other comprehensive loss — Accumulated other comprehensive loss at October 31, 2019 and 2018 consisted of:

	Cumulative translation adjustments	Pension and postretirement benefit plan adjustments	Accumulated other comprehensive loss
Balance at October 31, 2018	$ (57,042)	$ (122,272)	$ (179,314)
Pension and postretirement plan changes, net of tax of $(17,167)	—	(56,277)	(56,277)
Currency translation losses	3,710	—	3,710
Balance at October 31, 2019	$ (53,332)	$ (178,549)	$ (231,881)

Warranties — We offer warranties to our customers depending on the specific product and terms of the customer purchase agreement. A typical warranty program requires that we repair or replace defective products within a specified time period (generally one year) measured from the date of delivery or first use. We record an estimate for future warranty-related costs based on actual historical return rates. Based on analysis of return rates and other factors, the adequacy of our warranty provisions are adjusted as necessary. The liability for warranty costs is included in accrued liabilities in the Consolidated Balance Sheet.

Following is a reconciliation of the product warranty liability for 2019 and 2018:

	2019	2018
Balance at beginning of year	**$ 12,195**	$ 13,377
Accruals for warranties	**9,670**	11,937
Warranty payments	**(10,881)**	(12,966)
Currency adjustments	**22**	(153)
Balance at end of year	**$ 11,006**	$ 12,195

Note 2 — Recently issued accounting standards

New accounting guidance adopted:

On November 1, 2018, we adopted Accounting Standards Update (ASU) 2014-09 (“Topic 606”) using the modified retrospective method applied to those contracts which were not completed as of November 1, 2018. Results for reporting periods beginning after November 1, 2018 are presented under Topic 606, while prior period amounts are not adjusted and continue to be reported in accordance with our historic accounting. The cumulative impact of adopting Topic 606 as of November 1, 2018 did not have a material impact to the Consolidated Financial Statements.

In March 2017, the Financial Accounting Standards Board (FASB) issued a new standard which requires the presentation of the service cost component of the net periodic benefit cost in the same income statement line item as other employee compensation costs arising from services rendered during the period. All other components of net periodic benefit cost are presented below operating income. Additionally, only the service cost component is eligible for capitalization in assets. We adopted the standard beginning November 1, 2018. During the twelve months ended October 31, 2018 and 2017, the reclassification resulted in an increase in Other expense of $8,022 and $8,700, respectively, a decrease in Cost of sales of $ 363 and $289, respectively, and a decrease in Selling, general & administrative expenses of $7,659 and $8,411, respectively.

New accounting guidance issued and not yet adopted:

In February 2016, the FASB issued ASU 2016-02, “Leases (ASC 842)” which requires a lessee to recognize on the balance sheet the assets and liabilities for the rights and obligations created by those leases with a lease term of more than twelve months.

We adopted the new standard on November 1, 2019 using the transition option, established in ASU 2018-11, Leases (ASC 842), Targeted Improvements which provides a transition method that allows entities to initially apply the new standard at the adoption date and recognize a cumulative effect adjustment to the opening balance of retained earnings in the period of adoption without restating prior periods. We elected the practical expedient package related to the identification of leases in contracts, lease classification, and accounting for initial direct costs whereby prior conclusions do not have to be reassessed for leases that commenced before the effective date. As we did not reassess such conclusions, we did not adopt the practical expedient to use hindsight to determine the likelihood of whether a lease will be extended, terminated or whether a purchase option will be exercised. As part of our adoption of the new standard, we compiled an inventory of our lease agreements and implemented an enterprise-wide lease management system to help with the standard’s additional reporting requirements. We are complete with our assessment of ASC 842 and expect to record right-of-use assets and corresponding lease liabilities of approximately 3 percent and 6 percent of total assets and liabilities, respectively, in our consolidated balance sheet as of November 1, 2019. We do not expect the new standard to have a material impact our Consolidated Statement of Income or Consolidated Statement of Cash Flows.

In June 2016, the FASB issued a new standard that changes the impairment model for most financial instruments. Current guidance requires the recognition of credit losses based on an incurred loss impairment methodology that reflects losses once the losses are probable. We will be required to use a current expected credit loss model that will immediately recognize an estimate of credit losses that are expected to occur over the life of the financial instruments that are in the scope of this update, including trade receivables. ASU 2016-13 does not prescribe a specific method to make an estimate so the application will require judgment and should consider historical information, current information, reasonable and supportable forecasts, and includes estimates of prepayment. This guidance will become effective for us on November 1, 2020. Early adoption is permitted. We are currently assessing the impact this standard will have on our Consolidated Financial Statements.

In August 2018, the FASB issued a new standard which removes, modifies, and adds certain disclosure requirements on fair value measurements. The guidance removes disclosure requirements pertaining to the amount of and reasons for transfers between Level 1 and Level 2 of the fair value hierarchy, the policy for timing of transfers between levels, and the valuation processes for Level 3 fair value measurements. For investments in certain entities that calculate net asset value, an entity is required to disclose the timing of liquidation of an investee’s assets and the date when restrictions from redemption might lapse only if the investee has communicated the timing to the entity or announced the timing publicly. In addition, the amendment clarifies that the measurement uncertainty disclosure is to communicate information about the uncertainty in measurement as of the reporting date. The guidance adds disclosure requirements for changes in unrealized gains and losses for the period included in other comprehensive income for recurring Level 3 fair value measurements held at the end of the reporting period as well as the range and weighted average of significant unobservable inputs used to develop Level 3 fair value measurements. It will be effective for us beginning November 1, 2020. Early adoption is permitted. We are currently assessing the impact this standard will have on our Consolidated Financial Statements.

In August 2018, the FASB issued a new standard which addresses defined benefit plans. The amendments modify the following disclosure requirements for employers that sponsor defined benefit pension or other postretirement plans: the amounts in accumulated other comprehensive income expected to be recognized as components of net period benefit cost over the next fiscal year, amount and timing of plan assets expected to be returned to the employer, related party disclosure about the amount of future annual benefits covered by insurance and annuity contracts and significant transactions between the employer or related parties and the plan, and the effects of a one-percentage point change in assumed health care cost trend rates on the (a) aggregate of the service and interest cost components of net periodic benefit costs and (b) benefit obligations for postretirement health care benefits are removed. A disclosure requirement was added for the explanation of the reasons for significant gains and losses related to changes in the benefit obligation for the period. Additionally, the standard clarifies disclosure requirement surrounding the projected benefit obligation (PBO) and fair value of plan assets for plans with PBOs in excess of plan assets and the accumulated benefit obligation (ABO) and fair value of plan assets for plans with ABOs in excess of plan assets. It will be effective for us beginning November 1, 2021. Early adoption is permitted. We are currently assessing the impact this standard will have on our Consolidated Financial Statements.

In August 2018, the FASB issued a new standard which makes a number of changes meant to help entities evaluate the accounting for fees paid by a customer in a cloud computing arrangement (hosting arrangement), by providing guidance in determining when the arrangement includes a software license. It will be effective for us beginning November 1, 2020. Early adoption is permitted. We are currently assessing the impact this standard will have on our Consolidated Financial Statements.

Note 3 — Acquisitions

Business acquisitions have been accounted for using the acquisition method, with the acquired assets and liabilities recorded at estimated fair value on the dates of acquisition. The cost in excess of the net assets of the business acquired is included in goodwill. Operating results since the respective dates of acquisitions are included in the Consolidated Statement of Income.

2019 acquisition

On July 1, 2019, we purchased certain assets of Optical Control GmbH & Co. KG (“Optical”), a Nuremberg, Germany designer and developer of high speed, fully automatic counting systems utilizing x-ray technology. This transaction was not material to our Consolidated Financial Statements. We recorded the acquisition of Optical based on the fair value of the assets acquired and the liabilities assumed. Goodwill associated with this acquisition is tax deductible. This acquisition is being reported in our Advanced Technology Systems segment. As of October 31, 2019, the purchase price allocations remain preliminary as we complete our assessments of income taxes.

2018 acquisitions

On October 17, 2018, we purchased 100 percent of the outstanding shares of Cladach Nua Teoranta (“Clada”), a Galway, Ireland designer and developer primarily focused on medical balloons and balloon catheters. Clada’s technologies are used in key applications such as angioplasty and the treatment of vascular disease. We acquired Clada for an aggregate purchase price of $5,236, which included an earn-out liability of $1,131. Based on the fair value of the assets acquired and the liabilities assumed, goodwill of $ 3,776 and identifiable intangible assets of $697 were recorded. The identifiable intangible assets consist primarily of $ 58 of customer relationships (amortized over 6 years), $70 of tradenames (amortized over 9 years), $499 of technology (amortized over 7 years) and $70 of non-compete agreements (amortized over 3 years). Goodwill associated with this acquisition is not tax deductible. This acquisition is being reported in our Advanced Technology Systems segment.

On January 2, 2018, we purchased 100 percent of the outstanding shares of Sonoscan, Inc. (“Sonoscan”), an Elk Grove Village, Illinois leading designer and manufacturer of acoustic microscopes and sophisticated acoustic micro imaging systems used in a variety of microelectronic, automotive, aerospace and industrial electronic assembly applications. We acquired Sonoscan for an aggregate purchase price of $46,018, net of $655 of cash. Based on the fair value of the assets acquired and the liabilities assumed, goodwill of $ 22,775 and identifiable intangible assets of $7,910 were recorded. The identifiable intangible assets consist primarily of $ 1,700 of customer relationships (amortized over 7 years), $3,300 of tradenames (amortized over 11 years), $2,500 of technology (amortized over 7 years) and $410 of non-compete agreements (amortized over 5 years). Goodwill associated with this acquisition is tax deductible. This acquisition is being reported in our Advanced Technology Systems segment.

2017 acquisitions

On March 31, 2017, we completed the acquisition of Vention Medical's Advanced Technologies business ("Vention"), a Salem, New Hampshire leading designer, developer and manufacturer of minimally invasive interventional delivery devices, catheters and advanced components for the global medical technology market. This is a highly complementary business that adds significant scale and enhances strategic capabilities of our existing medical platform. We acquired Vention for an aggregate purchase price of $705,000, net of $3,313 of cash and other closing adjustments of $10,726. The acquisition was funded primarily through a new term loan facility, as well as through cash and borrowings on our credit facility. The purchase price was allocated to the underlying assets acquired and liabilities assumed based upon their estimated fair values at the date of acquisition. We determined the estimated fair values based on independent appraisals, discounted cash flow analyses, quoted market prices, replacement cost analyses and estimates made by management.

Based on the fair value of the assets acquired and the liabilities assumed, goodwill of $ 434,123, of which $37,200 is tax deductible, and identifiable intangible assets of $286,000 were recorded. The identifiable intangible assets consist primarily of $ 240,000 of customer relationships (amortized over 14 years), $2,000 of tradenames (amortized over 6 years), and $44,000 of technology, consisting of $36,000 (amortized over 14 years) and $8,000 (amortized over 10 years). Goodwill represents the value we expect to achieve through the expansion of our existing medical platform. This acquisition is being reported in our Advanced Technology Systems segment.

The following table summarizes the purchase price allocation of the estimated fair values of the assets acquired and liabilities assumed at the acquisition date:

Assets acquired:		
Cash	$	3,313
Receivables		26,742
Inventories		14,279
Prepaid expenses		3,079
Property, plant and equipment		34,319
Goodwill		434,123
Intangible assets		286,000
Other assets		1,071
Total assets acquired	$	802,926
Liabilities assumed:		
Current liabilities		19,130
Deferred tax liabilities		64,757
Total liabilities assumed	$	83,887
Net assets acquired	$	719,039

On February 16, 2017, we purchased 100 percent of the outstanding shares of InterSelect GmbH ("InterSelect"), a German designer and manufacturer of selective soldering systems used in a variety of automotive, aerospace and industrial electronics assembly applications. We acquired InterSelect for an aggregate purchase price of $5,432, net of cash acquired of $492. Based on the fair value of the assets acquired and the liabilities assumed, goodwill of $3,548 and identifiable intangible assets of $1,879 were recorded. The identifiable intangible assets consist primarily of $1,109 of customer relationships (amortized over 9 years), $348 of tradenames (amortized over 12 years), and $422 of technology (amortized over 9 years). Goodwill associated with this acquisition is not tax deductible. This acquisition is being reported in our Advanced Technology Systems segment.

On February 1, 2017, we purchased 100 percent of the outstanding shares of Plas-Pak Industries, Inc. ("Plas-Pak"), a Norwich, Connecticut designer and manufacturer of injection molded, single-use plastic dispensing products. Plas-Pak's broad product offering includes two-component (2K) cartridges for industrial and commercial do-it-yourself adhesives, dial-a-dose calibrated syringes for veterinary and animal health applications, and specialty syringes for pesticide, dental and other markets. We acquired Plas-Pak for an aggregate purchase price of $70,798, net of cash acquired of $543. Based on the fair value of the assets acquired and the liabilities assumed, goodwill of $24,995 and identifiable intangible assets of $33,800 were recorded. The identifiable intangible assets consist primarily of $23,700 of customer relationships (amortized over 17 years), $4,100 of tradenames (amortized over 12 years), $5,000 of technology (amortized over 9 years) and $1,000 of non-compete agreements (amortized over 5 years). Goodwill associated with this acquisition is tax deductible. This acquisition is being reported in our Advanced Technology Systems segment.

On January 3, 2017, we purchased certain assets of ACE Production Technologies, Inc. (“ACE”), a Spokane, Washington based designer and manufacturer of selective soldering systems used in a variety of automotive and industrial electronics assembly applications. We acquired the assets for an aggregate purchase price of $13,761. Based on the fair value of the assets acquired and the liabilities assumed, goodwill of $6,383 and identifiable intangible assets of $ 5,010 were recorded. The identifiable intangible assets consist primarily of $2,800 of customer relationships (amortized over 7 years), $1,000 of tradenames (amortized over 11 years), $1,100 of technology (amortized over 7 years) and $110 of non-compete agreements (amortized over 3 years). Goodwill associated with this acquisition is tax deductible. This acquisition is being reported in our Advanced Technology Systems segment.

Note 4 — Details of Consolidated Balance Sheet

	2019	2018
Receivables:		
Accounts	**$ 506,318**	$ 475,638
Notes	**3,980**	4,476
Other	**30,268**	20,889
	540,566	501,003
Allowance for doubtful accounts	**(9,801)**	(9,580)
	$ 530,765	$ 491,423
Inventories:		
Raw materials and component parts	**$ 102,044**	$ 112,823
Work-in-process	**42,904**	47,126
Finished goods	**183,973**	148,618
	328,921	308,567
Obsolescence and other reserves	**(39,377)**	(37,545)
LIFO reserve	**(6,145)**	(6,545)
	$ 283,399	$ 264,477
Property, plant and equipment:		
Land	**$ 10,468**	$ 10,544
Land improvements	**4,390**	4,294
Buildings	**256,195**	252,127
Machinery and equipment	**489,864**	456,307
Enterprise management system	**53,020**	53,234
Construction-in-progress	**34,944**	24,266
Leased property under capitalized leases	**29,528**	26,118
	878,409	826,890
Accumulated depreciation and amortization	**(479,514)**	(440,224)
	$ 398,895	$ 386,666
Accrued liabilities:		
Salaries and other compensation	**$ 49,908**	$ 72,364
Pension and retirement	**9,993**	5,095
Taxes other than income taxes	**8,606**	8,060
Other	**93,148**	89,566
	$ 161,655	$ 175,085

Note 5 — Goodwill and intangible assets

We account for goodwill and other intangible assets in accordance with the provisions of ASC 350 and account for business combinations using the acquisition method of accounting and accordingly, the assets and liabilities of the entities acquired are recorded at their estimated fair values at the acquisition date. Goodwill is the excess of purchase price over the fair value of tangible and identifiable intangible net assets acquired in various business combinations. Goodwill is not amortized but is subject to annual impairment testing. Our annual impairment testing is performed as of August 1. Testing is done more frequently if an event occurs or circumstances change that would indicate the fair value of a reporting unit is less than the carrying amount of those assets. We assess the fair value of reporting units on a non-recurring basis using a quantitative analysis that uses a combination of the discounted cash flow method of the Income Approach and the guideline public company method of the Market Approach, and compare the result against the reporting unit’s carrying value of net assets. The implied fair value of our reporting units is determined based on significant unobservable inputs, as discussed below; accordingly, these inputs fall within Level 3 of the fair value hierarchy.

The discounted cash flow method (Income Approach) uses assumptions for revenue growth, operating margin, and working capital turnover that are based on management's strategic plans tempered by performance trends and reasonable expectations about those trends. Terminal value calculations employ a published formula known as the Gordon Growth Model Method that essentially captures the present value of perpetual cash flows beyond the last projected period assuming a constant Weighted Average Cost of Capital (WACC) methodology and growth rate. For each reporting unit, a sensitivity analysis is performed to vary the discount and terminal growth rates in order to provide a range of reasonableness for detecting impairment. Discount rates are developed using a WACC methodology. The WACC represents the blended average required rate of return for equity and debt capital based on observed market return data and company specific risk factors.

In the application of the guideline public company method (Market Approach), fair value is determined using transactional evidence for similar publicly traded equity. The comparable company guideline group is determined based on relative similarities to each reporting unit since exact correlations are not available. An indication of fair value for each reporting unit is based on the placement of each reporting unit within a range of multiples determined for its comparable guideline company group. Valuation multiples are derived by dividing latest twelve-month performance for revenues and Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) into total invested capital, which is the sum of traded equity plus interest bearing debt less cash. These multiples are applied against the revenue and EBITDA of each reporting unit. While the implied indications of fair value using the guideline public company method yield meaningful results, the discounted cash flow method of the income approach includes management's thoughtful projections and insights as to what the reporting units will accomplish in the near future. Accordingly, the reasonable, implied fair value of each reporting unit is a blend based on the consideration of both the Income and Market approaches.

An impairment charge is recorded for the amount by which the carrying value of the reporting unit exceeds the fair value of the reporting unit, as calculated in the quantitative analysis described above. Based on our annual impairment tests in 2019, 2018 and 2017, the fair value of each reporting unit exceeded its carrying value, and accordingly we did not record any goodwill impairment charges in 2019, 2018 or 2017.

Our reporting units are the Adhesive Dispensing Systems segment, the Industrial Coating Systems segment and one level below the Advanced Technology Systems segment.

Changes in the carrying amount of goodwill during 2019 by operating segment:

	Adhesive Dispensing Systems	Advanced Technology Systems	Industrial Coating Systems	Total
Balance at October 31, 2018	**$ 388,991**	**$ 1,194,969**	**$ 24,058**	**$ 1,608,018**
Acquisitions	**—**	**9,225**	**—**	**9,225**
Currency effect	**(1,588)**	**(916)**	**—**	**(2,504)**
Balance at October 31, 2019	**$ 387,403**	**$ 1,203,278**	**$ 24,058**	**$ 1,614,739**

Changes in the carrying amount of goodwill during 2018 by operating segment:

	Adhesive Dispensing Systems	Advanced Technology Systems	Industrial Coating Systems	Total
Balance at October 31, 2017	$ 392,295	$ 1,172,857	$ 24,058	$ 1,589,210
Acquisition	—	24,679	—	24,679
Currency effect	(3,304)	(2,567)	—	(5,871)
Balance at October 31, 2018	$ 388,991	$ 1,194,969	$ 24,058	$ 1,608,018

Accumulated impairment losses, which were recorded in 2009, were $232,789 at October 31, 2019 and October 31, 2018. Of these losses, $229,173 related to the Advanced Technology Systems segment and $ 3,616 related to the Industrial Coating Systems segment.

Information regarding intangible assets subject to amortization:

	October 31, 2019		
	Carrying Amount	Accumulated Amortization	Net Book Value
Customer relationships	**$ 480,007**	**$ 173,996**	**$ 306,011**
Patent/technology costs	**154,735**	**71,663**	**83,072**
Trade name	**96,655**	**41,303**	**55,352**
Noncompete agreements	**11,540**	**10,406**	**1,134**
Other	**1,400**	**1,394**	**6**
Total	**$ 744,337**	**$ 298,762**	**$ 445,575**

	October 31, 2018		
	Carrying Amount	Accumulated Amortization	Net Book Value
Customer relationships	$ 480,404	$ 137,640	$ 342,764
Patent/technology costs	153,602	59,845	93,757
Trade name	96,433	34,768	61,665
Noncompete agreements	11,469	9,919	1,550
Other	1,386	1,381	5
Total	$ 743,294	$ 243,553	$ 499,741

Amortization expense for 2019, 2018 and 2017 was $ 54,790, $55,448 and $44,907 respectively.

Estimated amortization expense for each of the five succeeding years:

Year	Amounts
2020	$ 55,241
2021	$ 49,799
2022	$ 45,794
2023	$ 44,822
2024	$ 42,109

Note 6 — Retirement, pension and other postretirement plans

Retirement plans — We have funded contributory retirement plans covering certain employees. Our contributions are primarily determined by the terms of the plans, subject to the limitation that they shall not exceed the amounts deductible for income tax purposes. We also sponsor unfunded contributory supplemental retirement plans for certain employees. Generally, benefits under these plans vest gradually over a period of approximately three years from date of employment, and are based on the employee's contribution. The expense applicable to retirement plans for 2019, 2018 and 2017 was approximately $22,573, $22,634 and $19,259, respectively.

Pension plans — We have various pension plans covering a portion of our United States and international employees. Pension plan benefits are generally based on years of employment and, for salaried employees, the level of compensation. Actuarially determined amounts are contributed to United States plans to provide sufficient assets to meet future benefit payment requirements. We also sponsor an unfunded supplemental pension plan for certain employees. International subsidiaries fund their pension plans according to local requirements.

A reconciliation of the benefit obligations, plan assets, accrued benefit cost and the amount recognized in financial statements for pension plans is as follows:

	United States		International	
	2019	**2018**	**2019**	**2018**
Change in benefit obligation:				
Benefit obligation at beginning of year	**$ 425,605**	$ 430,816	**$ 87,227**	$ 88,761
Service cost	**14,587**	13,052	**1,933**	2,048
Interest cost	**18,304**	14,797	**1,670**	1,656
Participant contributions	**—**	—	**83**	90
Plan amendments	**—**	—	**186**	50
Settlements	**—**	—	**(3,018)**	(1,431)
Foreign currency exchange rate change	**—**	—	**106**	(2,676)
Actuarial (gain) loss	**107,662**	(20,502)	**11,852**	107
Benefits paid	**(14,161)**	(12,558)	**(2,049)**	(1,378)
Benefit obligation at end of year	**$ 551,997**	$ 425,605	**$ 97,990**	$ 87,227
Change in plan assets:				
Beginning fair value of plan assets	**$ 361,073**	$ 369,234	**$ 39,617**	$ 37,504
Actual return on plan assets	**76,700**	(13,890)	**707**	2,370
Company contributions	**25,319**	18,287	**3,696**	3,728
Participant contributions	**—**	—	**83**	90
Settlements	**—**	—	**(3,018)**	(1,431)
Foreign currency exchange rate change	**—**	—	**604**	(1,266)
Benefits paid	**(14,161)**	(12,558)	**(2,049)**	(1,378)
Ending fair value of plan assets	**$ 448,931**	$ 361,073	**$ 39,640**	$ 39,617
Funded status at end of year	**$ (103,066)**	$ (64,532)	**$ (58,350)**	$ (47,610)
Amounts recognized in financial statements:				
Noncurrent asset	**$ 2,171**	$ 1,544	**$ 1,375**	$ 748
Accrued benefit liability	**(6,435)**	(1,176)	**(21)**	(36)
Long-term pension obligations	**(98,802)**	(64,900)	**(59,704)**	(48,322)
Total amount recognized in financial statements	**$ (103,066)**	$ (64,532)	**$ (58,350)**	$ (47,610)

	United States		International	
	2019	**2018**	**2019**	**2018**
Amounts recognized in accumulated other comprehensive (gain) loss:				
Net actuarial loss	**$ 178,390**	$ 130,788	**$ 33,826**	$ 23,304
Prior service credit	**(100)**	(161)	**(2,342)**	(2,844)
Accumulated other comprehensive loss	**$ 178,290**	$ 130,627	**$ 31,484**	$ 20,460
Amounts expected to be recognized during next fiscal year:				
Amortization of net actuarial loss	**$ 13,591**	$ 6,221	**$ 2,945**	$ 1,700
Amortization of prior service credit	**(84)**	(61)	**(288)**	(302)
Total	**$ 13,507**	$ 6,160	**$ 2,657**	$ 1,398

The following table summarizes the changes in accumulated other comprehensive loss:

	United States		International	
	2019	**2018**	**2019**	**2018**
Balance at beginning of year	**$ 130,627**	$ 124,733	**$ 20,460**	$ 23,855
Net (gain) loss arising during the year	**54,304**	15,351	**12,737**	(752)
Prior service cost arising during the year	**—**	—	**186**	50
Net gain recognized during the year	**(6,702)**	(9,479)	**(1,696)**	(2,115)
Prior service credit recognized during the year	**61**	22	**303**	316
Settlement loss	**—**	—	**(470)**	(252)
Exchange rate effect during the year	**—**	—	**(36)**	(642)
Balance at end of year	**$ 178,290**	$ 130,627	**$ 31,484**	$ 20,460

Information regarding the accumulated benefit obligation is as follows:

	United States		International	
	2019	**2018**	**2019**	**2018**
For all plans:				
Accumulated benefit obligation	**$ 513,861**	$ 403,590	**$ 83,439**	$ 74,690
For plans with benefit obligations in excess of plan assets:				
Projected benefit obligation	**491,816**	373,531	**86,534**	46,292
Accumulated benefit obligation	**453,681**	351,516	**73,293**	42,363
Fair value of plan assets	**386,580**	307,455	**27,769**	5,355

Net periodic pension costs include the following components:

	United States			International		
	2019	**2018**	**2017**	**2019**	**2018**	**2017**
Service cost	**$ 14,587**	$ 13,052	$ 11,992	**$ 1,933**	$ 2,048	$ 2,343
Interest cost	**18,304**	14,797	13,308	**1,670**	1,656	1,572
Expected return on plan assets	**(23,341)**	(21,964)	(20,784)	**(1,592)**	(1,512)	(1,338)
Amortization of prior service cost (credit)	**(61)**	(22)	44	**(303)**	(316)	(302)
Amortization of net actuarial loss	**6,702**	9,479	9,537	**1,696**	2,115	2,605
Settlement loss	**—**	—	648	**470**	252	363
Total benefit cost	**$ 16,191**	$ 15,342	$ 14,745	**$ 3,874**	$ 4,243	$ 5,243

Net periodic pension cost for 2019, 2018 and 2017 included a settlement loss of $ 470, $252 and $1,011, respectively, due to lump sum retirement payments.

The components of net periodic pension cost other than service cost are included in Other – net in our Consolidated Statements of Income.

The weighted average assumptions used in the valuation of pension benefits were as follows:

	United States			International		
	2019	**2018**	**2017**	**2019**	**2018**	**2017**
Assumptions used to determine benefit obligations at October 31:						
Discount rate	**3.25%**	4.53%	3.80%	**1.26%**	2.14%	2.07%
Rate of compensation increase	**4.00**	3.90	3.61	**3.12**	3.12	3.13
Assumptions used to determine net benefit costs for the years ended October 31:						
Discount rate - benefit obligation	**4.53**	3.80	3.94	**2.14**	2.07	1.86
Discount rate - service cost	**4.70**	4.01	4.31	**1.82**	1.76	1.55
Discount rate - interest cost	**4.15**	3.31	3.20	**1.90**	1.83	1.66
Expected return on plan assets	**6.00**	6.00	6.25	**3.96**	3.91	3.51
Rate of compensation increase	**3.90**	3.61	3.61	**3.12**	3.13	3.12

The amortization of prior service cost is determined using a straight-line amortization of the cost over the average remaining service period of employees expected to receive benefits under the plans.

The discount rate reflects the current rate at which pension liabilities could be effectively settled at the end of the year. The discount rate used considers a yield derived from matching projected pension payments with maturities of a portfolio of available bonds that receive the highest rating given from a recognized investments ratings agency. The changes in the discount rates in 2019, 2018, and 2017 are due to changes in yields for these types of investments as a result of the economic environment.

In determining the expected return on plan assets using the calculated value of plan assets, we consider both historical performance and an estimate of future long-term rates of return on assets similar to those in our plans. We consult with and consider the opinions of financial and other professionals in developing appropriate return assumptions. The rate of compensation increase is based on management's estimates using historical experience and expected increases in rates.

Net actuarial gains or losses are amortized to expense on a plan-by-plan basis when they exceed the accounting corridor, which is set at 10 percent of the greater of the plan assets or benefit obligations. Gains or losses outside of the corridor are subject to amortization over an average employee future service period that differs by plan. If substantially all of the plan's participants are no longer actively accruing benefits, the average life expectancy is used.

The allocation of pension plan assets as of October 31, 2019 and 2018 is as follows:

	United States		International	
	2019	**2018**	**2019**	**2018**
Asset Category				
Equity securities	**11%**	13%	**—%**	—%
Debt securities	**53**	50	**—**	—
Insurance contracts	**—**	—	**54**	55
Pooled investment funds	**35**	36	**45**	44
Other	**1**	1	**1**	1
Total	**100%**	100%	**100%**	100%

Our investment objective for defined benefit plan assets is to meet the plans' benefit obligations, while minimizing the potential for future required plan contributions.

Our United States plans comprise 92 percent of the worldwide pension assets. In general, the investment strategies focus on asset class diversification, liquidity to meet benefit payments and an appropriate balance of long-term investment return and risk. Target ranges for asset allocations are determined by dynamically matching the actuarial projections of the plans' future liabilities and benefit payments with expected long-term rates of return on the assets, taking into account investment return volatility and correlations across asset classes. For 2019, the target in "return-seeking assets" is 30 percent and 70 percent in fixed income. Plan assets are diversified across several investment managers and are invested in liquid funds that are selected to track broad market indices. Investment risk is carefully controlled with plan assets rebalanced to target allocations on a periodic basis and continual monitoring of investment managers' performance relative to the investment guidelines established with each investment manager.

Our international plans comprise 8 percent of the worldwide pension assets. Asset allocations are developed on a country-specific basis. Our investment strategy is to cover pension obligations with insurance contracts or to employ independent managers to invest the assets.

The fair values of our pension plan assets at October 31, 2019 by asset category are in the table below:

	United States				International			
	Total	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3
Cash	$ 1,208	$ 1,208	$ —	$ —	$ 441	$ 441	$ —	$ —
Money market funds	5,566	5,566	—	—	—	—	—	—
Equity securities:								
Basic materials	2,318	2,318	—	—	—	—	—	—
Consumer goods	4,412	4,412	—	—	—	—	—	—
Financial	6,120	6,120	—	—	—	—	—	—
Healthcare	4,460	4,460	—	—	—	—	—	—
Industrial goods	3,152	3,152	—	—	—	—	—	—
Technology	5,064	5,064	—	—	—	—	—	—
Utilities	937	937	—	—	—	—	—	—
Mutual funds	19,674	19,674	—	—	—	—	—	—
Fixed income securities:								
U.S. Government	83,025	13,094	69,931	—	—	—	—	—
Corporate	151,607	—	151,607	—	—	—	—	—
Other	5,051	—	5,051	—	—	—	—	—
Other types of investments:								
Insurance contracts	—	—	—	—	21,245	—	—	21,245
Other	1,101	1,101	—	—	—	—	—	—
Total investments in the fair value hierarchy	$293,695	$ 67,106	$226,589	$ —	$ 21,686	$ 441	$ —	$ 21,245
Investments measured at Net Asset Value:								
Real estate collective funds	33,917				—			
Pooled investment funds	121,319				17,954			
Total Investments at Fair Value	$448,931				$ 39,640			

The fair values of our pension plan assets at October 31, 2018 by asset category are in the table below:

	United States				International			
	Total	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3
Cash	$ 1,083	$ 1,083	$ —	$ —	$ 528	$ 528	$ —	$ —
Money market funds	1,620	1,620	—	—	—	—	—	—
Equity securities:								
Basic materials	2,763	2,763	—	—	—	—	—	—
Consumer goods	3,703	3,703	—	—	—	—	—	—
Financial	5,306	5,306	—	—	—	—	—	—
Healthcare	4,179	4,179	—	—	—	—	—	—
Industrial goods	2,516	2,516	—	—	—	—	—	—
Technology	4,690	4,690	—	—	—	—	—	—
Utilities	732	732	—	—	—	—	—	—
Mutual funds	21,987	21,987	—	—	—	—	—	—
Fixed income securities:								
U.S. Government	50,602	10,224	40,378	—	—	—	—	—
Corporate	123,159	—	123,159	—	—	—	—	—
Other	5,589	—	5,589	—	—	—	—	—
Other types of investments:								
Insurance contracts	—	—	—	—	21,645	—	—	21,645
Other	1,967	1,967	—	—	—	—	—	—
Total investments in the fair value hierarchy	$229,896	$ 60,770	$169,126	$ —	$ 22,173	$ 528	$ —	$ 21,645
Investments measured at Net Asset Value:								
Real estate collective funds	23,109				—			
Pooled investment funds	108,068				17,444			
Total Investments at Fair Value	$361,073				$ 39,617			

These investment funds did not own a significant number of shares of Nordson Corporation common stock for any year presented.

The inputs and methodology used to measure fair value of plan assets are consistent with those described in Note 10. Following are the valuation methodologies used to measure these assets:

- **Money market funds** - Money market funds are public investment vehicles that are valued with a net asset value of one dollar. This is a quoted price in an active market and is classified as Level 1.
- **Equity securities** - Common stocks and mutual funds are valued at the closing price reported on the active market on which the individual securities are traded and are classified as Level 1.
- **Fixed income securities** - U.S. Treasury bills reflect the closing price on the active market in which the securities are traded and are classified as Level 1. Securities of U.S. agencies are valued using bid evaluations and are classified as Level 2. Corporate fixed income securities are valued using evaluated prices, such as dealer quotes, bids and offers and are therefore classified as Level 2.
- **Insurance contracts** - Insurance contracts are investments with various insurance companies. The contract value represents the best estimate of fair value. These contracts do not hold any specific assets. These investments are classified as Level 3.
- **Real estate collective funds** – These funds are valued using the net asset value of the underlying properties. Net asset value is calculated using a combination of key inputs, such as revenue and expense growth rates, terminal capitalization rates and discount rates.
- **Pooled investment funds** - These are public investment vehicles valued using the net asset value. The net asset value is based on the value of the assets owned by the plan, less liabilities. These investments are not quoted on an active exchange.

The following tables present an analysis of changes during the years ended October 31, 2019 and 2018 in Level 3 plan assets, by plan asset class, for U.S. and international pension plans using significant unobservable inputs to measure fair value:

	Fair Value Measurements Using Significant Unobservable Inputs (Level 3)	
	Insurance contracts	**Total**
Beginning balance at October 31, 2018	**$ 21,645**	**$ 21,645**
Actual return on plan assets:		
Assets held, end of year	**913**	**913**
Assets sold during the period	**—**	**—**
Purchases	**2,431**	**2,431**
Sales	**(4,102)**	**(4,102)**
Foreign currency translation	**358**	**358**
Ending balance at October 31, 2019	**$ 21,245**	**$ 21,245**

	Fair Value Measurements Using Significant Unobservable Inputs (Level 3)	
	Insurance contracts	**Total**
Beginning balance at October 31, 2017	$ 21,037	$ 21,037
Actual return on plan assets:		
Assets held, end of year	862	862
Assets sold during the period	—	—
Purchases	2,760	2,760
Sales	(2,501)	(2,501)
Foreign currency translation	(513)	(513)
Ending balance at October 31, 2018	**$ 21,645**	**$ 21,645**

Contributions to pension plans in 2020 are estimated to be approximately $ 41,100.

Retiree pension benefit payments, which reflect expected future service, are anticipated to be paid as follows:

Year	United States	International
2020	$ 22,543	$ 2,277
2021	18,439	3,225
2022	20,173	2,797
2023	21,760	2,852
2024	23,096	3,292
2025-2029	140,195	18,378

Other postretirement plans - We sponsor an unfunded postretirement health care benefit plan covering certain of our United States employees. Employees hired after January 1, 2002, are not eligible to participate in this plan. For eligible retirees under the age of 65 who enroll in the plan, the plan is contributory in nature, with retiree contributions in the form of premiums that are adjusted annually. For eligible retirees age 65 and older who enroll in the plan, the plan delivers a benefit in the form of a Health Reimbursement Account (HRA), which retirees use for eligible reimbursable expenses, including premiums paid for purchase of a Medicare supplement plan or other out-of-pocket medical expenses such as deductibles or co-pays.

A reconciliation of the benefit obligations, accrued benefit cost and the amount recognized in financial statements for other postretirement plans is as follows:

	United States		International	
	2019	**2018**	**2019**	**2018**
Change in benefit obligation:				
Benefit obligation at beginning of year	**$ 72,010**	$ 75,146	**$ 512**	$ 599
Service cost	**545**	709	**16**	20
Interest cost	**2,984**	2,557	**19**	20
Participant contributions	**684**	663	**—**	—
Foreign currency exchange rate change	**—**	—	**(1)**	(11)
Actuarial (gain) loss	**15,101**	(4,519)	**(86)**	(110)
Benefits paid	**(2,664)**	(2,546)	**(6)**	(6)
Benefit obligation at end of year	**$ 88,660**	$ 72,010	**$ 454**	$ 512
Change in plan assets:				
Beginning fair value of plan assets	**$ —**	$ —	**$ —**	$ —
Company contributions	**1,980**	1,883	**6**	6
Participant contributions	**684**	663	**—**	—
Benefits paid	**(2,664)**	(2,546)	**(6)**	(6)
Ending fair value of plan assets	**$ —**	$ —	**$ —**	$ —
Funded status at end of year	**$ (88,660)**	$ (72,010)	**$ (454)**	$ (512)
Amounts recognized in financial statements:				
Accrued benefit liability	**$ (2,740)**	$ (2,360)	**$ (6)**	$ (8)
Long-term postretirement obligations	**(85,920)**	(69,650)	**(448)**	(504)
Total amount recognized in financial statements	**$ (88,660)**	$ (72,010)	**$ (454)**	$ (512)

	United States		International	
	2019	**2018**	**2019**	**2018**
Amounts recognized in accumulated other comprehensive (gain) loss:				
Net actuarial (gain) loss	**$ 28,992**	$ 14,526	**$ (482)**	$ (423)
Prior service credit	**(16)**	(43)	**—**	—
Accumulated other comprehensive (gain) loss	**$ 28,976**	$ 14,483	**$ (482)**	$ (423)
Amounts expected to be recognized during next fiscal year:				
Amortization of net actuarial (gain) loss	**$ 1,674**	$ 609	**$ (37)**	$ (28)
Amortization of prior service credit	**(16)**	(27)	**—**	—
Total	**$ 1,658**	$ 582	**$ (37)**	$ (28)

The following table summarizes the changes in accumulated other comprehensive (gain) loss:

	United States		International	
	2019	**2018**	**2019**	**2018**
Balance at beginning of year	**$ 14,483**	$ 19,982	**$ (423)**	$ (342)
Net (gain) loss arising during the year	**15,101**	(4,519)	**(86)**	(110)
Net gain (loss) recognized during the year	**(634)**	(1,079)	**28**	20
Prior service credit recognized during the year	**26**	99	—	—
Exchange rate effect during the year	**—**	—	**(1)**	9
Balance at end of year	**$ 28,976**	$ 14,483	**$ (482)**	$ (423)

Net postretirement benefit costs include the following components:

	United States			International		
	2019	2018	2017	2019	2018	2017
Service cost	**$ 545**	$ 709	$ 722	**$ 16**	$ 20	$ 20
Interest cost	**2,984**	2,557	2,337	**19**	20	20
Amortization of prior service credit	**(26)**	(99)	(164)	**—**	—	—
Amortization of net actuarial (gain) loss	**634**	1,079	874	**(28)**	(20)	(17)
Total benefit cost	**$ 4,137**	$ 4,246	$ 3,769	**$ 7**	$ 20	$ 23

The weighted average assumptions used in the valuation of postretirement benefits were as follows:

	United States			International		
	2019	2018	2017	2019	2018	2017
Assumptions used to determine benefit obligations at October 31:						
Discount rate	**3.27%**	4.56%	3.86%	**3.03%**	3.88%	3.52%
Health care cost trend rate	**3.62**	3.75	3.70	**4.00**	6.35	6.50
Rate to which health care cost trend rate is assumed to incline/decline (ultimate trend rate)	**3.24**	3.27	3.23	**4.05**	3.50	3.50
Year the rate reaches the ultimate trend rate	**2026**	2026	2026	**2040**	2037	2037
Assumption used to determine net benefit costs for the years ended October 31:						
Discount rate - benefit obligation	**4.56%**	3.86%	4.03%	**3.88%**	3.52%	3.40%
Discount rate - service cost	**4.77**	4.11	4.48	**3.90**	3.54	3.56
Discount rate - interest cost	**4.18**	3.39	3.27	**3.80**	3.40	3.20

The weighted average health care trend rates reflect expected increases in the Company's portion of the obligation.

Net actuarial gains or losses are amortized to expense on a plan-by-plan basis when they exceed the accounting corridor, which is set at 10 percent of the greater of the plan assets or benefit obligations. Gains or losses outside of the corridor are subject to amortization over an average employee future service period that differs by plan. If substantially all of the plan's participants are no longer actively accruing benefits, the average life expectancy is used.

A one-percentage point change in the assumed health care cost trend rate would have the following effects. Bracketed numbers represent decreases in expense and obligation amounts.

	United States		International	
	1% Point Increase	1% Point Decrease	1% Point Increase	1% Point Decrease
Health care trend rate:				
Effect on total net postretirement benefit cost components in 2019	$ 494	$ (400)	$ 9	$ (7)
Effect on postretirement obligation as of October 31, 2019	$ 11,984	$ (9,800)	$ 108	$ (84)

Contributions to postretirement plans in 2020 are estimated to be approximately $ 2,800.

Retiree postretirement benefit payments are anticipated to be paid as follows:

Year	United States	International
2020	$ 2,747	$ 6
2021	2,990	6
2022	3,230	6
2023	3,505	6
2024	3,769	6
2025-2029	21,330	46

Note 7 — Income taxes

Income tax expense includes the following:

	2019	2018	2017
Current:			
U.S. federal	**$ 40,012**	$ 39,837	$ 54,878
State and local	**3,429**	1,734	3,731
Foreign	**51,590**	63,522	66,352
Total current	**95,031**	105,093	124,961
Deferred:			
U.S. federal	**1,470**	(32,829)	3,596
State and local	**633**	891	1,164
Foreign	**(3,121)**	(2,011)	(5,232)
Total deferred	**(1,018)**	(33,949)	(472)
	$ 94,013	$ 71,144	$ 124,489

Earnings before income taxes of domestic operations, which are calculated after intercompany profit eliminations, were $ 222,435 $192,643 and $181,840 in 2019, 2018 and 2017, respectively.

On December 22, 2017 the U.S. Tax Cuts and Jobs Act ("the Act") was enacted. It reduces the U.S. federal corporate income tax rate from 35 percent to 21 percent. We have an October 31 fiscal year end, therefore the lower corporate income tax rate was phased in, resulting in a U.S. statutory federal rate of 23.34 percent for our fiscal year ended October 31, 2018, and 21.00 percent for subsequent fiscal years. The statutory tax rate of 21.00 percent was applied to earnings in the current year.

Our income tax provision for 2018 included a provisional tax benefit of $ 49,082 to reflect the revaluation of our tax assets and liabilities at the reduced corporate tax rate. We also recorded a provisional tax expense of $27,618 to reflect the transition tax on previously deferred foreign earnings. The net tax effect of these discrete items resulted in a decrease of $21,464 in income tax expense for 2018.

Subsequent to the enactment of the Act, the SEC staff issued SAB 118, which provided a measurement period of up to one year after the enactment date for companies to finalize the recognition of the income tax effects of the Act. As of January 31, 2019, our provisional accounting for the effects of the Act was complete. As a result, during 2019, and within the one year measurement period provided by SAB 118, we recorded tax expense of $4,866 to the provisional amounts recognized in 2018 due to changes in interpretations and assumptions and the finalizations of estimates. We are paying the transition tax in installments over the eight-year period allowable under the Act. The remaining transition tax is included in other long-term liabilities in the Consolidated Balance Sheet at October 31, 2019.

Other provisions of the Act became effective for us in 2019. The Foreign-Derived Intangible Income provision generates a deduction against our U.S. taxable income for U.S. earnings derived offshore that utilize intangibles held in the U.S. Conversely, the Global Intangible Low-Taxed Income (“GILTI”) provision requires us to subject to U.S. taxation a portion of our foreign subsidiary earnings that exceed an allowable return. We elected to treat any GILTI inclusion as a period expense in the year incurred.

A reconciliation of the U.S. statutory federal rate to the worldwide consolidated effective tax rate follows:

	2019	2018	2017
Statutory federal income tax rate	**21.00%**	23.34%	35.00%
Transition tax	**1.46**	6.16	—
Tax rate change deferred tax remeasurement	**—**	(10.94)	—
Share-based and other compensation	**(0.55)**	(1.45)	—
Domestic production deduction	**—**	(0.82)	(1.48)
Foreign tax rate variances, net of foreign tax credits	**1.16**	(0.46)	(4.69)
State and local taxes, net of federal income tax benefit	**0.74**	0.45	0.76
Amounts related to prior years	**(0.55)**	(0.21)	0.03
Foreign-Derived Intangible Income Deduction	**(1.51)**	—	—
Global Intangible Low-Taxed Income net of foreign tax credits	**0.85**	—	—
Other – net	**(0.79)**	(0.21)	—
Effective tax rate	**21.81%**	15.86%	29.62%

Earnings before income taxes of international operations, which are calculated before intercompany profit elimination entries, were $208,669, $255,877 and $238,451 in 2019, 2018 and 2017, respectively. Deferred income taxes are not provided on undistributed earnings of international subsidiaries that are intended to be permanently invested in their operations. These undistributed earnings represent the post-income tax earnings under U.S. GAAP not adjusted for previously taxed income which aggregated approximately $1,101,736 and $1,088,183 at October 31, 2019 and 2018, respectively. Should these earnings be distributed, applicable foreign tax credits, distributions of previously taxed income, and utilization of other attributes would substantially offset taxes due upon the distribution. It is not practical to estimate the amount of additional taxes that might be payable on these basis differences because of the multiple methods by which these differences could reverse and the impact of withholding, US state and local taxes and currency translation considerations.

At October 31, 2019 and 2018, total unrecognized tax benefits were $ 2,909 and $2,891, respectively. The amounts that, if recognized, would impact the effective tax rate were $2,429 and $2,411 at October 31, 2019 and 2018, respectively. During 2019, unrecognized tax benefits related primarily to foreign positions and, as recognized, a portion of the gross unrecognized tax benefits were offset against assets recorded in the Consolidated Balance Sheet. A reconciliation of the beginning and ending amount of unrecognized tax benefits for 2019, 2018 and 2017 is as follows:

	2019	2018	2017
Balance at beginning of year	**$ 2,891**	$ 3,781	$ 3,336
Additions based on tax positions related to the current year	**370**	310	529
Additions for tax positions of prior years	**547**	40	621
Reductions for tax positions of prior years	**—**	(120)	(150)
Lapse of statute of limitations	**(899)**	(1,120)	(555)
Balance at end of year	**$ 2,909**	$ 2,891	$ 3,781

At October 31, 2019 and 2018, we had accrued interest and penalty expense related to unrecognized tax benefits of $ 593 and $538, respectively. We include interest accrued related to unrecognized tax benefits in interest expense. Penalties, if incurred, would be recognized as other income (expense).

We are subject to United States Federal income tax as well as income taxes in numerous state and foreign jurisdictions. We are subject to examination in the U.S. by the Internal Revenue Service (IRS) for the 2016 through 2019 tax years; tax years prior to the 2016 year are closed to further examination by the IRS. Generally, major state and foreign jurisdiction tax years remain open to examination for tax years after 2013. Within the next twelve months, it is reasonably possible that certain statute of limitations periods would expire, which could result in a minimal decrease in our unrecognized tax benefits.

Significant components of deferred tax assets and liabilities are as follows:

	2019	2018
Deferred tax assets:		
Employee benefits	**$ 73,025**	$ 56,622
Other accruals not currently deductible for taxes	**16,294**	18,186
Tax credit and loss carryforwards	**18,074**	16,652
Inventory adjustments	**5,269**	4,451
Total deferred tax assets	**112,662**	95,911
Valuation allowance	**(15,301)**	(14,862)
Total deferred tax assets	**97,361**	81,049
Deferred tax liabilities:		
Depreciation and amortization	**169,009**	171,304
Other - net	**655**	669
Total deferred tax liabilities	**169,664**	171,973
Net deferred tax liabilities	**$ (72,303)**	$ (90,924)

At October 31, 2019, we had $8,132 of tax credit carryforwards, $1,424 of which expires in 2028-2029 and $6,708 of which has an indefinite carryforward period. We also had $169 Federal, $61,136 state, $18,435 foreign operating loss carryforwards, and a $20,149 capital loss carryforward, of which $84,464 will expire in 2020 through 2039, and $15,425 of which has an indefinite carryforward period. The net change in the valuation allowance was an increase of $439 in 2019 and a decrease of $29 in 2018. The valuation allowance of $15,301 at October 31, 2019, related primarily to tax credits and loss carryforwards that may expire before being realized. We continue to assess the need for valuation allowances against deferred tax assets based on determinations of whether it is more likely than not that deferred tax benefits will be realized.

Note 8 — Notes payable

Bank lines of credit and notes payable are summarized as follows:

	2019	2018
Maximum borrowings available under bank lines of credit (all foreign banks)	**$ 79,930**	**$ 76,151**
Outstanding borrowings / notes payable (all foreign bank debt)	**—**	**—**
Weighted-average interest rate on notes payable	**—**	**—**
Unused bank lines of credit	**$ 79,930**	**$ 76,151**

Note 9 — Long-term debt

A summary of long-term debt is as follows:

	2019	2018
Revolving credit agreement, due 2024	**$ —**	$ 52,200
Senior notes, due 2020-2025	**140,800**	156,700
Senior notes, due 2020-2027	**92,857**	100,000
Senior notes, due 2023-2030	**350,000**	350,000
Term loan, due 2020-2024	**505,000**	605,000
Euro loan, due 2021	**128,219**	16,967
Private shelf facility, due 2020	**30,556**	36,111
Development loans, due 2019-2026	**951**	1,086
	1,248,383	1,318,064
Less current maturities	**168,738**	28,734
Less unamortized debt issuance costs	**4,241**	3,973
Long-term maturities	**$ 1,075,404**	$ 1,285,357

Revolving credit agreement — In April 2019, we entered into a $ 850,000 unsecured multi-currency credit facility with a group of banks, which amended, restated and extended our existing syndicated revolving credit agreement that was scheduled to expire in February 2020. This facility has a five-year term and includes a $75,000 subfacility for swing-line loans. It expires in April 2024. At October 31, 2019, we had no balances outstanding under this facility, compared to $ 52,200 outstanding at October 31, 2018. We were in compliance with all covenants at October 31, 2019, and the amount we could borrow under the facility would not have been limited by any debt covenants.

Senior notes, due 2020-2025 — These unsecured fixed-rate notes entered into in 2012 with a group of insurance companies had a remaining weighted-average life of 2.76 years. The weighted-average interest rate at October 31, 2019 was 3.05 percent.

Senior notes, due 2020-2027 — These unsecured fixed-rate notes entered into in 2015 with a group of insurance companies had a remaining weighted-average life of 4.59 years. The weighted-average interest rate at October 31, 2019 was 3.05 percent.

Senior notes, due 2023-2030 — These unsecured fixed-rate notes entered in 2018 with a group of insurance companies had a remaining weighted-average life of 6.05 years. The weighted-average interest rate at October 31, 2019 was 3.90 percent.

Term loan, due 2020-2024 — In April 2019, we amended, restated and extended the term of our existing $ 605,000 term loan facility with a group of banks. The interest rate is variable based upon the LIBOR rate. The Term Loan Agreement provides for the following term loans due in three tranches. $100,000 is due in March 2020, $200,000 is due in September 2022, and $305,000 is due in March 2024 . The weighted average interest rate for borrowings under this agreement was 2.52 percent at October 31, 2019. For the portion that is due in March 2024, $100,000 of this term loan facility was paid down in 2019. We were in compliance with all covenants at October 31, 2019 .

Euro loan, due 2021 — In October 2018, we entered into a € 150,000 unsecured Term Loan Agreement with Bank of America Merrill Lynch International Limited. The interest rate is variable based upon the EUR LIBOR rate. The weighted average interest rate at October 31, 2019 was 1.00 percent.

Private shelf facility — In 2011, we entered into a $150,000 three-year Private Shelf Note agreement with New York Life Investment Management LLC (NYLIM). The amount of the facility was increased to $180,000 in 2015, and then increased to $200,000 in 2016. Borrowings under the agreement may be for up to 12 years and are unsecured. The interest rate on each borrowing is fixed based upon the market rate at the borrowing date or is variable based upon the LIBOR rate. At October 31, 2019, the amount outstanding under this facility was at fixed rates of 2.21 percent and 2.56 percent.

Development loans, due 2019-2026 — These fixed-rate loans with the State of Ohio and Cuyahoga County, Ohio were issued in 2011 in connection with the construction of our corporate headquarters building and are payable in monthly installments over 15 years beginning in 2011. The interest rate on the State of Ohio loan is 3.00 percent, and the interest rate on the Cuyahoga County loan is 3.50 percent.

Annual maturities — The annual maturities of long-term debt for the five years subsequent to October 31, 2019, are as follows: $ 168,738 in 2020; $166,406 in 2021; $230,791 in 2022; $130,796 in 2023 and $315,801 in 2024.

Note 10 — Leases

We have lease commitments expiring at various dates, principally for manufacturing, warehouse and office space, automobiles and office equipment. Many leases contain renewal options and some contain purchase options and residual guarantees.

Rent expense for all operating leases was approximately $ 22,061, $19,131 and $17,938 in 2019, 2018 and 2017, respectively.

Amortization of assets recorded under capital leases is recorded in depreciation expense.

Assets held under capitalized leases and included in property, plant and equipment are as follows:

	2019	2018
Transportation equipment	**$ 21,602**	$ 18,226
Other	**7,926**	7,892
Total capitalized leases	**29,528**	26,118
Accumulated amortization	**(14,940)**	(12,956)
Net capitalized leases	**$ 14,588**	$ 13,162

At October 31, 2019, future minimum lease payments under non-cancelable capitalized (which include executory and interest costs) and operating leases are as follows:

	Capitalized Leases	Operating Leases
Year:		
2020	$ 5,685	$ 20,194
2021	3,832	17,579
2022	1,893	16,238
2023	952	13,540
2024	647	11,925
Later years	3,562	60,672
Total minimum lease payments	$ 16,571	$ 140,148

Note 11 — Fair value measurements

The inputs to the valuation techniques used to measure fair value are classified into the following categories:

Level 1: Quoted market prices in active markets for identical assets or liabilities.

Level 2: Observable market based inputs or unobservable inputs that are corroborated by market data.

Level 3: Unobservable inputs that are not corroborated by market data.

The following tables present the classification of our assets and liabilities measured at fair value on a recurring basis:

October 31, 2019	**Total**	**Level 1**	**Level 2**	**Level 3**
Assets:				
Foreign currency forward contracts (a)	**$ 5,042**	**$ —**	**$ 5,042**	**$ —**
Total assets at fair value	**$ 5,042**	**$ —**	**$ 5,042**	**$ —**
Liabilities:				
Deferred compensation plans (b)	**$ 11,850**	**$ —**	**$ 11,850**	**$ —**
Foreign currency forward contracts (a)	**2,381**	**—**	**2,381**	**—**
Total liabilities at fair value	**$ 14,231**	**$ —**	**$ 14,231**	**$ —**

October 31, 2018	**Total**	**Level 1**	**Level 2**	**Level 3**
Assets:				
Foreign currency forward contracts (a)	$ 6,428	$ —	$ 6,428	$ —
Total assets at fair value	$ 6,428	$ —	$ 6,428	$ —
Liabilities:				
Deferred compensation plans (b)	$ 11,018	$ —	$ 11,018	$ —
Foreign currency forward contracts (a)	9,289	—	9,289	—
Total liabilities at fair value	$ 20,307	$ —	$ 20,307	$ —

(a) We enter into foreign currency forward contracts to reduce the risk of foreign currency exposures resulting from receivables, payables, intercompany receivables, intercompany payables and loans denominated in foreign currencies. Foreign exchange contracts are valued using market exchange rates. These foreign exchange contracts are not designated as hedges.

(b) Executive officers and other highly compensated employees may defer up to 100 percent of their salary and annual cash incentive compensation and for executive officers, up to 90 percent of their long-term incentive compensation, into various non-qualified deferred compensation plans. Deferrals can be allocated to various market performance measurement funds. Changes in the value of compensation deferred under these plans are recognized each period based on the fair value of the underlying measurement funds.

Fair value disclosures related to goodwill and indefinite-lived intangible assets are disclosed in Note 5.

The carrying amounts and fair values of financial instruments, other than cash and cash equivalents, receivables, and accounts payable, are shown in the table below. The carrying values of cash and cash equivalents, receivables and accounts payable approximate fair value due to the short-term nature of these instruments.

	2019		2018	
	Carrying Amount	Fair Value	Carrying Amount	Fair Value
Long-term debt (including current portion)	**1,244,142**	**1,278,142**	1,314,091	1,293,899

We used the following methods and assumptions in estimating the fair value of financial instruments:

- Long-term debt is valued by discounting future cash flows at currently available rates for borrowing arrangements with similar terms and conditions, which are considered to be Level 2 inputs under the fair value hierarchy. The carrying amount of long-term debt is shown net of unamortized debt issuance costs as described in Note 9.

Note 12 — Derivative financial instruments

We operate internationally and enter into intercompany transactions denominated in foreign currencies. Consequently, we are subject to market risk arising from exchange rate movements between the dates foreign currency transactions occur and the dates they are settled. We regularly use foreign currency forward contracts to reduce our risks related to most of these transactions. These contracts usually have maturities of 90 days or less and generally require us to exchange foreign currencies for U.S. dollars at maturity, at rates stated in the contracts. These contracts are not designated as hedging instruments under U.S. GAAP. Accordingly, the changes in the fair value of the foreign currency forward contracts are recognized in each accounting period in “Other – net” on the Consolidated Statement of Income together with the transaction gain or loss from the related balance sheet position. In 2019, we recognized net gains of $2,373 on foreign currency forward contracts and net losses of $2,231 from the change in fair value of balance sheet positions. In 2018, we recognized net losses of $3,151 on foreign currency forward contracts and net gains of $ 4,284 from the change in fair value of balance sheet positions. In 2017, we recognized net gains of $329 on foreign currency forward contracts and net losses of $ 1,015 from the change in fair value of balance sheet positions.

The following table summarizes, by currency, the contracts outstanding at October 31, 2019 and 2018:

	Notional Amounts	
	Sell	Buy
October 31, 2019 contract amounts:		
Euro	**$ 264,661**	**$ 107,598**
Pound sterling	**32,600**	**48,867**
Japanese yen	**29,397**	**51,217**
Australian dollar	**168**	**7,767**
Hong Kong dollar	**189**	**135,862**
Singapore dollar	**1,108**	**15,684**
Others	**4,485**	**66,349**
Total	**$ 332,608**	**$ 433,344**
October 31, 2018 contract amounts:		
Euro	$ 323,571	$ 184,170
Pound sterling	23,879	60,007
Japanese yen	25,408	46,671
Australian dollar	178	7,912
Hong Kong dollar	—	112,414
Singapore dollar	604	14,092
Others	4,730	57,546
Total	$ 378,370	$ 482,812

We are exposed to credit-related losses in the event of nonperformance by counterparties to financial instruments. These financial instruments include cash deposits and foreign currency forward contracts. We periodically monitor the credit ratings of these counterparties in order to minimize our exposure. Our customers represent a wide variety of industries and geographic regions. As of October 31, 2019 and 2018, there were no significant concentrations of credit risk.

Note 13 — Capital shares

Preferred — We have authorized 10,000 Series A convertible preferred shares without par value. No preferred shares were outstanding in 2019, 2018 or 2017.

Common — We have 160,000 authorized common shares without par value. At October 31, 2019 and 2018, there were 98,023 common shares issued. At October 31, 2019 and 2018, the number of outstanding common shares, net of treasury shares, was 57,600 and 58,037, respectively.

Common shares repurchased as part of publicly announced programs during 2019, 2018 and 2017 were as follows:

Year	Number of Shares	Total Amount	Average per Share
2019	**949**	**$ 114,790**	**$ 121.01**
2018	145	$ 18,939	$ 130.21
2017	—	$ —	$ —

Note 14 — Stock-based compensation

During the 2018 Annual Meeting of Shareholders, our shareholders approved the Amended and Restated 2012 Stock Incentive and Award Plan (the “2012 Plan”). The 2012 Plan provides for the granting of stock options, stock appreciation rights, restricted shares, restricted share units, performance shares, cash awards and other stock or performance-based incentives. A maximum of 4,525 common shares are available for grant under the 2012 Plan.

Stock options — Nonqualified or incentive stock options may be granted to our employees and directors. Generally, options granted to employees may be exercised beginning one year from the date of grant at a rate not exceeding 25 percent per year and expire 10 years from the date of grant. Vesting accelerates upon a qualified termination in connection with a change in control. In the event of termination of employment due to early retirement or normal retirement at age 65, options granted within 12 months prior to termination are forfeited, and vesting continues post retirement for all other unvested options granted. In the event of disability or death, all unvested stock options granted within 12 months prior to termination (or at any time prior to December 28, 2017) fully vest. Termination for any other reason results in forfeiture of unvested options and vested options in certain circumstances. The amortized cost of options is accelerated if the retirement eligibility date occurs before the normal vesting date. Option exercises are satisfied through the issuance of treasury shares on a first-in, first-out basis. We recognized compensation expense related to stock options of $10,067, $9,964 and $9,326 for 2019, 2018 and 2017, respectively.

The following table summarizes activity related to stock options during 2019:

	Number of Options	Weighted-Average Exercise Price Per Share	Aggregate Intrinsic Value	Weighted-Average Remaining Term
Outstanding at October 31, 2018	1,885	$ 85.33		
Granted	348	$ 124.89		
Exercised	(416)	$ 62.51		
Forfeited or expired	(30)	$ 121.60		
Outstanding at October 31, 2019	1,787	$ 97.74	$ 105,567	6.6 years
Expected to vest	873	$ 115.26	$ 36,255	8.0 years
Exercisable at October 31, 2019	902	$ 80.42	$ 68,915	5.3 years

Summarized information on currently outstanding options follows:

	Range of Exercise Price		
	$43 - $62	$63 - $81	$82 - $129
Number outstanding	160	638	989
Weighted-average remaining contractual life, in years	2.6	5.4	8.1
Weighted-average exercise price	$ 55.20	$ 73.48	$ 120.26
Number exercisable	160	527	215
Weighted-average exercise price	$ 55.20	$ 74.03	$ 114.72

As of October 31, 2019, there was $7,904 of total unrecognized compensation cost related to nonvested stock options. That cost is expected to be amortized over a weighted average period of approximately 1.5 years.

The Black-Scholes option valuation model was used to estimate the fair value of traded options that have no vesting restrictions and are fully transferable. Option valuation models require the input of subjective assumptions, including the expected stock price volatility. The fair value of each option grant was estimated at the date of grant using the Black-Scholes option-pricing model with the following assumptions:

	2019	2018	2017
Expected volatility	**24.1%-24.5%**	24.0%-26.7%	26.0%-29.2%
Expected dividend yield	**1.04%**	0.97%	0.91%-1.17%
Risk-free interest rate	**2.84%-2.95%**	2.09%-2.20%	1.89%-2.06%
Expected life of the option (in years)	**5.3-6.2**	5.4-6.2	5.4-6.2

The weighted-average expected volatility used to value options granted in 2019, 2018 and 2017 was 24.3 percent, 25.0 percent and 29.1 percent, respectively.

Historical information was the primary basis for the selection of the expected volatility, expected dividend yield and the expected lives of the options. The risk-free interest rate was selected based upon yields of United States Treasury issues with terms equal to the expected life of the option being valued.

The weighted average grant date fair value of stock options granted during 2019, 2018 and 2017 was $ 31.74, $31.42 and $28.86, respectively.

The total intrinsic value of options exercised during 2019, 2018 and 2017 was $ 31,881, $35,696 and $22,317, respectively.

Cash received from the exercise of stock options for 2019, 2018 and 2017 was $ 26,020, $18,811 and $14,086, respectively.

Restricted shares and restricted share units — We may grant restricted shares and/or restricted share units to our employees and directors. These shares or units may not be transferred for a designated period of time (generally one to three years) defined at the date of grant.

For employee recipients, in the event of termination of employment due to early retirement, with consent of the Company, restricted shares granted within 12 months prior to termination are forfeited, and other restricted shares vest on a pro-rata basis. In the event of termination of employment due to normal retirement at age 65, restricted shares granted within 12 months prior to termination are forfeited, and, for other restricted shares, the restriction period will lapse and the shares will vest and be transferable. For restricted shares granted within 12 months prior to termination (or at any time prior to December 28, 2017), the restrictions lapse in the event of a recipient’s disability or death. Termination for any other reason prior to the lapse of any restrictions results in forfeiture of the shares.

For non-employee directors, all restrictions lapse in the event of disability or death. Termination of service as a director for any other reason within one year of date of grant results in a pro-rata vesting of shares or units.

As shares or units are issued, deferred stock-based compensation equivalent to the fair market value on the date of grant is expensed over the vesting period. Tax benefits arising from the lapse of restrictions are recognized when realized and credited to capital in excess of stated value.

The following table summarizes activity related to restricted shares during 2019:

	Number of Shares	Weighted-Average Grant Date Fair Value Per Share
Restricted at October 31, 2018	53	$ 108.82
Granted	41	$ 131.30
Forfeited	(2)	$ 111.75
Vested	(26)	$ 97.84
Restricted at October 31, 2019	66	$ 126.83

As of October 31, 2019, there was $4,579 of unrecognized compensation cost related to restricted shares. The cost is expected to be amortized over a weighted average period of 1.6 years. The amount charged to expense related to restricted shares was $ 3,608, $2,610 and $2,127 in 2019, 2018 and 2017, respectively. These amounts included common share dividends of $ 84, $70, and $64 in 2019, 2018 and 2017, respectively.

The following table summarizes activity related to restricted share units in 2019:

	Number of Units	Weighted-Average Grant Date Fair Value
Restricted share units at October 31, 2018	—	$ —
Granted	8	$ 126.83
Vested	(8)	$ 126.83
Restricted share units at October 31, 2019	—	$ —

As of October 31, 2019, there was no remaining expense to be recognized related to outstanding restricted share units. The amount charged to expense related to restricted share units during 2019 was $1,052, and was $1,011 for both 2018 and 2017, respectively.

Deferred directors' compensation — Non-employee directors may defer all or part of their cash and equity-based compensation until retirement. Cash compensation may be deferred as cash or as share equivalent units. Deferred cash amounts are recorded as liabilities, and share equivalent units are recorded as equity. Additional share equivalent units are earned when common share dividends are declared.

The following table summarizes activity related to director deferred compensation share equivalent units during 2019:

	Number of Shares	Weighted-Average Grant Date Fair Value Per Share
Outstanding at October 31, 2018	107	$ 51.24
Restricted stock units vested	5	$ 126.89
Dividend equivalents	2	$ 132.49
Outstanding at October 31, 2019	114	$ 55.52

The amount charged to expense related to director deferred compensation was $154, $127 and $106 in 2019, 2018 and 2017, respectively.

Performance share incentive awards — Executive officers and selected other key employees are eligible to receive common share-based incentive awards. Payouts, in the form of unrestricted common shares, vary based on the degree to which corporate financial performance exceeds predetermined threshold, target and maximum performance goals over three-year performance periods. No payout will occur unless threshold performance is achieved.

The amount of compensation expense is based upon current performance projections for each three-year period and the percentage of the requisite service that has been rendered. The calculations are also based upon the grant date fair value determined using the closing market price of our common shares at the grant date, reduced by the implied value of dividends not to be paid. The per share values were $120.12 and $138.53 for 2019, $123.45 and $138.53 for 2018, and $103.75, $104.49 and $138.53 for 2017. The amounts charged to expense for executive officers and selected other key employees in 2019, 2018 and 2017 were $2,989, $7,635 and $7,398, respectively. The cumulative amount recorded in shareholders' equity at October 31, 2019, and 2018 was $10,459 and $14,757, respectively.

Deferred compensation — Our executive officers and other highly compensated employees may elect to defer up to 100 percent of their base pay and cash incentive compensation and, for executive officers, up to 90 percent of their share-based performance incentive award payout each year. Additional share units are credited for quarterly dividends paid on our common shares. Expense related to dividends paid under this plan was $300, $273 and $264 for 2019, 2018 and 2017, respectively.

Shares reserved for future issuance — At October 31, 2019, there were 2,460 of common shares reserved for future issuance through the exercise of outstanding options or rights.

Note 15 — Operating segments and geographic area data

We conduct business in three primary operating segments: Adhesive Dispensing Systems, Advanced Technology Systems, and Industrial Coating Systems. The composition of segments and measure of segment profitability is consistent with that used by our chief operating decision maker. The primary measure used by the chief operating decision maker for purposes of making decisions about allocating resources to the segments and assessing performance is operating profit, which equals sales less cost of sales and certain operating expenses. Items below the operating profit line of the Consolidated Statement of Income (interest and investment income, interest expense and other income/expense) are excluded from the measure of segment profitability reviewed by our chief operating decision maker and are not presented by operating segment. The accounting policies of the segments are generally the same as those described in Note 1, Significant Accounting Policies.

No single customer accounted for 10 percent or more of sales in 2019, 2018 or 2017.

The following table presents information about our reportable segments:

	Adhesive Dispensing Systems	Advanced Technology Systems	Industrial Coating Systems	Corporate		Total
Year ended October 31, 2019						
Net external sales	**$ 950,917**	**$ 985,850**	**$ 257,459**	$ —		**$ 2,194,226**
Depreciation and amortization	**32,401**	**62,836**	**5,932**	**9,075**		**110,244**
Operating profit (loss)	**275,216**	**205,609**	**53,838**	**(51,550)**		**483,113**
Identifiable assets (b)	**839,997**	**1,740,259**	**157,463**	**782,188**	**(a)**	**3,519,907**
Expenditures for long-lived assets	**26,005**	**26,010**	**4,395**	**7,834**		**64,244**
Year ended October 31, 2018						
Net external sales	$ 955,192	$ 1,039,366	$ 260,110	$ —		$ 2,254,668
Depreciation and amortization	31,597	62,594	6,166	8,050		108,407
Operating profit (loss)	262,627	244,880	52,421	(57,349)		502,579
Identifiable assets (b)	829,696	1,713,404	122,088	763,734	(a)	3,428,922
Expenditures for long-lived assets	46,911	16,205	8,546	18,128		89,790
Year ended October 31, 2017						
Net external sales	$ 916,019	$ 897,623	$ 253,340	$ —		$ 2,066,982
Depreciation and amortization	29,118	49,535	5,559	6,642		90,854
Operating profit (loss)	256,812	229,611	45,528	(65,549)		466,402
Identifiable assets (b)	794,699	1,718,844	120,458	790,940	(a)	3,424,941
Expenditures for long-lived assets	35,310	21,135	9,108	6,005		71,558

(a) Corporate assets are principally cash and cash equivalents, deferred income taxes, capital leases, headquarter facilities, the major portion of our enterprise management system, and intangible assets.

(b) Operating segment identifiable assets include notes and accounts receivable net of customer advance payments and allowance for doubtful accounts, inventories net of reserves, property, plant and equipment net of accumulated depreciation and goodwill.

We have significant sales and long-lived assets in the following geographic areas:

	2019	2018	2017
Net external sales			
United States	**$ 758,383**	$ 720,832	$ 647,657
Americas	**167,661**	158,837	147,026
Europe	**571,596**	622,108	530,812
Japan	**126,756**	161,771	147,189
Asia Pacific	**569,830**	591,120	594,298
Total net external sales	**$ 2,194,226**	$ 2,254,668	$ 2,066,982
Long-lived assets			
United States	**$ 286,894**	$ 279,437	$ 266,921
Americas	**1,948**	2,158	2,322
Europe	**44,041**	41,663	39,102
Japan	**6,169**	5,492	5,594
Asia Pacific	**59,843**	57,916	32,472
Total long-lived assets	**$ 398,895**	$ 386,666	$ 346,411

A reconciliation of total segment operating profit to total consolidated income before income taxes is as follows:

	2019	2018	2017
Total profit for reportable segments	**$ 483,113**	$ 502,579	$ 466,402
Interest expense	**(47,145)**	(49,576)	(36,601)
Interest and investment income	**1,844**	1,384	1,124
Other-net	**(6,708)**	(5,868)	(10,634)
Income before income taxes	**$ 431,104**	$ 448,519	$ 420,291

A reconciliation of total assets for reportable segments to total consolidated assets is as follows:

	2019	2018	2017
Total assets for reportable segments	**$ 3,519,907**	$ 3,428,922	$ 3,424,941
Customer advance payments	**41,131**	38,997	34,654
Eliminations	**(44,591)**	(46,907)	(45,056)
Total consolidated assets	**$ 3,516,447**	$ 3,421,012	$ 3,414,539

Note 16 — Supplemental information for the statement of cash flows

	2019	2018	2017
Cash operating activities:			
Interest paid	**$ 50,578**	$ 42,305	$ 36,450
Income taxes paid	**104,326**	87,879	118,096

Note 17 — Quarterly financial data (unaudited)

	First	Second	Third	Fourth
2019:				
Sales	**$ 497,910**	**$ 551,119**	**$ 559,746**	**$ 585,451**
Gross margin	**268,976**	**301,529**	**302,623**	**318,975**
Net income	**48,567**	**91,923**	**93,928**	**102,673**
Earnings per share:				
Basic	**0.84**	**1.60**	**1.64**	**1.79**
Diluted	**0.83**	**1.58**	**1.62**	**1.76**
2018:				
Sales	$ 550,424	$ 553,706	$ 581,243	$ 569,295
Gross margin	300,973	307,015	320,476	307,864
Net income	104,555	91,235	94,884	86,702
Earnings per share:				
Basic	1.81	1.57	1.63	1.49
Diluted	1.78	1.55	1.61	1.47

The sum of the per-share amounts for the four quarters may not always equal the annual per-share amounts due to differences in the average number of shares outstanding during the respective periods. The sum of other amounts for the four quarters may not always equal the annual amounts due to rounding.

During the first quarter of 2019, we recorded a discrete tax expense of $ 4,866 related to the Act. During the first quarter of 2018, we recorded discrete items to income tax expense as a result of the Act. Refer to Note 7 for additional information.

Note 18 — Contingencies

We are involved in pending or potential litigation regarding environmental, product liability, patent, contract, employee and other matters arising from the normal course of business. It is our opinion, after consultation with legal counsel, that resolutions of these matters are not expected to result in a material effect on our financial condition, quarterly or annual operating results or cash flows.

Management’s Report on Internal Control Over Financial Reporting

The management of Nordson Corporation is responsible for establishing and maintaining adequate internal control over financial reporting.

Using criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in Internal Control-Integrated Framework (2013 framework), Nordson’s management assessed the effectiveness of our internal control over financial reporting as of October 31, 2019.

Based on our assessment, management concluded that our internal control over financial reporting was effective as of October 31, 2019.

The independent registered public accounting firm, Ernst & Young LLP, has also audited the effectiveness of our internal control over financial reporting as of October 31, 2019. Their report is included herein.

/s/ Sundaram Nagarajan
President and
Chief Executive Officer
December 13, 2019

/s/ Gregory A. Thaxton
Executive Vice President, Chief Financial Officer
December 13, 2019

Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Directors of Nordson Corporation

Opinion on Internal Control over Financial Reporting

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

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of October 31, 2019 and 2018, the related consolidated statements of income, comprehensive income, shareholders' equity and cash flows, for each of the three years in the period ended October 31, 2019, and the related notes and financial statement schedule listed in the Index at Item 15(a) and our report dated December 13, 2019 expressed an unqualified opinion thereon.

Basis for Opinion

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

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

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

Definition and Limitations of Internal Control Over Financial Reporting

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

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

/s/ Ernst & Young LLP
Cleveland, Ohio

December 13, 2019

Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Directors of Nordson Corporation

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Nordson Corporation (the Company) as of October 31, 2019 and 2018, the related consolidated statements of income, comprehensive income, shareholders' equity and cash flows for each of the three years in the period ended October 31, 2019, and the related notes and financial statement schedule listed in the Index at Item 15(a) (collectively referred to as the “consolidated financial statements”). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at October 31, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended October 31, 2019, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company’s internal control over financial reporting as of October 31, 2019, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated December 13, 2019 expressed an unqualified opinion thereon.

Basis for Opinion

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

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

Critical Audit Matter

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

Valuation of Goodwill

Description of the Matter	At October 31, 2019, the Company had $1,614,739 thousand of goodwill. As discussed in Note 5 to the consolidated financial statements, the Company evaluates the carrying amount of goodwill for impairment annually as of August 1, and between annual evaluations if an event occurs or circumstances change that would indicate the fair value of a reporting unit is less than the carrying amount of those assets. The Company performed a quantitative impairment test for all reporting units in fiscal 2019. As part of the quantitative impairment test, the Company estimated the fair value of each reporting unit using a combination of valuation techniques including the discounted cash flow method, a form of the income approach, and the guideline public company method, a form of the market approach. Auditing management’s annual goodwill impairment assessment relating to goodwill was complex due to the use of valuation methodologies in the determination of the estimated fair values of the reporting units. These fair value estimates are impacted by significant assumptions such as the selection of comparable guideline companies and the related valuation multiples, as well as discount rates, revenue growth rates, and operating margins which are affected by expectations about future market or economic conditions.
How We Addressed the Matter in Our Audit	We obtained an understanding and evaluated the design and tested the operating effectiveness of controls over the Company’s goodwill impairment process whereby the Company develops significant assumptions that are used as inputs to the annual goodwill impairment test. This included controls over management's review of the valuation model and the significant assumptions, described above. To test the implied fair value of the Company’s reporting units, we performed audit procedures that included, among others, assessing the methodologies, testing the significant assumptions, and testing the completeness and accuracy of the underlying data. We utilized internal valuation specialists in assessing the fair value methodologies applied and evaluating the reasonableness of certain assumptions selected by management. We assessed the historical accuracy of management’s estimates and performed sensitivity analyses of significant assumptions to evaluate the changes in the fair value of the reporting units that would result from changes in the assumptions. We tested management’s reconciliation of the fair value of the reporting units to the market capitalization of the Company. We also assessed the appropriateness of the disclosures in the consolidated financial statements.

/s/ Ernst & Young LLP

We have served as the Company’s auditor since 1956.

Cleveland, Ohio
December 13, 2019

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

None.

Item 9A. Controls and Procedures

(a) Evaluation of disclosure controls and procedures. Our management, with the participation of the principal executive officer (president and chief executive officer) and the principal financial officer (executive vice president and chief financial officer), has reviewed and evaluated our disclosure controls and procedures (as defined in the Securities Exchange Act Rule 13a-15e) as of October 31, 2019. Based on that evaluation, our management, including the principal executive and financial officers, has concluded that our disclosure controls and procedures were effective as of October 31, 2019 in ensuring that information required to be disclosed in the reports that we file or submit under the Securities Exchange Act of 1934 is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and is accumulated and communicated to our management, including the principal executive officer and the principal financial officer, as appropriate to allow timely decisions regarding required disclosure.

(b) Management's report on internal control over financial reporting. The Report of Management on Internal Control over Financial Reporting and the Report of Independent Registered Public Accounting Firm thereon are set forth in Part II, Item 8 of this Annual Report on Form 10-K.

(c) Changes in internal control over reporting. There were no changes in our internal controls over financial reporting that occurred during the fourth quarter of 2019 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information required by this Item is incorporated by reference to the captions “Election of Directors Whose Terms Expire in 2023” and “Delinquent Section 16(a) Reports” of our definitive Proxy Statement for the 2020 Annual Meeting of Shareholders. Information regarding the Audit Committee and Audit Committee financial experts is incorporated by reference to the caption “Committees of the Board of Directors” of our definitive Proxy Statement for the 2020 Annual Meeting of Shareholders.

Our executive officers serve for a term of one year from date of election to the next organizational meeting of the board of directors and until their respective successors are elected and qualified, except in the case of death, resignation or removal. Information concerning executive officers is contained in Part I of this report under the caption “Information about Our Executive Officers.”

We have adopted a code of ethics and business conduct for all employees and directors, including the principal executive officer, other executive officers, principal finance officer and other finance personnel. A copy of the code of ethics is available free of charge on our Web site at http://www.nordson.com/en/our-company/corporate-governance. We intend to satisfy our disclosure requirement under Item 5.05 of Form 8-K regarding any amendment to or waiver of a provision of our code of ethics and business conduct that applies to our principal executive officer, principal financial officer, principal accounting officer or controller or persons performing similar functions and that relates to any element of the code of ethics definition enumerated in Item 406(b) of Regulation S-K by posting such information on our Web site.

Item 11. Executive Compensation

The information required by this Item is incorporated by reference to the “Executive Compensation Discussion and Analysis” section of the definitive Proxy Statement for the 2020 Annual Meeting of Shareholders, along with the sections captioned “Directors Compensation,” “Summary Compensation for Fiscal Year 2019,” “Grants of Plan-Based Awards,” “Outstanding Equity Awards at October 31, 2019,” “Stock Option Exercises and Stock Vested Tables,” “Pension Benefits,” “Nonqualified Deferred Compensation,” “Potential Benefits Upon Termination” and “CEO Pay Ratio” in our definitive Proxy Statement for the 2020 Annual Meeting of Shareholders.

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

The information required by this Item is incorporated by reference to the caption “Security Ownership of Nordson Common Shares by Directors, Director Nominees, Executive Officers and Large Beneficial Owners” in our definitive Proxy Statement for the 2020 Annual Meeting of Shareholders.

Equity Compensation Table

The following table sets forth information regarding equity compensation plans in effect as of October 31, 2019:

Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights	Weighted-average exercise price of outstanding options, warrants and rights	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in first reporting column)
Equity compensation plans approved by security holders	1,787	$ 97.74	1,888
Equity compensation plans not approved by security holders	—	—	—
Total	1,787	$ 97.74	1,888

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

The information required by this Item is incorporated by reference to the captions “Director Independence” and “Review of Transactions with Related Persons” in our definitive Proxy Statement for the 2020 Annual Meeting of Shareholders.

Item 14. Principal Accountant Fees and Services

The information required by this Item is incorporated by reference to the caption “Fees Paid to Ernst & Young LLP” and the caption “Pre-Approval of Audit and Non-Audit Services” in our definitive Proxy Statement for the 2020 Annual Meeting of Shareholders.

PART IV

Item 15. Exhibits and Financial Statement Schedules

The following are filed as part of this report:

(a) 1. Financial Statements

The following financial statements are included in Part II, Item 8:

Consolidated Statements of Income for each of the three years in the period ended October 31, 2019

Consolidated Statements of Comprehensive Income for each of the three years in the period ended October 31, 2019

Consolidated Balance Sheets as of October 31, 2019 and October 31, 2018

Consolidated Statements of Shareholders' Equity for each of the three years in the period ended October 31, 2019

Consolidated Statements of Cash Flows for each of the three years in the period ended October 31, 2019

Notes to Consolidated Financial Statements

Reports of Independent Registered Public Accounting Firm

(a) 2. Financial Statement Schedule

Schedule II Valuation and Qualifying Accounts and Reserves for each of the three years in the period ended October 31, 2019.

No other consolidated financial statement schedules are presented because the schedules are not required, because the required information is not present or not present in amounts sufficient to require submission of the schedule, or because the information required is included in the financial statements, including the notes thereto.

(a) 3. Exhibits

The exhibits listed on the accompanying index to exhibits are filed as part of this Annual Report on Form 10-K.

NORDSON CORPORATION

Index to Exhibits

(Item 15(a) (3))

Exhibit Number	Description
(2)	Plan of Acquisition, Reorganization or Arrangement
2-a	Agreement and Plan of Merger, dated as of February 20, 2017, by and among Nordson Corporation, Viking Merger Corp., Vention Medical Holdings, Inc. and VMHI Rep Services, LLC (incorporated herein by reference to Exhibit 2.1 to Registrant's Form 8-K dated April 5, 2017)**
2-b	First Amendment to Agreement and Plan of Merger, dated as of March 30, 2017, by and among Nordson Corporation, Viking Merger Corp., Vention Medical Holdings, Inc. and VMHI Rep Services, LLC (incorporated herein by reference to Exhibit 2.2 to Registrant's Form 8-K dated April 5, 2017)
(3)	Articles of Incorporation and By-Laws
3-a	1989 Amended Articles of Incorporation (incorporated herein by reference to Exhibit 3-a to Registrant's Annual Report on Form 10-K for the year ended October 31, 2017)
3-a-1	Certificate of Amendment to 1989 Amended Articles of Incorporation (incorporated herein by reference to Exhibit 3-a-1 to Registrant's Annual Report on Form 10-K for the year ended October 31, 2017)
3-b	1998 Amended Regulations (incorporated herein by reference to Exhibit 3-b to Registrant's Annual Report on Form 10-K for the year ended October 31, 2016)
(4)	Instruments Defining the Rights of Security Holders, including indentures
4-a	Description of Nordson Corporation's Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934
4-b	Amended and Restated Note Purchase and Private Shelf Agreement for $200 million between Nordson Corporation and New York Life Investment Management LLC dated as of September 30, 2016 (incorporated herein by reference to Exhibit 4-b to Registrant's Annual Report on Form 10-K for the year ended October 31, 2016)
4-e	Master Note Purchase Agreement dated July 26, 2012 between Nordson Corporation and the purchasers listed therein (incorporated herein by reference to Exhibit 4-e to Registrant's Annual Report on Form 10-K for the year ended October 31, 2018).
4-h	Third Amended and Restated Credit Agreement dated April 30, 2019, among Nordson Corporation, various financial institutions named therein, and KeyBank, National Association, as administrative agent (incorporated herein by reference to Exhibit 4.1 to Registrant's Form 8-K dated May 6, 2019)**
4-j	Master Note Purchase Agreement dated July 28, 2015 between Nordson Corporation and the purchasers listed therein (incorporated herein by reference to Exhibit 4.1 to Registrant's Quarterly Report on Form 10-Q for the quarter ended July 31, 2015)
4-k	Amended and Restated Term Loan Agreement, dated April 30, 2019, among Nordson Corporation, various financial institutions named therein, and PNC Bank, National Association, as administrative agent (incorporated herein by reference to Exhibit 4.2 to Registrant's Form 8-K dated May 6, 2019)**
4-l	Master Note Purchase Agreement, dated as of June 22, 2018, by and among Nordson Corporation and the purchasers named therein (incorporated herein by reference to Exhibit 4.1 to Registrant's Form 8-K dated June 28, 2018)
(10)	Material Contracts
10-b-2	Nordson Corporation 2005 Deferred Compensation Plan (as Amended and Restated Effective January 1, 2009) (incorporated herein by reference to Exhibit 10-b-2 to Registrant's Annual Report on Form 10-K for the year ended October 31, 2014)*
10-b-3	First Amendment to the Nordson Corporation 2005 Deferred Compensation Plan (incorporated herein by reference to Exhibit 10.1 to Registrant's Quarterly Report on Form 10-Q for the quarter ended April 30, 2016)*
10-c	Resolution of Board of Directors Authorizing Execution of Indemnification Agreements (incorporated herein by reference to Exhibit 10-c to Registrant's Annual Report on Form 10-K for the year ended October 31, 2013)*
10-c-1	Form of Indemnity Agreement between the Registrant and Directors, effective November 1, 2016 (incorporated herein by reference to Exhibit 10-c-1 to Registrant's Annual Report on Form 10-K for the year ended October 31, 2016)*
10-c-2	Form of Indemnity Agreement between the Registrant and Executive Officers, effective November 1, 2016 (incorporated herein by reference to Exhibit 10-c-2 to Registrant's Annual Report on Form 10-K for the year ended October 31, 2016)*
10-d	Restated Nordson Corporation Excess Defined Contribution Retirement Plan (incorporated herein by reference to Exhibit 10-d to Registrant's Annual Report on Form 10-K for the year ended October 31, 2009)*

NORDSON CORPORATION

Index to Exhibits

(Item 15(a) (3))

Exhibit Number	Description
10-d-1	First Amendment to Restated Nordson Corporation Excess Defined Contribution Retirement Plan (incorporated herein by reference to Exhibit 10-d-1 to Registrant's Annual Report on Form 10-K for the year ended October 31, 2018)*
10-d-3	Nordson Corporation 2005 Excess Defined Contribution Retirement Plan (as Amended and Restated Effective January 1, 2009) (incorporated herein by reference to Exhibit 10-d-3 to Registrant's Annual Report on Form 10-K for the year ended October 31, 2014)*
10-e	Nordson Corporation Excess Defined Benefit Pension Plan (incorporated herein by reference to Exhibit 10-e to Registrant's Annual Report on Form 10-K for the year ended October 31, 2009)*
10-e-1	First Amendment to Nordson Corporation Excess Defined Benefit Pension Plan (incorporated herein by reference to Exhibit 10-f-1 to Registrant's Annual Report on Form 10-K for the year-ended October 29, 2000)*
10-e-2	Second Amendment to Nordson Corporation Excess Defined Benefit Pension Plan (incorporated herein by reference to Exhibit 10-e-1 to Registrant's Annual Report on Form 10-K for the year ended October 31, 2018)*
10-e-3	Nordson Corporation 2005 Excess Defined Benefit Pension Plan (as Amended and Restated Effective January 1, 2009) (incorporated herein by reference to Exhibit 10-e-3 to Registrant's Annual Report on Form 10-K for the year ended October 31, 2014)*
10-g-1	Amended and Restated Nordson Corporation 2004 Long-Term Performance Plan (incorporated herein by reference to Exhibit 10-g-1 to Registrant's Annual Report on Form 10-K for the year ended October 31, 2013)*
10-g-2	Nordson Corporation Amended and Restated 2012 Stock Incentive and Award Plan (incorporated herein by reference to Exhibit 10.1 to Registrant's Form 8-K dated March 2, 2018)*
10-g-3	Nordson Corporation 2012 Stock Incentive and Award Plan, Form of Notice of Award - Key Employees (as amended November 24, 2014) (incorporated herein by reference to Exhibit 10-g-3 to Registrant's Annual Report on Form 10-K for the year ended October 31, 2014)*
10-g-4	Nordson Corporation 2012 Stock Incentive and Award Plan, Form of Notice of Award - Executive Officers (as amended November 24, 2014) (incorporated herein by reference to Exhibit 10-g-4 to Registrant's Annual Report on Form 10-K for the year ended October 31, 2014)*
10-g-5	Nordson Corporation 2012 Stock Incentive and Award Plan, Directors' Deferred Compensation Sub-Plan (incorporated herein by reference to Exhibit 10-g-5 to Registrant's Annual Report on Form 10-K for the year ended October 31, 2013)*
10-g-6	Nordson Corporation 2012 Stock Incentive and Award Plan, Directors' Deferred Compensation Sub-Plan, Form of Notice of Award (incorporated herein by reference to Exhibit 10-g-6 to Registrant's Annual Report on Form 10-K for the year ended October 31, 2013)*
10-g-7	Amended and Restated Nordson Corporation Directors' Deferred Compensation Sub-Plan (incorporated herein by reference to Exhibit 10-g-7 to Registrant's Annual Report on Form 10-K for the year ended October 31, 2017)*
10-h	Assurance Trust Agreement between Nordson Corporation and Key Trust Company of Ohio, N.A. amended and restated as of January 22, 2014 (incorporated herein by reference to Exhibit 10.1 to Registrant's Quarterly Report on Form 10-Q for the quarter ended January 31, 2014)*
10-h-1	Form of Change in Control Retention Agreement between the Registrant and Executive Officers (incorporated herein by reference to Exhibit 10-h-1 to Registrant's Annual Report on Form 10-K for the year ended October 31, 2014)*
10-j	Compensation Committee Rules of the Nordson Corporation Amended and Restated Nordson Corporation 2004 Long Term Performance Plan governing directors' deferred compensation (incorporated herein by reference to Exhibit 10-j to Registrant's Annual Report on Form 10-K for the year ended October 31, 2016)*
10-m	Employment Agreement between Nordson Corporation and Michael F. Hilton (incorporated herein by reference to Exhibit 10-m to Registrant's Annual Report on Form 10-K for the year ended October 31, 2015)*
10-m-1	Amendment to Employment Agreement, dated June 10, 2019, between Nordson Corporation and Michael F. Hilton (incorporated herein by reference to Exhibit 10.1 to Registrant's Form 8-K dated June 14, 2019)*
10-n	Employment Agreement (Change in Control Retention Agreement) between Nordson Corporation and Michael F. Hilton (incorporated herein by reference to Exhibit 10-n to Registrant's Annual Report on Form 10-K for the year ended October 31, 2015)*
10-o	Supplemental Retirement Agreement between Nordson Corporation and Michael F. Hilton (incorporated herein by reference to Exhibit 10-o to Registrant's Annual Report on Form 10-K for the year ended October 31, 2016)*

NORDSON CORPORATION

Index to Exhibits

(Item 15(a) (3))

Exhibit Number	Description
10-p	Employment Agreement, effective as of August 1, 2019, between Nordson Corporation and Sundaram Nagarajan (incorporated herein by reference to Exhibit 10.2 to Registrant's Form 8-K dated June 14, 2019)*
10-q	Change-in-Control Retention Agreement between Nordson Corporation and Sundaram Nagarajan (incorporated herein by reference to Exhibit 10.3 to Registrant's Form 8-K dated June 14, 2019)*
(21)	Subsidiaries of the Registrant
(23)	Consent of Independent Registered Public Accounting Firm
31.1	Certification pursuant to Rule 13a-14(a)/15d-14(a) of the Securities Exchange Act of 1934 by the Chief Executive Officer, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
31.2	Certification pursuant to Rule 13a-14(a)/15d-14(a) of the Securities Exchange Act of 1934 by the Chief Financial Officer, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
32.1	Certification of CEO pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
32.2	Certification of CFO pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
99-a	Form S-8 Undertakings (incorporated herein by reference to Exhibit 99-a to Registrant's Annual Report on Form 10-K for the year ended October 31, 2016)
101	The following financial information from Nordson Corporation's Annual Report on Form 10-K for the year ended October 31, 2019, formatted in inline Extensible Business Reporting Language (iXBRL): (i) the Consolidated Statements of Income for the years ended October 31, 2019, 2018 and 2017, (ii) the Consolidated Statements of Comprehensive Income for the years ended October 31, 2019, 2018 and 2017, (iii) the Consolidated Balance Sheets at October 31, 2019 and 2018, (iv) the Consolidated Statements of Changes in Shareholders' Equity for the years ended October 31, 2019, 2018 and 2017, (v) the Consolidated Statements of Cash Flows for the years ended October 31, 2019, 2018 and 2017, and (vi) the Notes to Consolidated Financial Statements.
104	The cover page from Nordson Corporation's Annual Report on Form 10-K for the year ended October 31, 2019, formatted in inline Extensible Business Reporting Language (iXBRL) (included in Exhibit 101).

* Indicates management contract or compensatory plan, contract or arrangement in which one or more directors and/or executive officers of Nordson Corporation may be participants.

** Schedules and attachments to this exhibit have been omitted pursuant to Regulation S-K, Item 601(a)(5). The Registrant will provide a copy of any omitted schedule to the Securities and Exchange Commission or its staff upon request.

Item 16. Form 10-K Summary

None.

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.

NORDSON CORPORATION

Date: December 13, 2019

By: /s/ Gregory A. Thaxton
Gregory A. Thaxton
Executive Vice President, Chief Financial Officer

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Gregory A. Thaxton as his or her true and lawful attorney-in-fact and agent with full power to act alone, for him or her and in his or her name, place and stead, in any and all capacities, to sign any and all amendments to this Annual Report on Form 10-K, and to file the same, with all exhibits thereto, and all other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorney-in-fact and agent full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorney-in-fact and agent, may lawfully do or cause to be done by virtue hereof.

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

Signatures	Title	Date
/s/ Sundaram Nagarajan Sundaram Nagarajan	Director, President and Chief Executive Officer (Principal Executive Officer)	December 13, 2019
/s/ Michael F. Hilton Michael F. Hilton	Director, Senior Advisor to the Company	December 13, 2019
/s/ Gregory A. Thaxton Gregory A. Thaxton	Executive Vice President, Chief Financial Officer (Principal Financial Officer) (Principal Accounting Officer)	December 13, 2019
/s/ Michael J. Merriman, Jr. Michael J. Merriman, Jr.	Chairman of the Board	December 13, 2019
/s/ Lee C. Banks Lee C. Banks	Director	December 13, 2019
/s/ Randolph W. Carson Randolph W. Carson	Director	December 13, 2019
/s/ Arthur L. George, Jr. Arthur L. George, Jr.	Director	December 13, 2019
/s/ Frank M. Jaehnert Frank M. Jaehnert	Director	December 13, 2019
/s/ Ginger M. Jones Ginger M. Jones	Director	December 13, 2019
/s/ Joseph P. Keithley Joseph P. Keithley	Director	December 13, 2019
/s/ Mary G. Puma Mary G. Puma	Director	December 13, 2019
/s/ Victor L. Richey, Jr. Victor L. Richey, Jr.	Director	December 13, 2019

Schedule II – Valuation and Qualifying Accounts and Reserves

	Balance at Beginning of Year	Charged to Expense	Deductions	Currency Effects	Balance at End of Year
Allowance for Doubtful Accounts					
2017	$ 5,535	4,030	349	575	$ 9,791
2018	$ 9,791	1,185	1,189	(207)	$ 9,580
2019	**$ 9,580**	**2,254**	**1,840**	**(193)**	**$ 9,801**
Inventory Obsolescence and Other Reserves					
2017	$ 29,324	8,888	4,530	(542)	$ 33,140
2018	$ 33,140	13,041	8,930	294	$ 37,545
2019	**$ 37,545**	**10,623**	**8,720**	**(71)**	**$ 39,377**