

Ultra Clean Holdings, Inc.
Form 10-K
March 22, 2019

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 28, 2018

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 000-50646

Ultra Clean Holdings, Inc.

(Exact name of Registrant as specified in its charter)

Delaware	61-1430858
(State or other jurisdiction of	(IRS Employer
incorporation or organization)	Identification No.)

26462 Corporate Avenue

Hayward, California	94545
(Address of principal executive offices)	(Zip Code)
Registrant's telephone number, including area code:	

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(510) 576-4400

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

Title of Each Class	Name of Each Exchange on Which Registered
Common Stock, \$0.001 par value	The NASDAQ Global 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 (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes No

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

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or 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 by Rule 12b-2 of the Act). Yes No

The aggregate market value of the voting and non-voting stock held by non-affiliates of the Registrant, based on the closing sale price of the Registrant's common stock on June 29, 2018 as reported on the NASDAQ Global Market, was

approximately \$635.5 million. Shares of common stock held by each executive officer and director have been excluded from this computation. The determination of affiliate status for this purpose is not necessarily a conclusive determination for other purposes.

Number of shares of the registrant's common stock outstanding as of February 22, 2019: 39,110,649

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive proxy statement to be delivered to stockholders in connection with the 2018 annual meeting of stockholders are incorporated by reference in Part III of this Form 10-K where indicated. Such proxy statement will be filed with the Securities and Exchange Commission within 120 days of the registrant's fiscal year ended December 28, 2018.

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This Annual Report on Form 10-K contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Words such as “expects,” “anticipates,” “targets,” “goals,” “projects,” “intends,” “plans,” “believes,” “seeks,” “estimates,” “continues,” “may,” “will be,” “will continue,” “will likely results,” variations of such words, and similar expressions are intended to identify such forward-looking statements, but the absence of these words does not necessarily mean that a statement is not forward-looking. These forward-looking statements include, but are not limited to, statements concerning the following: projections of our financial performance, our anticipated growth and trends in our business, levels of capital expenditures, the adequacy of our capital resources to fund operations and growth, our ability to compete effectively with our competitors, our strategies and ability to protect our intellectual property, future acquisitions, customer demand, our manufacturing and procurement process, employee matters, supplier relations, foreign operations (including our operations in China and Singapore), the legal and regulatory backdrop (including environmental regulation), our exposure to market risks and other characterizations of future events or circumstances described in this Annual Report. Readers are cautioned that these forward-looking statements are only predictions and are subject to risks, uncertainties, and assumptions that are difficult to predict, including those identified below, under “Risk Factors,” and elsewhere herein. Therefore, actual results may differ materially and adversely from those expressed in any forward-looking statements. We undertake no obligation to revise or update any forward-looking statements for any reason, except as required by law.

Item 1. Business

Overview

Ultra Clean Holdings, Inc. (“UCT”, the “Company” or “We”) was founded in November 2002 for the purpose of acquiring Ultra Clean Technology Systems and Services, Inc. a US-based company founded in 1991 by Mitsubishi Corporation and operated as a subsidiary of Mitsubishi. UCT became a publicly traded company in March 2004. In 2006, we acquired Sieger Engineering, Inc. to better position ourselves as a subsystem supplier primarily to the semiconductor and display capital equipment industries. Sieger Engineering merged into Ultra Clean Technology Systems and Service, Inc. in July of 2016. To facilitate operations in Asia, Ultra Clean Technology (Shanghai) Co., Ltd (“UCTS”) and Ultra Clean Micro-Electronics Equipment (Shanghai) Co., Ltd. (“UCME”) were established in China in 2005 and 2007, respectively, and Ultra Clean Asia Pacific, Pte, Ltd. was established in Singapore in 2008. UCTS merged into UCME in December of 2015. Our July 2012 acquisition of American Integration Technologies LLC (“AIT”) added to our existing customer base in the semiconductor and medical spaces and provided additional manufacturing capabilities. In February 2015, we acquired Marchi Thermal Systems, Inc. (“Marchi”) and in July 2015, we acquired MICONEX s.r.o (“Miconex”), both privately held companies with a majority of their revenues in the semiconductor market. Marchi designs and manufactures specialty heaters, thermocouples and temperature controllers, delivering flexible heating elements and thermal solutions to our customers. The Company believes heaters are increasingly critical in equipment design for the most advanced semiconductor nodes. Miconex is a provider of advanced precision fabrication of plastics that has expanded our capabilities with existing customers. In May 2018, Marchi and Miconex changed their names to UCT Thermal Solutions, Inc. (“Thermal”) and to UCT Fluid Delivery Solutions s.r.o (“FDS”), respectively.

In August 2018, the Company acquired Quantum Global Technologies, LLC (“QGT”), a provider of ultra-high purity outsourced parts cleaning, process tool part recoating, surface treatment and analytical services to the semiconductor and related industries, for a total purchase price of approximately \$340.8 million. See Note 5 to the Company’s Consolidated Financial Statements for further information about the acquisition of QGT.

We are a global leader in the design, engineering, and manufacture of production tools, modules and subsystems for the semiconductor capital equipment industry and industry segments with similar requirements including display, consumer and medical. We focus on providing specialized engineering and manufacturing solutions for these applications. We enable our customers to realize lower manufacturing costs and reduced design-to-delivery cycle times while maintaining high quality standards.

With our acquisition of QGT, a leader in the parts cleaning, coating and semiconductor Fab-related analytical services, we expanded our capabilities to provide ultra-high purity parts cleaning, process tool part recoating, surface treatment, and analytical services to the semiconductor and related industries.

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We ship a majority of our products and serviced parts to U.S. registered customers with locations in and outside the U.S. In addition to U.S. manufacturing and service operations, we manufacture products and provide parts cleaning and other related services in our Asian and European facilities to support local and U.S. based customers. We conduct our operating activities primarily through our subsidiaries, Ultra Clean Technology Systems and Service, Inc., AIT, UCME, UCAP, Thermal, FDS and QGT.

Our international revenues represented 56.7%, 53.6% and 48.0% of revenues for fiscal years ended 2018, 2017 and 2016, respectively. See Note 13 to the Notes to Consolidated Financial Statements for further information about our geographic areas.

Our Suite of Offerings

We are a leading developer and supplier of critical subsystems, ultra-high purity cleaning and analytical services primarily for the semiconductor industry. We offer our customers an integrated outsourced solution for major subassemblies, improved design-to-delivery cycle times, design for manufacturability, prototyping and component manufacturing, and tool chamber parts cleaning and coating, as well as micro contamination analytical services. We offer our customers:

- A vertically integrated solution for complex and highly configurable systems. We provide our original equipment manufacturing (OEM) customers a broad outsourced solution for the development, design, component sourcing, prototyping, engineering, manufacturing and testing of advanced systems. We utilize our machining, sheet metal, and frame fabrication capabilities with highly specialized engineering, global supply chain management, and assembly capabilities to produce high performance products that are customized to meet the needs of our customers, as well as their respective end users. We minimize the overall number of suppliers and manage our global supply chain logistics to reduce inventory levels that our customers would otherwise be required to manage.

- Subsystem manufacturing. Our experience with the demanding requirements in semiconductor equipment manufacturing has enabled us to grow from primarily supplying gas delivery modules to being a leading developer and supplier of other critical modules and subsystems. These assemblies include chemical and fluid delivery modules, wafer transport, and process modules.

- Improved design-to-delivery cycle times. Our strong relationships with our customers and familiarity with their product requirements and the ever-changing needs of their customer base help us reduce their design-to-delivery cycle times. We seek to optimize our supply chain management, design and manufacturing coordination and controls to respond rapidly to order requests, enabling us to decrease design-to-delivery cycle times for our customers. Because our engineers work closely with our customers' engineers and understand the fabrication, assembly and testing of their products, we often can improve their design for manufacturability, thereby improving their cost, quality and consistency.

- Component neutral design and manufacturing. We do not manufacture components such as mass flow controllers and valves which are selected based on manufacturer published specifications. Our component neutral position enables us to recommend components on the basis of technology, performance and cost and to optimize our customers' overall designs based on these criteria. Furthermore, our neutral approach allows us to maintain close relationships with a wide range of component suppliers.

- Component testing capabilities. We utilize our technical expertise to test and characterize key components and subsystems. We have made significant investments in advanced analytical and automated test equipment, enabling us to test and qualify key components. We can perform diagnostic tests, design verifications and failure analyses for our customers and suppliers. Our analytical and testing capabilities of supplier components provide us the ability to recommend to our customers a wide range of appropriate component and design choices for their products.

- Increased integration with OEMs through local presence. Our local presence in close proximity to the facilities of most of our OEM customers enables us to remain closely integrated with their design, development and implementation teams. This level of integration enables us to respond quickly and efficiently to customer changes

and requests.

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Precision machining capabilities. We manufacture high quality, precision machined parts using equipment capable of efficiently providing complex parts with exacting tolerances. Our diverse precision fabrication equipment enables us to manufacture a broad range of machined parts using a wide range of materials, from exotic metals to high purity plastics. Our manufacturing capabilities include horizontal and vertical milling, turning, welding and joining, among others. We own and operate advanced machining and fabrication systems at multiple sites in the U.S., Europe and Asia.

Precision frame fabrication. We design and manufacture frames using tubing or sheet metal in all customary sizes with exacting standards to meet or exceed our customers' needs. We utilize over 25 years of experience in the fabrication of complex frames to provide a cost competitive edge in our vertical integration model. Many of our customers require frames that are powder coated; in 2016, we added this capability to our Chandler, Arizona frame fabrication facility.

Precision sheet metal fabrication. Our ability to provide broad sheet metal solutions for our customers enables us to support prototype to volume production, from brackets to sheet metal frames, and from structural to high quality cosmetic finishing of the final product. Our automated equipment and design capabilities allow us to develop accurate prototype and final production products for our customers.

Custom thermal control. Our acquisition of Thermal has enabled us to design and manufacture heaters, sensors, and controllers for precise temperature control. These products are complementary to our gas delivery systems products.

Parts cleaning and coating and analytical verification: Our acquisition of QGT has enabled us to extend our offerings to our OEM and integrated device manufacturer (IDM) customers. Through QGT, we now offer customers validated, ultra-high purity outsourced process tool chamber parts cleaning and coating services. Included in these services is tool part process optimization solutions that could lower the total cost of ownership for our customers. Through ChemTrace, we also now provide analytical verification of process tool chamber part cleaning effectiveness. ChemTrace offers micro contamination analysis of tool parts, wafers and depositions, chemicals, cleanroom materials, deionized water and airborne molecular contamination.

Our Strategy

Our objective is to grow our position as a leading solutions and service provider in the semiconductor markets we serve, while supporting other technologically similar markets in the display, consumer, medical, energy, industrial and research industries. Our strategy is comprised of the following key elements:

Expand our solutions and service market share with semiconductor OEMs and IDMs. We believe that equipment outsourcing among OEMs creates a significant market opportunity for us to grow our business with existing and new customers. We believe our customers will continue to outsource critical subsystems and that we are well positioned to capture a significant portion of these outsourcing opportunities. We believe that our continued focus on efficient manufacturing, reduced design-to-delivery cycle times, and quality and reliability will also allow us to gain market share. Similarly, we believe there is room to gain market share with our QGT service and analytical offerings, both with IDMs and OEMs, as customers typically outsource these solutions. By providing customers process improvement through consistently cleaner parts and analytical verification of process tool chamber part cleaning effectiveness, we have expanded our total available market significantly.

Develop or acquire solutions that allow our customer's customers to succeed at the leading edge of the semiconductor processing nodes. We continue to expand the number and type of subsystems and services that we offer in this rapidly advancing semiconductor market.

Leverage our geographic presence in lower cost manufacturing regions. Our manufacturing facilities in Shanghai, China allow us to produce in a low-cost region. These facilities house precision machined parts and subsystem assembly operations. Together, these facilities put us in close proximity to the manufacturing facilities of existing and potential customers and their end users. In Singapore, we have a procurement office and substantial manufacturing capabilities. Our manufacturing facilities all use similar processes and procedures, enabling us to respond rapidly to demand changes from our customer.

Several QGT cleaning and analytic facilities are also in low cost regions, strategically close to our customers, adding to our competitive advantage.

• Drive profitable growth with our flexible cost structure. We implement cost containment and capacity enhancement initiatives throughout the semiconductor capital equipment demand cycle and benefit from the global presence and efficiencies of our supply chain. In addition, we believe our Shanghai and Singapore facilities position us to respond effectively to future business demands. We employ a core engineering strategy with flexible partnering to augment our staff during the steep rise and fall often associated with cycles in the semiconductor industry.

• Continue to selectively pursue strategic acquisitions. We will continue to consider strategic acquisitions that will enable us to improve our financial model, expand our geographic presence, secure new customers and diversify into complementary products and services markets as well as broaden our technological and cleaning and analytical capabilities in the markets we serve.

• Strengthen vertical integration. We continue to invest in our operations to meet customer quality delivery targets. We have expanded welding operations at several of our manufacturing sites, developed/built in-house powder coating capability, and purchased new machining tools. In addition to organic growth, we continue to manage/foster key strategic partnerships to efficiently meet production needs.

• In late 2018, UCT began a series of cost improvement initiatives aimed at improving the flexibility of its operating and financial model over time. These initiatives include the closure or combination of some facilities to maximize operations, the postponement of selective capital expenditures, and a significant reduction in workforce, without constraining our capacity or ability to grow when the semiconductor industry recovers. These initiatives will roll out over the coming quarters and are expected to be complete by the end of 2019.

Products and Services

We design, develop, prototype, manufacture and test subsystems, and clean and analyze tool parts, primarily for the semiconductor market. We also support customers in the consumer, medical, energy, industrial, and research industries. Our products include precision robotic solutions, gas delivery systems, a variety of industrial and automation production equipment products, and subsystems that include wafer cleaning modules, chemical delivery modules, top-plate assemblies, frame assemblies, and process modules. Our services include ultra-high purity outsourced process tool chamber parts cleaning and coating services, tool part life extension and process tool part optimization solutions, and analytical verification of process tool chamber part cleaning effectiveness.

• **Chemical delivery modules:** Chemical delivery modules deliver gases and reactive chemicals in a liquid or gaseous form from a centralized subsystem to the reaction chamber. The module may be a gas delivery system in combination with liquid and vapor precursor delivery systems or may be a liquid delivery system in combination with a liquid storage system.

• **Frame assemblies:** Frame assemblies are support structures fabricated from steel tubing or folded sheet metal and form the backbone to which all other assemblies are attached. The complexity of the frames includes powder coating, pneumatic harnesses and cables that connect other critical subsystems together.

• **Gas delivery systems:** A typical OEM gas delivery system consists of one or more gas lines, comprised of small diameter internally polished stainless steel tubing, filters, mass flow controllers, regulators, pressure transducers and valves, component heaters, and an integrated electronic and/or pneumatic control system. These systems are mounted on a pallet and are typically enclosed in a sheet metal encasing. Our gas delivery system designs are developed in collaboration with our customers and are customized to meet the needs of specific processing requirements for OEMs. Our customers either specify the particular brands of components they want incorporated into a particular system or rely on our design expertise and component characterization capabilities to help them select the appropriate components for their particular system.

Fluid delivery system: A typical OEM liquid delivery system consists of one or more chemical delivery units, comprised of small diameter high purity PFA tubing, filters, flow controllers, regulators, component heaters, and an integrated electronic and/or pneumatic control system. These units are typically contained in a plastic enclosure and further integrated into a frame. Our liquid delivery system designs are developed in collaboration with our customers and are customized to meet the needs of specific processing requirements for OEMs. Our customers either specify the particular materials and the brands of components they want incorporated into a particular system or rely on our design expertise and component characterization capabilities to help them select the appropriate components for their particular system.

Precision robotics: Precision robotic systems are used when accurate controlled motion is required. Some of the systems that employ robotic systems are: semiconductor wafer and chip handling, wire bonding and industrial equipment.

Process modules: Process modules refer to the larger subsystems of semiconductor manufacturing tools that process integrated circuits onto wafers. Process modules include several smaller subsystems such as the frame assembly, top-plate assembly and gas and chemical delivery modules, as well as the chamber and electronic, pneumatic and mechanical subsystems.

Other high level assemblies: Other high level assemblies refer to large subsystems used in semiconductor manufacturing, display, medical, energy, industrial and research industries.

Parts cleaning and coating: Through QGT, we now offer customers validated, ultra-high purity outsourced process tool chamber parts cleaning and coating services. Included in these services are tool part process optimization solutions that could lower the total cost of ownership for our customers.

Cleaning analysis: Through QGT, we now provide analytical verification of process tool chamber part cleaning effectiveness. We offer micro contamination analysis of tool parts, wafers and depositions, chemicals, cleanroom materials, deionized water and airborne molecular contamination.

Customers

We sell our products and services primarily to customers in the semiconductor capital equipment and semiconductor integrated device manufacturing industries, and we also sell to the display, consumer, medical, energy, industrial, and research equipment industries.

The majority of our total revenues comes from the semiconductor capital equipment industry (OEM's), which is highly concentrated, so we are therefore highly dependent upon a small number of customers. Our two largest customers for our equipment product revenues in fiscal year 2018, 2017 and 2016 were Applied Materials, Inc. and Lam Research Corporation, each of which accounted for more than 10.0% of our total revenues in fiscal years 2018, 2017 and 2016. As a group, our respective year's top two customers accounted for 76.6%, 84.4% and 82.2% of the Company's revenues for fiscal years 2018, 2017 and 2016, respectively. The composition of our most significant customers changes from time to time based on various factors, including acquisition activity by our customers.

Approximately 4.0% of our total revenues came from the semiconductor integrated device manufacturing industry (IDM's). We expect this percentage to increase in fiscal 2019 with a full year of operations of QGT. This industry is not as concentrated and we have a diverse customer base with no single customer representing more than 10% of total revenues for 2018.

We have successfully qualified as a supplier of equipment and cleaning and analytical services with each of our customers who require it. This lengthy qualification process involves the inspection and audit of our facilities and evaluation by our customers of our engineering, documentation, manufacturing and quality control processes and procedures. Our customers generally place orders with suppliers who have met and continue to meet their qualification criteria.

Customer Business Management

We sell and support our products and services through our Customer Business Management organization which, consisted of customer relationship directors, managers and support staff. Our customer relationship directors are responsible for establishing sales strategy and setting the objectives for specific customer accounts. Each customer relationship manager is dedicated to a specific customer account and is responsible for maintaining strong working relationships with that customer. Customer relationship managers work closely with customers and in many cases provide on-site support. OEM Customer relationship managers often attend customers' internal meetings

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related to production and engineering design and quality to ensure that customer expectations are interpreted and communicated properly to our operations group. Customer relationship managers also work with our customers to identify and meet their cost and design-to-delivery cycle time objectives. Our IDM Customer relationship managers work with process tool owners and Fab maintenance managers relating to the development of validation of cleaning recipes, addressing new tools, and to optimize processes toward node transitions.

We have dedicated business development managers responsible for new business development for gas delivery systems and other critical subsystems as well as our service business. Our new business development managers initiate and develop long-term, multilevel relationships with customers and work closely with customers on new business opportunities. Our customer relationship organization includes technical sales support for order placement, spare parts quotes, production status updates as well as service and maintenance contracts and analysis business. We have a technical relationship representative located at most of our manufacturing facilities.

We integrate new business wins into our facilities via a rigorous product transition process, working in concert with our customers to ensure all production and test requirements are identified, documented, and validated. We employ the same process at all our sites, enabling products and service offerings to smoothly transition into and between our sites as needed to support customer demand.

In addition, we have developed an overall service and support infrastructure to provide our customers with service and support 24 hours a day, seven days a week. Our dedicated global field service engineers provide customer support through the performance of on-site installation, servicing and repair.

Technology Development

We engage in ongoing technology development efforts to remain a leader for gas delivery systems and to further develop our expertise in other critical subsystems. Our design engineering and new product engineering groups support our technology development activities. Our technology development group works closely with our customers to identify and anticipate changes and trends in next-generation equipment. Our technology development group participates in customer technology partnership programs that focus on process application requirements for gas and liquid delivery systems and other critical subsystems. These development efforts are designed to meet specific customer requirements in the areas of subsystem design, materials, component selection and functionality. Our technology development group also works directly with our suppliers to help them identify new component technologies and make necessary changes in, and enhancements to, the components that we integrate into our products. Our analytical and testing capabilities enable us to evaluate multiple supplier component technologies and provide our customers with a wide range of appropriate component and design choices for their gas delivery systems and other critical subsystems.

Our analytical and testing capabilities also help us anticipate technological changes and requirements in component features for our core UCT next-generation gas delivery systems and other critical subsystems. We are developing additional features to improve the performance and functionality of our gas delivery systems and other critical subsystems. Our technology development activities for next-gen gas delivery and other critical subsystems are performed principally in Hayward, California.

We also engage in ongoing technology development to maintain technological leadership in the cleaning, coating and analytical markets. Our QGT subsidiary works closely with customers to identify and anticipate changes that will be required in next-generation equipment. QGT service's technical capability is becoming extremely critical and differentiated to ensure high wafer yields and throughput as geometries shrink and density increases. QGT's development activities are performed primarily in Phoenix, AZ.

Our technology development and new product engineering expenses were approximately \$13.3 million, \$11.7 million and \$9.9 million for the 2018, 2017 and 2016 fiscal years, respectively.

Intellectual Property

Our success depends in part on our ability to maintain and protect our proprietary technology and to conduct our business without infringing the proprietary rights of others. Both our products and services businesses largely

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depend upon our design, engineering, manufacturing, testing, cleaning, coating and analytical know-how. We also rely on a combination of trade secrets and confidentiality provisions, and to a much lesser extent, patents, copyrights and trademarks, to protect our proprietary rights. We have four patents with various expiration dates ranging from 2019 to 2034. We have no pending U.S. patents. Intellectual property that we develop on behalf of our customers is generally owned exclusively by those customers.

We require our employees, suppliers and potential business partners to enter into confidentiality and non-disclosure agreements before we disclose to them any sensitive or proprietary information regarding our products, technology or business plans. We require employees to assign to us proprietary information, inventions and other intellectual property they create, modify or improve.

Competition

Our industry is highly fragmented. When we compete for new business, we face competition from other suppliers of gas delivery systems, critical subsystems, cleaning and analytical services, as well as the internal manufacturing groups of our customers. Customers that have elected to outsource their gas delivery systems and other critical subsystems including cleaning and analytics, could elect in the future to develop and manufacture these subsystems internally, leading to further competition.

Our principal competitor for gas delivery systems is Ichor Systems, Inc., and our principal competitors for other critical subsystems are Flex Ltd., Foxsemicon Integrated Technology Inc. and Celestica Inc. Some of these competitors have substantially greater financial, technical, manufacturing and marketing resources than we do. We expect our competitors to continue to improve the performance of their current products and to introduce new products or new technologies that could adversely affect sales of our current and future products. For our services, coating and analytical offerings, our main competitors in the US are Pentagon Technologies and Cleanpart, and in Korea, KoMiCo.

The limited number of potential customers in our industry further intensifies competition. The primary competitive factors in our industry are quality, meeting customer timeline demands, price, technology, design-to-delivery cycle time, customer qualification approvals, the development of product recipes for cleaning and analytics and historical customer relationships. We anticipate that increased competitive pressures will cause intensified price-based competition and we may have to reduce the prices of our products. In addition, we expect to face new competitors as we enter new markets.

Employees

As of December 28, 2018, we had 4,280 employees, of which 443 were temporary. Of our total employees, there were 126 in engineering, 11 in technology development, 235 in sales and support, 2,861 in direct manufacturing, 690 in indirect manufacturing and 357 in executive and administrative functions. These figures include 1,706 employees in Asia and 519 employees in Europe. None of our employees are represented by a labor union and we have not experienced any work stoppages.

Governmental Regulation and Environmental Matters

Our operations are subject to federal, state and local regulatory requirements and foreign laws relating to environmental, waste management and health and safety matters, including measures relating to the release, use, storage, treatment, transportation, discharge, disposal and remediation of contaminants, hazardous substances and waste, as well as practices and procedures applicable to the construction and operation of our UCT and QGT facilities.

Our past or future operations may result in injury or claims of injury by employees or the public which may result in material costs and liabilities to us. Although some risk of costs and liabilities related to these matters is inherent in our business, we believe that our business is in compliance with applicable regulations. However, new, modified or more stringent requirements or enforcement policies could be adopted, which could adversely affect us.

Available Information

We file with the Securities and Exchange Commission (“SEC”) annual reports on Form 10-K, quarterly reports on Form 10-Q and current reports on Form 8-K pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, or the Exchange Act. You may read and copy any materials we file with the SEC at the Public Reference Room maintained by the SEC at 100 F Street, N.E., Washington, D.C. 20549. You may also request copies of all or any portion of such material from the SEC at prescribed rates. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the public reference room. In addition, materials filed electronically with the SEC are available at the SEC’s website at <http://www.sec.gov>.

In addition, we make available free of charge, on or through our website at <http://www.uct.com>, our annual, quarterly and current reports and any amendments to those reports, as soon as reasonably practicable after electronically filing such reports with, or furnishing them to, the SEC. This website address is intended to be an inactive textual reference only; none of the information contained on our website is part of this report or is incorporated by reference herein.

Executive Officers

Set forth below is information concerning our executive officers as of February 22, 2019.

Name	Age	Position
James P. Scholhamer	52	Chief Executive Officer & Director
Sheri Savage	48	Chief Financial Officer
Scott Nicholas	62	President, Semiconductor Services Business
Joe Williams	46	President, Semiconductor Products & Solutions Business
Joan Sterling	61	Senior Vice President, Human Resources

James P. Scholhamer joined UCT as Chief Executive Officer and a member of the Board of Directors in January 2015. Prior to joining UCT, Mr. Scholhamer served in various capacities with Applied Materials Inc., most recently as corporate vice president and general manager of the Equipment Products Group and Display Services Group within its Global Service Division from February 2011 to January 2015. Mr. Scholhamer was the corporate vice president and general manager of the Display Business Group from December 2008 to February 2011 and vice president of Operations-Energy for the Environmental and Display Products Division from July 2006 to December 2008 at Applied Materials, Inc. Mr. Scholhamer held various positions at Applied Films Corporation from August 1997 to July 2006, including chief operating officer, chief technology officer and executive vice president as well as vice president of Operations, Engineering and Research & Development. In addition to managing Applied Films Germany and Taiwan sites, Mr. Scholhamer served as vice president and general manager of the Thin Film Coating Division and the Thin Film Equipment Division in the company’s Colorado office from July 2000 to September 2004. Prior to that, Mr. Scholhamer held various operational and technical positions in several companies related to the design and fabrication of optical components such as Visible, UV and X-ray optics. Mr. Scholhamer holds a Bachelor of Science degree in materials and metallurgical engineering from the University of Michigan.

Sheri Savage has served as our Chief Financial Officer and Secretary since July 2016. Ms. Savage joined the Company as the Senior Director of Finance in April 2009. She was Senior Vice President of Finance and Chief Accounting Officer from February 2016 to July 2016. Prior to joining UCT, Ms. Savage served at Credence Systems Corporation, a manufacturer of test equipment for the global semiconductor industry, as its Corporate Controller and Vice President of Finance from February 2008 to February 2009 and as Director of Internal Audit from May 2006 to February 2008. Prior to Credence Systems, Ms. Savage served in various accounting and finance roles at Protiviti, a global business consulting and internal audit firm, and KLA-Tencor Corporation, a supplier of process control and yield management solutions for the semiconductor and related nanoelectronics industries. Ms. Savage also served as Manager, Business Process Risk Accounting, at Arthur Anderson LLP, the former accounting firm, from May 1996 to October 1999. Ms. Savage holds a Bachelor of Science degree in Managerial Economics from the University of California, Davis.

Scott Nicholas joined UCT with the acquisition of QGT in August 2018. At QGT, Mr. Nicholas was the President, CEO and Chairman of the Board from February 2000 until August 2018. Mr. Nicholas has more than thirty years of leadership and executive management experience in manufacturing, service and distribution companies. In addition to his more than 15 years semiconductor experience, Mr. Nicholas has held leadership positions in protective clothing, sterile pharmaceutical, and implantable medical device manufacturing businesses, including executing two successful business turnaround ventures leading to profitable exits. Mr. Nicholas earned a Masters of Management degree from Northwestern University's J.L. Kellogg Graduate School of Management in 1984 and a Bachelor of Science in Chemical Engineering from Lehigh University in 1979.

Joe Williams joined UCT in February 2015 with the acquisition of Thermal as President of Thermal. He continues to manage Thermal and serves as our Senior Vice President of Customer Business Management since October 2016. Mr. Williams was president of Thermal from April 2013 to 2015. He worked previously at UCT as vice president of new business development. Mr. Williams was Senior Vice President of Business Development & Engineering at AIT from 2007 to 2013. Prior to that, Mr. Williams co-founded Integrated Flow Systems and served as vice president of engineering and operations and director of engineering and operations from 1997 to 2004. He worked at Watkins-Johnson Company as a mechanical design engineer from 1994 to 1997. Mr. Williams holds a Bachelor of Science Degree in Mechanical Engineering from North Carolina State University.

Joan Sterling has served as our Senior Vice President of Global Human Resources since 2016. Ms. Sterling joined UCT in March 2013 as Director of Global Human Resources. Prior to joining UCT, Ms. Sterling was the Human Resources Director for Engineering and Broadcast Operations at SiriusXM Satellite Radio from 2009 to 2013. She worked at Hitachi Data Systems from 2007 to 2009 as an executive change management consultant for a global IT redesign. Ms. Sterling served as human resource senior vice president for the consumer credit group at Wells Fargo from 2005 to 2007. From 2000 to 2005, Ms. Sterling served in several senior director roles at Hewlett Packard managing human resources sites and functions of staffing, compensation, benefits, training and development. She was the corporate director of human resource strategic planning for First Energy Corporation from 1999 to 2000. She worked at Hewlett Packard Enterprise from 1994 to 1999 as the Midwest Region Headquarters Human Resource Manager. Ms. Sterling holds a Bachelor of Science in business from DePaul University and a Master of Arts in organizational development from Loyola University.

Item 1A. Risk Factors

The cyclical and highly volatile nature of the industries we serve could harm our operating results.

Our business and operating results depend in significant part upon capital expenditures by manufacturers in the semiconductor and display industries, which in turn depend upon the current and anticipated market demand for such products. Historically, the industries we serve (in particular the semiconductor industry) have been highly cyclical, with recurring periods of over-supply of products that have had a severe negative effect on the demand for capital equipment and related services involved in manufacturing such products. We have experienced and anticipate that we will continue to experience significant fluctuations in customer orders for our products through such cycles. Although certain aspects of our business, including the cleaning, coating and analytical services delivered by QGT which also supports the semiconductor chip market are less susceptible to variations in capital expenditures by manufacturers than other aspects of our business, slowdowns in the industries we serve have had, and future slowdowns may also have, a material adverse effect on our operating results. During periods of decreasing demand for our products and services, we must be able to appropriately align our cost structure with

prevailing market conditions, effectively manage our supply chain and motivate and retain employees. During periods of increased demand, we must expand manufacturing capacity and inventory to meet customer demands, effectively manage our supply chain and attract, retain and motivate a sufficient number of employees. If the industries we serve experience downturns, or if we are not able to timely and appropriately adapt to the changes in our business environment, our results of operations will be harmed. Also, the limited visibility we have from the majority of our customers of their future orders, combined with the cyclical and volatile nature of the industries we serve, make future revenues, results of operations and net cash flows difficult to estimate.

We rely on a small number of original equipment manufacturing (“OEM”) and integrated device manufacturing (“IDM”) customers for a significant portion of our revenues, and any adverse change in our relationships with these customers, including a decision by such customers not to continue to outsource critical subsystems or part cleaning, coating or analytical services to us or to give market share to one of our competitors, would adversely affect our business, results of operations and financial condition. Our customers also exert a significant amount of negotiating leverage over us, which may require us to accept lower operating margins, increased liability risks or changes in our operations in order to retain or expand our market share with them.

A relatively small number of OEM customers have historically accounted for a significant portion of our revenues, and we expect this trend to continue. As a group, the respective year’s top two customers accounted for 76.6%, 84.4% and 82.2% of our revenues for fiscal years 2018, 2017 and 2016, respectively, and we expect that our revenues will continue to be concentrated among a small number of customers. In addition, our customer contracts generally do not require customers to place any orders. Accordingly, the success of our products business depends on OEMs continuing to outsource the manufacturing of critical subsystems to us. Because of the small number of OEMs in the markets we serve, most of which are already our customers, it would be difficult to replace lost revenue resulting from the loss of, or the reduction, cancellation or delay in purchase orders by, any one of these customers, whether due to such customer’s decision to not continue to outsource all or a portion of its critical subsystems for its capital equipment to us, such customer giving market share to our competitors or for other reasons, such as a customer’s bankruptcy or insolvency or decreased demand for such customer’s products. We have in the past lost business from customers who have taken the manufacturing of our products in-house, given market share to our competitors or declared bankruptcy. Further, since our customers generally own the designs and other intellectual property to the products we manufacture, we cannot prevent them from licensing such designs and other intellectual property to our competitors for the manufacturing of such products. If we are unable to replace revenue from customers who determine to take subsystem assembly in-house, give market share to our competitors or from whom we otherwise lose business, such events could have a material adverse impact on our financial position and results of operations.

Our services business, providing part cleaning, coating and analytical expertise, to IDM and OEM customers has expanded our customer base to include IDM customers. Our IDM business is concentrated in a relatively small number of customers, and we compete with in-house capabilities, OEM’s who perform cleaning as part of service contracts and cleaning, coating and analytical services competitors. The OEM customer profile has significant overlap with our products business and is subject to risks of market share loss to cleaning, coating and analytical services competitors. The cleaning and analytical process are proprietary to QuantumClean and ChemTrace, respectively, and transition to new suppliers may require requalification on the part of the customer.

Consolidation among our customers, or a decision by any one or more of our customers to outsource all or most manufacturing, assembly, cleaning, coating and analytical services work to a single equipment manufacturer, may further concentrate our business in a limited number of customers and expose us to increased risks relating to dependence on an even smaller number of customers.

In addition, due to the size and revenue contribution levels from our largest customers, they are able to exert significant pricing pressure in the negotiation of our commercial agreements and individual purchase orders. Our

customers often require reduced prices or other quality, manufacturing or delivery commitments as a condition to their awarding the placement of orders with us in any given period. This may, among other things, result in reduced operating margins or require capital or other expenditures in order to maintain or expand our market share. Our customers' negotiating leverage also can result in terms and conditions that may contain significant liability risk to us. For example, our customers generally require that we provide them indemnification against certain liabilities, which may include claims of losses by their. In some cases, we have self-insured against liability risk meaning that we may be directly responsible for a high magnitude of liability claims by our customers without recourse to insurance proceeds from third-party insurers. Our customers may also pressure us to make other concessions in

order to preserve or expand our market share with them. Those concessions may harm our business. For example, customers may require us to move the manufacturing of our products from lower-cost geographies such as China to higher-cost geographies such as Singapore. The transfer of manufacturing could result in reduced margins and a sub-optimal cost structure. If we are unable to retain and expand our business with our customers on favorable terms, our business and operating results will be adversely affected and we may be susceptible to increased liability risk. This additional liability risk could have a material adverse effect on our business, cash flows, results of operations and financial condition.

We may not be able to respond quickly enough to changes in demand for our products.

Demand shifts in the industries we serve are rapid and difficult to predict, and we may not be able to anticipate or respond quickly enough to changes in demand. Our ability to increase revenues of our products and services in periods of increasing demand depends, in part, upon our ability to:

- mobilize our supply chain in order to maintain component and raw material supply;
- optimize the use of our design, engineering and manufacturing capacity in a timely manner;
- deliver our products and services to our customers in a timely fashion;
- expand, if necessary, our manufacturing, cleaning, coating and analytical services capacity; and
- maintain our product and service quality as we increase production.

If we are unable to respond to rapid increases in demand for our products and services on a timely basis, or to manage any corresponding expansion of our manufacturing and service capacity effectively, our customers could divert their purchases of products and services from us to our competitors, which would adversely affect our business.

Our ability to remain profitable and mitigate the impact on our business in periods of decreasing demand depends, in part, upon our ability to:

- optimize our inventory levels and reduce or cancel orders from our suppliers without compromising our relationships with such suppliers;
- reduce our fixed and variable costs through a number of initiatives, which may include reducing our manufacturing workforce;
 - continue to motivate our employees; and
- maintain the prices, quality and delivery cycles of our products and services in order to retain our customers' business.

Our dependence on our suppliers may prevent us from delivering an acceptable product on a timely basis.

We rely on both single-source and sole-source suppliers, some of whom are relatively small, for many of the components we use in our products and services. In addition, our customers often specify components or raw materials of particular suppliers that we must incorporate into our products. Our suppliers may be under no long-term obligation to provide us with components or raw materials. As a result, the loss of or failure to perform by any of these suppliers could adversely affect our business and operating results. In addition, the manufacturing of certain components and subsystems and the cleaning, coating and analysis of tool parts are complex processes. Therefore, if a supplier were unable to provide the volume of supplies, components or raw materials we require on a timely basis and at acceptable prices and quality, we would have to identify and qualify replacements from alternative sources. However, the process of qualifying new suppliers for complex components and raw materials is lengthy and could delay our production or delivery of services, which would adversely affect our business, operating results and financial condition.

We may also experience difficulty in obtaining sufficient supplies of components and raw materials in times of growth in our business. For example, we have in the past experienced shortages in supplies of various components, such as mass flow controllers, valves and regulators, and certain prefabricated parts, such as sheet metal enclosures, used in the manufacture of our products. In addition, one of our competitors manufactures mass flow controllers that may be specified by one or more of our customers. If we are unable to obtain these particular mass flow controllers from our competitor or convince a customer to select alternative mass flow controllers, we may be unable to meet that customer's requirements, which could result in a loss of market share.

If we, or our suppliers, are unable to procure sufficient quantities of supplies, components or raw materials from suppliers, it could influence decisions by our customers to delay or cancel orders or service contracts and decisions by our vendors to fulfill our purchase orders and, consequently, have a material adverse effect on our results of operations.

Our inability to successfully manage the implementation of a company-wide enterprise resource planning ("ERP") system could adversely affect our operating results.

We are in the process of implementing a new company-wide ERP system. This process has been and continues to be complex and time-consuming and we expect to incur additional expenses. This ERP system will replace many of our existing operating and financial systems, which is a major undertaking from a financial management and personnel perspective. Should the new ERP system not be implemented successfully throughout all our business units and within budget and on time, or if the system does not perform in a satisfactory manner, it could be disruptive and adversely affect our operations, including our potential ability to report accurate, timely and consistent financial results; our ability to purchase supplies, components and raw materials from and pay our suppliers; and our ability to deliver products and services to customers on a timely basis and to collect our receivables from them. Furthermore, we began to place this new ERP system into service in the third quarter of 2018 and anticipate that it will be fully in service by the end of fiscal year 2020. Amortization of previously capitalized costs amounted to \$0.9 million in fiscal year 2018 and are expected to be substantially greater in fiscal year 2019 and the years that follow as the system goes into service company-wide.

In addition, we have teams leading the implementation of the ERP system at most of our locations. To the extent that these teams or key individuals are not retained through the implementation period, the success of our implementation could be compromised and the expected benefits of the ERP system may not be realized. If the new ERP system is not successfully and fully implemented, it could negatively affect our financial reporting, inventory management and our future sales, profitability and financial condition.

We are subject to order and shipment uncertainties and any significant reductions, cancellations or delays in customer orders could cause our revenue to decline and our operating results to suffer.

Our revenue is difficult to forecast because we generally do not have a material backlog of unfilled orders and because of the short time frame within which we are often required to design, produce or deliver products to our customers. Most of our revenue in any quarter depends on customer orders for our products that we receive and fulfill in the same quarter. We generally do not have long-term purchase orders or contracts that contain minimum purchase commitments from our customers. Instead, we receive non-binding forecasts of the future volume of orders

from our customers. Occasionally, we order and build component inventory in advance of the receipt of actual customer orders. Customers may cancel order forecasts, change production quantities from forecasted volumes or delay production for reasons beyond our control. Furthermore, reductions, cancellations or delays in customer order forecasts, which may occur for various reasons, including reduced demand for our customer's products, customer bankruptcies or customer insolvency, usually occur without penalty to, or compensation from, the customer. Reductions, cancellations or delays in forecasted orders could cause us to hold inventory longer than anticipated, which could reduce our gross profit, restrict our ability to fund our operations and cause us to incur unanticipated reductions or delays in revenue. Moreover, many of the products we manufacture are custom built for our customers and are therefore not fungible with products we sell to other customers. If we do not obtain orders as we anticipate, we could have excess component inventory for a specific product that we would not be able to sell to another customer, likely resulting in inventory write-offs, which could have a material adverse effect on our business, financial condition and operating results. In addition, because many of our costs are fixed in the short term, we could experience deterioration in our gross profit and operating margins when our sales volumes decline.

The manufacturing of our products is highly complex, and if we are not able to manage our manufacturing and procurement process effectively, our business and operating results will suffer.

The manufacturing of our products is a highly complex process that involves the integration of multiple components and requires effective management of our supply chain while meeting our customers' design-to-delivery cycle time requirements. Through the course of the manufacturing process, our customers may modify design and system configurations in response to changes in their own customers' requirements. In order to rapidly respond to these modifications and deliver our products to our customers in a timely manner, we must effectively manage our manufacturing and procurement process. If we fail to manage this process effectively, we risk losing customers and damaging our reputation. We may also be subject to liability under our agreements with our customers if we or our suppliers fail to effectively or timely re-configure manufacturing processes or components in response to these modifications or if shipments of our products are delayed, which may lead to product defect or other claims by our customers or cancelled orders. In addition, if we acquire inventory in excess of demand or that does not meet customer specifications, we could incur excess or obsolete inventory charges. These risks are even greater during periods of macroeconomic uncertainty or down cycles in our industry, and as we continue to expand our business beyond gas delivery systems into new subsystems or services with which we have less experience. During periods of economic uncertainty or down cycles in our industry, certain of our suppliers may be forced to reduce or go out of business, which could require us to either procure products from higher-cost suppliers or, if no additional suppliers exist, reconfigure the design and manufacture of our products. This could limit our growth and have a material adverse effect on our business, financial condition and operating results.

Our results of operations, financial position and cash flows may suffer if we do not effectively manage our inventory.

Inventory is typically the largest asset on our balance sheet, representing 19.3% of our total assets as of December 28, 2018. We must manage our inventory of raw materials, work-in-process and finished goods effectively to meet changing customer requirements, while keeping inventory costs down and maintaining or improving gross margins.

Historically, the industries we serve (in particular the semiconductor capital equipment industry) have been highly cyclical, which makes accurately forecasting customers' product needs difficult. Although we seek to maintain sufficient inventory levels of materials to guard against interruptions in supply and to meet our customers' needs, we may experience shortages of certain key materials, particularly in times of high industry demand. We also face long lead times from our suppliers, which may be longer than the lead times provided to us by our customers. If we underestimate customer demand or if insufficient manufacturing capacity or raw materials are available, we may have to forego sales opportunities, lose market share and damage our customer relationships.

In the event we overestimate customer demand, we may allocate resources to manufacturing products that we may not be able to sell. As a result, we could hold excess or obsolete inventory, which would reduce our profit margins and adversely affect our financial results. Some of our products have in the past and may in the future become obsolete while in inventory due to changing customer specifications, or become excess inventory due to decreased demand for our products and an inability to sell the inventory within a foreseeable period. Furthermore,

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our customers may be able to cancel orders on short notice. This could result in charges that reduce our gross profit and gross margin. Furthermore, if market prices drop below the prices at which we value inventory, we would need to take a charge for a reduction in inventory values in accordance with the applicable accounting rules. Any future unexpected changes in demand or increases in costs of production that cause us to take additional charges for un-saleable, obsolete or excess inventory, or to reduce inventory values, would adversely affect our results of operations.

We hold inventory at our various manufacturing sites globally and many of these sites have more than one inventory warehouse. Successfully managing our inventory is dependent upon our information technology systems and internal controls. We rely upon such information technology systems and internal controls to accurately and timely manage, store and replenish inventory, complete and track customer orders, coordinate sales activities across all of our products and maintain and report vital data and information. A disruption in our information technology systems or a failure of our internal controls could result in delays or disruptions in receiving inventory and supplies or filling customer orders, incorrect inventory counts, over or under stocking or loss of inventory and adversely affect our business, customer relationships and results of operations. In particular, our largest customer requires that certain of our products are manufactured and shipped out of our Singapore facility. High levels of customer demand at such facility in fiscal year 2017 created substantial strain on our processes, internal controls and information technology systems. There can be no assurance that such delays, failures or disruptions will not have a material adverse effect on our cash flows, results of operations and financial condition.

Our customers require our products to undergo a lengthy and expensive qualification process. If we are unsuccessful or delayed in qualifying any of our products with a customer, our results of operations and financial condition could suffer.

We have had to qualify, and are required to maintain our status, as a supplier for each of our customers. This is often a lengthy process that involves the inspection and approval by a customer of our engineering, documentation, manufacturing and quality control procedures before that customer will place volume orders. Our ability to lessen the adverse effect of any loss of, or reduction in sales to, an existing customer through the rapid addition of one or more new customers is limited because of these qualification requirements. Consequently, the risk that our business, operating results and financial condition would be adversely affected by the loss of, or any reduction in orders by, any of our significant customers is increased. Moreover, if we lose our existing status as a qualified supplier to any of our customers, such customer could cancel its orders from us or otherwise terminate its relationship with us, which could have a material adverse effect on our results of operations and financial condition.

Acquisitions could result in operating and integration difficulties, dilution, margin deterioration, diversion of management's attention, and other consequences that may adversely impact our business and results of operations.

We have made, and may in the future make, acquisitions of, or significant investments in, businesses that offer complementary products, services, technologies or market access. We expect that management will evaluate potential strategic transactions regularly with its advisors and our board of directors in the ordinary course of business. We may not be successful in negotiating the terms of potential acquisitions or financing potential acquisitions, and our due diligence may fail to identify all of the problems, liabilities or other challenges associated with an acquired business, product or technology, including issues related to intellectual property, product quality or product architecture, regulatory compliance practices, revenue recognition or other accounting practices or employee or customer retention issues. In addition, we may not be successful in effectively integrating the acquired business, product or technology into our existing business and operations. The areas where we face risks include:

- management of a larger, more complex and capital intensive, combined business, including integrating supply and distribution channels, computer and accounting systems, and other aspects of operations;

• exposure to new operational risks, rules, regulations, worker expectations, customs and practices to the extent acquired businesses are located in regions where UCT has not historically conducted business;

• inability to complete proposed transactions due to the failure to obtain regulatory or other approvals, litigation or other disputes, and any ensuing obligation to pay a termination fee;

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- deterioration of gross margins due to the acquired company having the same customer base as us, resulting in reduced pricing leverage;
- the failure to realize expected returns from acquired businesses;
- reductions in cash balances or increases in debt obligations to finance the acquisition, which reduce the availability of cash flow for general corporate or other purposes;
- integration of the capabilities of the acquired businesses while maintaining focus on providing consistently high quality products;
- incorporation of different financial and reporting controls, processes, systems and technologies into our existing business environment;
- unforeseen liabilities, expenses, or other losses associated with the acquisitions for which we do not have recourse under their respective agreements;
- the risk of litigation or claims associated with a proposed or completed transaction;
- inadequacy or ineffectiveness of an acquired company's internal financial controls, disclosure controls and procedures, or environmental, health and safety, anti-corruption, human resource or other policies or practices;
- performance shortfalls as a result of the diversion of management's attention from the Company's operations;
- cultural challenges associated with integrating employees from the acquired business into our organization, and incentivization and retention of employees from the businesses we acquire; and
- difficulties associated with the retention and transition of new customers and partners into our existing business.

Our failure to address these risks or other problems encountered in connection with our past or future acquisitions and investments could cause us to fail to realize the anticipated benefits of such acquisitions or investments, incur unanticipated liabilities and substantial costs, and materially harm our business generally.

Our acquisitions could also result in dilutive issuances of our equity securities, the incurrence of debt, contingent liabilities, or amortization expenses, impairment charges and restructuring charges, any of which could harm our financial condition. Also, the anticipated benefits or value of our acquisitions or investments may not materialize. Even if an acquisition or other investment is not completed, we may divert significant management time and effort and incur significant financial cost in evaluating such acquisition or investment, which could have an adverse effect on our results of operations. Furthermore, due to prevailing conditions in the credit market and our existing leverage, the financing of any such acquisition may be difficult to obtain if at all, and the terms of any such financing may not be favorable.

Failure to realize the benefits expected from the QGT acquisition could adversely affect the value of our common stock.

Although we expect significant benefits to result from the QGT acquisition, there can be no assurance that we will actually realize them. Achieving these benefits will depend, in part, on our ability to integrate QGT's business successfully and efficiently. The challenges involved in this integration, which will be complex and time consuming, include the following: preserving customer and other important relationships of QGT; managing effectively a new business and competing in a new industry; consolidating and integrating information technology, finance, general and administrative infrastructures; coordinating sales and marketing efforts to effectively position our capabilities; coordinating and integrating operations in countries in which we have not previously operated; and integrating employees and related HR systems and benefits, maintaining employee morale and retaining key employees. The successful integration of the QGT business will require significant management attention, and may divert the attention of management from our business and operational issues.

If we do not successfully manage these issues and the other challenges inherent in integrating an acquired business, then we may not achieve the anticipated benefits of the QGT acquisition and our revenue, expenses, operating results, financial condition and stock price could be materially adversely affected.

We are exposed to risks associated with volatility in the global economy.

We rely to a significant extent on OEM customers, whose business, in turn, depends largely on consumer spending and capital expenditures by businesses. Uncertainty regarding the global economy may pose challenges to our business. Economic uncertainty may exacerbate negative trends in business and consumer spending and may cause certain of our customers to push out, cancel, or refrain from placing orders for products or services, which may reduce sales and materially affect our results of operations and financial condition. Inflationary trends could also have an impact on labor costs and component costs, reducing our margins. Difficulties in obtaining capital, uncertain market conditions, or reduced profitability may also cause some customers to scale back operations, exit businesses, merge with other manufacturers, or file for bankruptcy protection and potentially cease operations, leading to customers' reduced research and development funding and/or capital expenditures and, in turn, lower orders from our customers and/or additional slow moving or obsolete inventory or bad debt expense for us. These conditions may also similarly affect key suppliers, which could impair their ability to deliver supplies, components or raw materials and result in delays for our products or services or require us to either procure supplies, components or raw materials from higher-cost suppliers, or if no additional suppliers exist, to reconfigure the design and manufacture of our products or services, and we may be unable to fulfill customer orders.

Escalating trade tensions and the adoption or expansion of tariffs and trade restrictions could negatively impact us.

International trade tensions or trade wars, as well as other changes in social, political, regulatory and economic conditions or laws and policies, could have a material adverse effect on our business, financial condition and operating results. The U.S. Government has recently announced tariffs on steel and aluminum products and materials imported into the United States. The U.S. Government has also implemented or announced plans to impose tariffs on a wide-range of goods imported from China, where we and our customers have significant operations. Additionally, various countries and economic regions have announced plans or intentions to impose retaliatory tariffs on a wide-range of products they import from the U.S., and there is a risk that a broader trade conflict could ensue. These newly imposed or threatened U.S. tariffs and retaliatory tariffs could have the effect of increasing the cost of materials for our products, which could result in our products becoming less competitive or generating lower margins. This has the potential to impact global trade and economic conditions in many of the regions where we do business.

The United Kingdom's (UK) pending withdrawal from the European Union (EU), commonly referred to as "Brexit," has created significant uncertainty concerning the future relationship between the UK and the EU and the impact on global markets. It is unclear what financial, trade, regulatory and legal implications the withdrawal of the UK from the EU will have and how such withdrawal will affect us. Furthermore, the announcement of Brexit caused significant volatility in global stock markets and currency exchange rate fluctuations, and the pending withdrawal of the UK from the EU may also adversely affect European and global economic and market conditions, which may cause our customers to closely monitor their costs and reduce their spending budgets. Any of these effects of Brexit, among others, could have a material adverse impact on our business, financial condition and results of operations.

Other changes in U.S. or international social, political, regulatory and economic conditions or laws and policies governing tax laws, foreign trade, manufacturing, and development and investment in the countries where we or our customers operate could also adversely affect our operating results and our business.

We have significant existing indebtedness; the restrictive covenants under our credit agreement or other limitations on financing may limit our ability to expand or pursue our business strategy or make capital expenditures; if we are

forced to pay some or all of our indebtedness prior to its maturity, our financial position could be severely and adversely affected.

We have total debt as of December 28, 2018 of \$341.2 million. Such debt is composed of a \$350.0 million term loan outstanding under our Credit Agreement with Barclays Bank less debt costs of \$11.5 million and \$2.7 million under FDS's revolving credit facility in the Czech Republic.

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Our indebtedness could have adverse consequences including:

- risk associated with any inability to satisfy debt obligations;
- the portion of our cash flows that must be dedicated to interest and principal payments and will not be available for operations, working capital, capital expenditures, expansion, acquisitions or general corporate or other purposes; and
- impairing our ability to obtain additional financing in the future, if needed.

If we are unable to meet our debt obligations as they come due, we could be forced to restructure or refinance such obligations, seek additional equity financing or sell assets, which we may not be able to do on satisfactory terms, or at all. If we determine it is necessary to seek additional funding for any reason, we may not be able to obtain such funding or, if funding is available, may not be able to obtain it on acceptable terms.

Our Credit Agreement contains certain covenants that restrict our ability to take certain actions, including our ability to incur additional debt, including guarantees, create liens, make certain investments, engage in transactions with affiliates and engage in certain mergers and acquisitions.

Our Credit Agreement requires us to maintain certain financial covenants, including compliance with a maximum consolidated total gross leverage ratio and a minimum fixed charge coverage ratio. Our failure to comply with these covenants could result in an event of default which, if not cured or waived, could result in the acceleration of all of our indebtedness, which would materially adversely affect our financial health if we are unable to access sufficient funds to repay all of the outstanding amounts.

As long as our indebtedness remains outstanding, the restrictive covenants and mandatory prepayment provisions could impair our ability to expand or pursue our business strategies or obtain additional funding.

We may not be able to fund our future capital requirements or strategic acquisitions from our operations, and financing from other sources may not be available on favorable terms or at all.

We made capital expenditures of approximately \$29.2 million and \$18.5 million for fiscal years 2018 and 2017, respectively, which primarily related to our ERP system implementation and to investment in our manufacturing facilities in the United States, China and Singapore. The amount of our future capital requirements will depend on many factors, including:

- the cost required to ensure appropriate IT systems;
- the cost required to ensure access to adequate manufacturing capacity;
- the timing and extent of spending to support product development efforts;
- the timing of introductions of new products and enhancements to existing products;
- the timing, size and availability of strategic transactions we may enter into;
- the cost required to integrate our acquisitions into our business, including into our ERP system;
- changing manufacturing capabilities to meet new or increased customer requirements;
- market acceptance of our products; and
- an ability to generate sufficient cash flow from our operating activities.

We regularly consider opportunities for strategic acquisitions. On August 27, 2018, we completed the acquisition of QGT for approximately \$340.8 million in cash consideration, subject to certain post-closing adjustments, and we may pay up to \$15.0 million in earn-out payments if QGT achieves certain specified revenue levels through December 27, 2019. In connection with our acquisition of QGT, we borrowed a total of \$350.0 million under our term loan B facility with Barclays, which was used to finance the acquisition of QGT and, along with existing cash, repay the total outstanding amount under our prior credit facility.

In order to finance our capital expenditures or any future strategic acquisitions, we may need to raise additional funds through public or private equity or debt financing, but such financing may not be available on terms satisfactory to us, or at all. Access to capital markets has, in the past, been unavailable to companies such as ours. In addition, equity financings could be dilutive to holders of our common stock, and debt financings would likely involve additional covenants that restrict our business operations. Any potential strategic acquisition or significant capital expenditure may also require the consent of our existing lenders. If we cannot raise funds on acceptable terms if and when needed, we may not be able to develop or enhance our products, take advantage of future opportunities, including potential acquisitions, grow our business or respond to competitive pressures or unanticipated requirements, any of which could adversely affect our business, operating results and financial condition.

Our quarterly revenue and operating results fluctuate significantly from period to period, and this may cause volatility in our common stock price.

Our quarterly revenue and operating results, including our gross margin, have fluctuated significantly in the past, and we expect them to continue to fluctuate in the future for a variety of reasons which may include:

- demand for and market acceptance of our products and services as a result of the cyclical nature of the industries we serve or otherwise, often resulting in reduced sales during industry downturns and increased sales during periods of industry recovery or growth;
- overall economic conditions;
- changes in the timing and size of orders by our customers;
- loss of business from one or more significant customers due to strategic decisions by our customers to terminate their outsourcing relationship with us or give market share to our competitors, or due to decreased demand for our customers' products by end customers;
- strategic consolidation by our customers;
- cancellations and postponements of previously placed orders;
- pricing pressure from either our competitors or our customers, resulting in the reduction of our product or service prices, margins or loss of market share;
- disruptions or delays in the manufacturing of our products or in the supply of components or raw materials that are incorporated into or used to manufacture our products or provide our services, thereby causing us to delay the shipment of products;
- decreased margins for several or more quarters following the introduction of new products or services, especially as we introduce new subsystems;
- delays in ramp-up in production, low yields or other problems experienced at our manufacturing facilities in China or Singapore;
- changes in design-to-delivery cycle times;
- inability to reduce our costs quickly in step with reductions in our prices or in response to decreased demand for our products;
- changes in our mix of products sold or services;
- write-offs of excess or obsolete inventory due to a customer's bankruptcy or insolvency;
- one-time expenses or charges associated with failed acquisition negotiations or completed acquisitions;
- inability to control our operating costs consistent with target levels;
- announcements by our competitors of new products, services or technological innovations, which may, among other things, render our products less competitive; and
- geographic mix of customer orders or worldwide earnings.

As a result of the foregoing, we believe that quarter-to-quarter comparisons of our revenue and operating results may not be meaningful and that these comparisons may not be an accurate indicator of our future performance. Changes in the timing or terms of a small number of transactions could disproportionately affect our operating results in any particular quarter. Moreover, our operating results in one or more future quarters may fail to meet our guidance or the expectations of securities analysts or investors. If this occurs, we would expect to experience an immediate and significant decline in the trading price of our common stock.

We have established and, as markets will allow, intend to expand our operations in Asia and Europe, which exposes us to risks associated with operating in foreign countries.

We generated approximately 56.7% and 53.6% of our revenues in international markets for fiscal years 2018 and 2017, respectively. Depending on market conditions, we intend to further expand our operations in Asia and Europe. Through our acquisition of QGT, we expanded our operations to several regions outside of the United States, including in South Korea, Taiwan, Ireland, Scotland and Israel, and increased our operations in China and Singapore. The carrying amount of our fixed assets in Asia and Europe were \$83.7 million and \$2.7 million, respectively as of December 28, 2018.

We are exposed to political, economic, legal and other risks associated with operating in Asia and Europe, including:

foreign currency exchange fluctuations;

political, civil and economic instability;

- restrictive governmental actions, such as restrictions on the transfer or repatriation of funds and foreign investments and trade protection measures, including increasing protectionism, import/export restrictions, import/export duties and quotas, trade sanctions and customs duties and tariffs, all of which could increase under the current or future U.S. administration;

uncertainty regarding social, political and trade policies in the United States and abroad;

timing and availability of export licenses;

disruptions to our and our customers' operations due to increased risk of outbreak of diseases, such as SARS and avian flu;

- disruptions in operations due to China's developing domestic infrastructure, including transportation and energy;

difficulties in developing relationships with local suppliers;

difficulties in attracting new international customers;

difficulties in conducting due diligence with respect to business partners in certain international markets;

difficulties in accounts receivable collections;

difficulties in staffing and managing distant international subsidiary and branch operations;

the burden of complying with foreign and international laws and treaties;

legal systems potentially subject to undue influence or corruption; and

potentially adverse tax consequences, including restrictions on the repatriation of earnings to the United States.

Negative or uncertain global conditions could prevent us from accurately forecasting demand for our products and services which could adversely affect our results of operations. In addition, due to generally lower labor and materials costs in the Asian markets in which we currently operate, a shift in the mix of orders from our customers away from such Asian markets or from low cost Asian markets, such as China, to higher cost Asian markets, such as Singapore, could adversely affect our operating margins.

Our operations in Asia and Europe are also subject to U.S. laws governing the export of equipment. These laws are complex and require us to obtain clearances for the export to Asia and Europe of certain equipment. We may fail to comply with these laws and regulations, which could require us to cease the export of certain equipment and expose us to fines or penalties.

Over the past several years, the Chinese government has pursued economic reform policies, including the encouragement of private economic activity and greater economic decentralization. The Chinese government may not continue these policies or may significantly alter them to our detriment from time to time without notice. Changes in laws and regulations or their interpretation, the imposition of confiscatory taxation policies, new restrictions on currency conversion or limitations on sources of supply could materially and adversely affect our Chinese operations, which could result in the partial or total loss of our investment in that country and materially and adversely affect our future operating results.

A significant legal risk associated with conducting business internationally is compliance with the various and differing laws and regulations, including anti-corruption and anti-bribery laws and regulations, of the countries in which we do business, antitrust and competition laws, data privacy laws and export regulations. In addition, the laws in various countries are constantly evolving and may, in some cases, conflict with each other. Although our Code of Business Conduct and Ethics and other policies prohibit us, our employees and our agents from engaging in unethical business practices, there can be no assurance that all of our employees or agents will refrain from acting in violation of our related anti-corruption policies and procedures. Any such violation could have a material adverse effect on our business.

Business practices in Asia may entail greater risk and dependence upon the personal relationships of senior management than is common in North America, and therefore some of our agreements with other parties in South Korea and China could be difficult or impossible to enforce.

Through our acquisition of QGT, we have expanded our business activities in Asia. The business culture in parts of Asia is, in some respects, different from the business cultures in Western countries. Personal relationships among business principals of companies and business entities in Asia are very significant in their business cultures. In some cases, because so much reliance is based upon personal relationships, written contracts among businesses in Asia may be less detailed and specific than is commonly accepted for similar written agreements in Western countries. In some cases, material terms of an understanding are not contained in the written agreement but exist only as oral agreements. In addition, in contrast to the Western business environment where a written agreement specifically defines the terms, rights and obligations of the parties in a legally-binding and enforceable manner, the parties to a written agreement in Asia may view that agreement more as a starting point for an ongoing business relationship which will evolve and undergo ongoing modification over time. As a result, any contractual arrangements we enter into with a counterparty in Asia may be more difficult to enforce.

We could be adversely affected by risks associated with joint ventures, including those in the Asian markets.

From time to time, we may seek to expand our business through investments in joint ventures with complementary businesses, technologies, services or products, subject to our business plans and management's ability to identify, acquire and develop suitable investments or acquisition targets in both new and existing market categories and geographic markets. Our investments in joint ventures are subject to a number of risks, including many of those described for acquisitions above under Risk Factors—"Acquisitions could result in operating and integration difficulties, dilution, margin deterioration, diversion of management's attention, and other consequences that may adversely impact our business and results of operations." In particular, at the closing of the QGT acquisition, we indirectly became a party to QGT's joint venture with Cinos Co., Ltd. ("Cinos") and Cinos Xi'an in South Korea and China, which is our first experience with a joint venture. There can be no assurances that the joint ventures will be successful. The success of

the joint ventures will require significant management and capital resources and there can be no assurances that such resources will be available. Operations at the joint ventures could expose us to increased risks inherent in such activities, such as protection of our intellectual property, economic and political stability, labor matters, language and cultural differences; contractual enforcement issues; and the need to manage product development, operations and sales activities that are located a long distance from our headquarters and have historically been centralized with local management. In addition, from time to time in the future, our joint venture partners may have economic or business interests or goals that are different from ours. Furthermore, our joint venture with Cinos will require us to make purchases of equity from time to time up to specified amounts. If

each joint venture business does not progress according to our plans and anticipated timing, our investment in the joint ventures may not be successful.

The industries in which we participate are highly competitive and rapidly evolving, and if we are unable to compete effectively, our operating results will be harmed.

We face intense competition from subsystem and component manufacturers in the industries we serve. Increased competition has in the past resulted, and could in the future result, in price reductions, reduced gross margins or loss of market share, any of which would harm our operating results. We are subject to significant pricing pressure as we attempt to maintain and increase market share with our existing customers. Competitors may offer reduced prices or introduce new products for the markets currently served by our products. These products may have better performance, lower prices and achieve broader market acceptance than our products. Further, OEMs typically own the design rights to their products and may provide these designs to other subsystem manufacturers. If our competitors obtain proprietary rights to these designs such that we are unable to obtain the designs necessary to manufacture products for our OEM customers, our business, financial condition and operating results could be adversely affected. The cleaning and analytical process are proprietary to QuantumClean and ChemTrace, respectively, and are subject to less risk of from cleaning, coating and analytics competitors. OEMs are looking to increase their maintenance services and could create proprietary cleaning processes with competitors, limiting our ability to compete for future business.

Our competitors may have greater financial, technical, manufacturing and marketing resources than we do. As a result, they may be able to respond more quickly to new or emerging technologies and changes in customer requirements, devote greater resources to the development, promotion, sale and support of their products and services, and reduce prices to increase market share. Moreover, there may be merger and acquisition activity among our competitors and potential competitors that may provide our competitors and potential competitors an advantage over us by enabling them to expand their product offerings and service capabilities to meet a broader range of customer needs. Further, if one of our customers develops or acquires the internal capability to develop and produce critical subsystems that we produce, or cleaning, coating and analytical services we provide, the loss of that customer could have a material adverse effect on our business, financial condition and operating results. The introduction of new technologies and new market entrants may also increase competitive pressures.

If our new products are not accepted by OEMs or other customers or if we are unable to obtain historical margins on our new products, our operating results would be adversely impacted.

We design, develop and market critical subsystems and proprietary cleaning, coating and analytical services to OEMs, IDMs and other customers. The introduction of new products and processes is inherently risky because it is difficult to foresee the adoption of new standards, coordinate our technical personnel and strategic relationships and win acceptance of new products by OEMs, IDMs and other customers. We may not be able to recoup design and development expenditures if our new products are not accepted by OEMs, IDMs or other customers. Newly introduced products typically carry lower gross margins than existing products for several or more quarters following their introduction. If any of our new systems or subsystems are not successful in the market, or if we are unable to obtain gross margins on new products that are similar to the gross margins we have historically achieved, our business, operating results and financial condition could be adversely affected.

Our business may be adversely affected by information technology, disruptions, including by impairing our ability to effectively deliver our products or services, which could cause us to lose customers and harm our results of operations.

The manufacture and delivery of our products, the provision of our services and our financial reporting depends on the continuing operation of our technology infrastructure and systems, particularly our data center located in California.

Any damage to or failure of our systems could result in interruptions in our ability to manufacture or deliver products or services on agreed upon lead times, or at all, on a local or worldwide basis, or adversely affect our impact to accurately and timely report our financial results. Interruptions could reduce our sales and profits, and our reputation could be damaged if people believe our systems are unreliable. Our systems and operations are vulnerable to damage or interruption from earthquakes, terrorist attacks, floods, fires, power loss, hardware or software failures, telecommunications failures, cybersecurity attacks, and similar events. Some of the

critical components of our system are not redundant and we currently do not have a backup data center. Accordingly, the risk associated with such events beyond our control is heightened.

Cybersecurity attacks, in particular, are evolving and include, but are not limited to, malicious software, attempts to gain unauthorized access to data, and other electronic security breaches that could lead to disruptions in systems, unauthorized release of confidential or otherwise protected information and corruption of data (our own or that of third parties). Although we have adopted certain measures to mitigate potential risks to our systems from information technology-related disruptions, given the unpredictability of the timing, nature and scope of such disruptions, we could potentially be subject to production downtimes, operational delays, other detrimental impacts on our operations or ability to provide products and services to our customers, the compromising of confidential or otherwise protected information, misappropriation, destruction or corruption of data, security breaches, other manipulation or improper use of our systems or networks, financial losses from remedial actions, loss of business or potential liability, and/or damage to our reputation, any of which could have a material adverse effect on our business, financial condition, results of operations and cash flows.

If we experience frequent or persistent system failures, the attractiveness of our products or services to customers could be permanently harmed. Any steps we take to increase the reliability and redundancy of our systems may be expensive, reduce our operating margin and may not be successful in reducing the frequency or duration of unscheduled interruptions.

If we were required to write down all or part of our goodwill, our net income and net worth could be materially adversely affected.

We had \$150.2 million of goodwill recorded on our consolidated balance sheet as of December 28, 2018. Goodwill represents the excess of cost over the fair market value of net tangible and finite lived, identifiable intangible assets acquired in business combinations. If our market capitalization drops significantly below the amount of net equity recorded on our balance sheet, it could indicate a decline in our value and would require us to further evaluate whether our goodwill has been impaired. During the fourth quarter of each year, we perform an annual review of our goodwill to determine if it has become impaired. We also evaluate goodwill for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. If we were required to write down all or a significant part of our goodwill, our financial results and net worth could be materially adversely affected.

Our business is largely dependent on the know-how of our employees, and we generally do not have an intellectual property position that is protected by patents.

Our business is largely dependent upon our design, engineering, manufacturing, chemical processing, analytical and testing know-how. We rely on a combination of trade secrets and contractual confidentiality provisions and, to a much lesser extent, patents, copyrights and trademarks to protect our proprietary rights. Confidentiality agreements with our employees and others may not adequately prevent disclosure of trade secrets and other proprietary information. Accordingly, our intellectual property position is more vulnerable than it would be if it were protected primarily by patents. If we fail to protect our proprietary rights successfully, our competitive position could suffer, which could harm our operating results. We may be required to spend significant resources to monitor and protect our proprietary rights, and, in the event infringement or breach of our proprietary rights occurs, our competitive position in the market may be harmed. In addition, competitors may design around our technology or develop competing technologies and know-how. Further, since our customers generally own the designs and other intellectual property to the products we manufacture, we cannot prevent them from licensing such designs and other intellectual property to our competitors for the manufacture of such products.

Third parties have claimed and may in the future claim we are infringing their intellectual property, which could subject us to litigation or licensing expenses, and we may be prevented from selling our products if any such claims prove successful.

We have in the past and may in the future receive claims that our products, processes or technologies infringe the patents or other proprietary rights of third parties. In addition, we may be unaware of intellectual property rights of others that may be applicable to our products. Any litigation regarding our patents or other intellectual property could be costly and time-consuming and divert the attention of our management and key personnel from our business operations, any of which could have a material adverse effect on our business and results of operations. The complexity of the technology involved in our products and the uncertainty of intellectual property litigation increase

these risks. Claims of intellectual property infringement may also require us to enter into costly license agreements. However, we may not be able to obtain licenses on terms acceptable to us, or at all. We also may be subject to significant damages or injunctions against the development, manufacture and sale of certain of our products if any such claims prove successful. We also rely on design specifications and other intellectual property of our customers in the manufacture of products for such customers. While our customer agreements generally provide for indemnification of us by our customers if we are subjected to litigation for third-party claims of infringement of such intellectual property, such indemnification provisions may not be sufficient to fully protect us from such claims, or our customers may breach such indemnification obligations to us, which could result in costly litigation to defend against such claims or enforce our contractual rights to such indemnification.

If we do not keep pace with developments in the industries we serve and with technological innovation generally, our products may not be competitive.

Rapid technological innovation in the markets we serve requires us to anticipate and respond quickly to evolving customer requirements and could render our current product or service offerings and technology obsolete. Technological innovations are inherently complex. We must devote resources to technology development in order to keep pace with such rapidly evolving technologies. We believe that our future success will depend upon our ability to design, engineer and manufacture products and services that meet the changing needs of our customers. This requires that we successfully anticipate and respond to technological changes in design, engineering and manufacturing processes, as well as cleaning and analytical processes, in a cost-effective and timely manner. If we are unable to integrate new technical specifications into competitive product and service designs, develop the technical capabilities necessary to manufacture new products or provide new services or make necessary modifications or enhancements to existing products or services, our business prospects could be harmed.

The timely development of new or enhanced products and services is a complex and uncertain process which requires that we:

- design innovative and performance-enhancing features that differentiate our products and services from those of our competitors;
- identify emerging technological trends in the industries we serve, including new standards for our products and services;
- accurately identify and design new products and services to meet market needs;
- collaborate with OEMs to design and develop products and IDMs to design and develop services on a timely and cost-effective basis;
- ramp-up production of new products, especially new subsystems, in a timely manner and with acceptable yields at acceptable costs;
- successfully manage development production cycles; and
- respond effectively to technological changes or product or service announcements by others.

If we are unsuccessful in keeping pace with technological developments for the reasons above or other reasons, our business prospects, results of operations and financial condition could be materially and adversely affected.

We must achieve design wins to retain our existing customers and to obtain new customers.

New capital equipment typically has a lifespan of several years, and OEMs frequently specify which systems, subsystems, components and instruments are to be used in their equipment. Once a specific system, subsystem, component or instrument is incorporated into a piece of capital equipment, it will likely continue to be incorporated into that piece of equipment for at least several months before the OEM would be in a position to switch to the product of another supplier. IDMs typically establish cleaning, coating, and analytical services as they develop and qualify new chip designs for production. Once a cleaned or coated part has been qualified, the associated

refurbishment processes are likely to continue to be used. Accordingly, it is important that our products are designed into the new capital equipment of OEMs and new chip designs, which we refer to as a design win, in order to retain our competitive position with existing customers and to obtain new customers.

We incur technology development and sales expenses with no assurance that our products will ultimately be designed into an OEM's capital equipment. Further, developing new customer relationships, as well as maintaining and increasing our market share with existing customers, requires a substantial investment of our sales, engineering and management resources without any assurance from prospective customers that they will place significant orders. We believe that OEMs and IDMs often consider long-term relationships in selecting and placing orders with suppliers. Accordingly, we may have difficulty achieving design wins from OEMs and IDMs that are not currently our customers. Our operating results and potential growth could be adversely affected if we fail to achieve design wins with leading OEMs and IDMs.

Defects in our products could damage our reputation, decrease market acceptance of our products, cause the unintended release of hazardous materials, and result in potentially costly litigation, indemnification liability or unexpected warranty claims.

A number of factors, including design flaws, material and component failures, workmanship issues, contamination in the manufacturing, cleaning, coating or analytical environment, impurities in the materials or chemicals used and unknown sensitivities to process conditions, such as temperature and humidity, as well as equipment failures, may cause our products to contain undetected errors or defects. Problems with our products may:

- cause delays in product introductions and shipments for us or our customers;
- result in increased costs and diversion of development resources;
- cause us to incur increased charges due to unusable inventory;
- require design modifications;
- result in liability for the unintended release of hazardous materials or other damages to our or our customers' property;
- create claims for rework, replacement and/or damages under our contracts with customers, as well as indemnification claims from customers;
- decrease market acceptance of, or customer satisfaction with, our products, which could result in decreased sales and product returns; or
- result in lower yields for semiconductor manufacturers.

If any of our products contain defects or have reliability, quality or compatibility problems, our reputation might be damaged and customers might be reluctant to buy our products or services. We may also face a higher rate of product defects as we increase our production levels. Product defects could result in warranty and indemnification liability, the loss of existing customers or impair our ability to attract new customers. In addition, we may not find defects or failures in our products until after they are installed in a manufacturer's fabrication facility. We may have to invest significant capital and other resources to correct these problems. Our current or potential customers also might seek to recover from us any losses resulting from defects or failures in our products. Hazardous materials flow through and are controlled by our products and an unintended release of these materials could result in serious injury or death. Liability claims could require us to spend significant time and money in litigation or pay significant damages or indemnification claims.

Fluctuations in currency exchange rates may adversely affect our financial condition and results of operations.

Our international revenues are denominated primarily, though not entirely, in U.S. dollars. Many of the costs and expenses associated with our international operations are paid in foreign currencies, including Chinese Renminbi, Singapore dollars, Japanese Yen, South Korean won and Euro and we expect our exposure to these foreign currencies to increase as we increase production in those facilities. Changes in exchange rates among other currencies in which our revenue or costs are denominated and the U.S. dollar may affect our revenue, cost of sales and operating margins.

The Company uses derivative instruments, such as foreign currency forward contracts, to hedge certain exposures to fluctuations in foreign currency exchange rates. The use of such hedging activities may not offset any, or more than a portion, of the adverse financial effects of unfavorable movements in foreign exchange rates over the limited time the hedges are in place.

The market for our stock is subject to significant fluctuation.

The size of our public market capitalization is relatively small, and the average volume of our shares that are traded is relatively low. The market price of our common stock could be subject to significant fluctuations. Among the factors that could affect our stock price are:

- quarterly variations in our operating results;
- our ability to successfully introduce new products and services and manage new product transitions;
- changes in revenue or earnings estimates or publication of research reports by analysts;
- speculation in the press or investment community;
- strategic actions by us, our customers or our competitors, such as acquisitions or restructurings;
- announcements relating to any of our key customers, significant suppliers or the semiconductor manufacturing and capital equipment industry generally;
- general market conditions;
- the effects of war and terrorist attacks; and
- domestic and international economic or political factors unrelated to our performance.

The stock markets in general, and the markets for technology stocks in particular, have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. These broad market fluctuations may adversely affect the trading price of our common stock.

The technology labor market is very competitive, and our business will suffer if we are unable to effectively hire, promote and retain key personnel.

Our future success depends in part on the continued service of our key executive officers, as well as our research, engineering, sales, manufacturing and administrative personnel, most of whom are not subject to employment or non-competition agreements. In addition, competition for qualified personnel in the technology industry is intense, and we operate in geographic locations in which labor markets are particularly competitive.

Our business is particularly dependent on expertise which only a limited number of engineers possess. The loss of any of our key employees and officers, including our Chief Executive Officer, our Chief Financial Officer, any of our Executive or Senior Vice Presidents or any of our other senior managers, or the failure to attract, promote and retain qualified employees, could adversely affect our business, operating results and financial condition.

Management transition also creates uncertainties and could harm our business. Disruption to our organization as a result of executive management transition could divert the executive management's attention away from certain key areas of our business and have a material adverse effect on our business, financial condition and results of operations.

The challenges of employee retention has also increased during the integration process with the companies we have acquired because of the necessity of combining personnel with varied business backgrounds and combining different corporate cultures and objectives, and several acquired employees, including members of the acquired companies' senior management, have left our company. The process of integrating operations and making such adjustments could cause an interruption of, or loss of momentum in, the activities of one or more of our businesses and the loss of key personnel. Employee uncertainty, lack of focus or turnover during the integration process may also disrupt our businesses.

If we fail to maintain an effective system of internal controls, we might not be able to report our financial results accurately or prevent fraud; in that case, our stockholders could lose confidence in our financial reporting, which would harm our business and could negatively impact the price of our stock.

Effective internal controls are necessary for us to provide reliable financial reports and prevent fraud. In addition, Section 404 of the Sarbanes-Oxley Act of 2002 requires us and our independent registered public accounting firm to evaluate and report on our internal control over financial reporting. The process of designing, implementing, maintaining and updating our internal controls and complying with Section 404 is expensive and time consuming, and requires significant attention from management and company resources. In addition, following the expiration of applicable grace periods, we are required to evaluate and report on the internal controls of the companies we acquire, and the attestation report we are required to obtain from our independent registered public accounting firm must include the internal control over financial reporting of the companies we acquire. Integrating acquired companies' internal control frameworks into the Company and upgrading acquired companies' controls to comply with the Sarbanes-Oxley Act has required and will require substantial resources, and we cannot assure you that we will be able to successfully or effectively maintain adequate controls over our financial processes at our acquired companies, or for our consolidated business. In addition, even though we have concluded, and our independent registered public accounting firm has concurred, that our internal control over financial reporting provides reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles as of December 28, 2018, because of its inherent limitations may not be effective as of future periods. Failure to maintain existing or implement new or improved controls, or difficulties encountered in their implementation, could harm our results of operations or cause us to fail to meet our reporting obligations. If we or our independent registered public accounting firm discover a material weakness, the disclosure of that fact, even if quickly remedied, could reduce the market's confidence in our financial statements and harm our stock price.

If environmental contamination were to occur in one of our production facilities, we could be subject to substantial liabilities.

We use substances regulated under various foreign, domestic, federal, state and local environmental laws and regulations in our facilities. In addition, we may not be aware of or in compliance with all environmental laws or regulations that could subject us to liability in the U.S. or internationally. Our failure or inability to comply with existing or future environmental requirements could result in significant remediation and other liabilities, the imposition of fines or the suspension or termination of the production of our services or products, and thus a material adverse impact on our business.

Our business is subject to the risks of earthquakes, fire, power outages, floods, and other catastrophic events, and to interruption by man-made disruptions, such as terrorism.

Our facilities could be subject to a catastrophic loss caused by natural disasters, including fires and earthquakes. We have facilities in areas with above average seismic activity, such as our facilities in South San Francisco, California, Hayward, California and our Taiwan facilities in Hsinchu and Tainan. If any of our facilities were to experience a catastrophic loss, it could disrupt our operations, delay production and shipments, reduce revenue and result in large expenses to repair or replace the facility. In addition, we have in the past experienced, and may in the future experience, fires and extended power outages at our facilities, such as the fire that occurred at a plant operated by our joint venture, Cinos, in Balan, Republic of Korea, which we announced on September 19, 2018. We do not carry insurance policies that cover potential losses caused by earthquakes or other natural disasters or power loss.

In addition, disruption in supply resulting from natural disasters or other casualties or catastrophic events, such as earthquakes, severe weather such as storms or floods, fires, labor disruptions, power outages, terrorist attacks or

political unrest, may result in certain of our suppliers being unable to deliver sufficient quantities of components or raw materials at all or in a timely manner, disruptions in our operations or disruptions in our customers' operations. For example, in 2011, the northern region of Japan experienced a severe earthquake followed by a tsunami. These geological events caused significant damage in that region and adversely affected Japan's infrastructure and economy. Some of our suppliers are located in Japan and they experienced, and may experience in the future, shutdowns or disruptions as a result of these types of events, and their operations may be negatively

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impacted by these events. Many of our customers and suppliers are also located in California, and may be subject to the same risk of seismic activity as described for us above.

To the extent that natural disasters or other calamities or casualties should result in delays or cancellations of customer orders, or the delay in the manufacture or shipment of our products or services, our business, financial condition and operating results would be adversely affected.

Changes in tax rates or tax assets and liabilities could affect results of operations.

As a global company, we are subject to taxation in the United States and various other countries. Significant judgment is required to determine and estimate worldwide tax liabilities. Our future annual and quarterly tax rates could be affected by numerous factors, including changes in the: (1) applicable tax laws; (2) amount and composition of pre-tax income in countries with differing tax rates; or (3) valuation of our deferred tax assets and liabilities.

On December 22, 2017, the Tax Act Cuts and Jobs (“TCJA”) was signed into law. The TCJA contains significant changes to corporate taxation, including reduction of the corporate tax rate from 35% to 21%, additional limitations on the tax deductibility of interest, substantial changes to the taxation of foreign earnings, immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modification or repeal of many business deductions and credits. The Company has made reasonable estimates of the financial impact of the TCJA on the Company. However, the estimates are provisional and a change in estimate can have an impact on our results of operations, cash flows and financial conditions, as well as the trading price of our Common Stock. UCT will continue to analyze the effects of the TCJA on its financial statements and operations. Additional impacts from the enactment of the TCJA will be recorded as they are identified during the one-year measurement period as provided for in SEC Staff Accounting Bulletin 118.

In addition, we are subject to regular examination by the Internal Revenue Service and other tax authorities, and from time to time we initiate amendments to previously filed tax returns. We regularly assess the likelihood of favorable or unfavorable outcomes resulting from these examinations and amendments to determine the adequacy of our provision for income taxes, which requires estimates and judgments. Although we believe our tax estimates are reasonable, there can be no assurance that the tax authorities will agree with such estimates. We may have to engage in litigation to achieve the results reflected in the estimates, which may be time-consuming and expensive. There can be no assurance that we will be successful or that any final determination will not be materially different from the treatment reflected in our historical income tax provisions and accruals, which could materially and adversely affect our financial condition and results of operations.

Certain regulations related to conflict minerals could adversely impact our business.

The Dodd-Frank Wall Street Reform and Consumer Protection Act contains provisions to improve transparency and accountability concerning the supply of certain minerals, known as conflict minerals, originating from the Democratic Republic of Congo (DRC) and adjoining countries. As a result, in August 2012 the SEC adopted annual disclosure and reporting requirements for those companies who use conflict minerals mined from the DRC and adjoining countries in their products. These requirements require us to perform ongoing due diligence efforts on our supply chain and require public disclosure of the nature and results of these efforts. We filed our most recent conflict minerals report on Form SD on May 30, 2018 reporting that we could not yet determine whether the conflict minerals we source were, directly or indirectly, used to finance or benefit armed groups in the Covered Countries. There have been and there will be costs associated with complying with these disclosure requirements to determine the sources of conflict minerals used in our products and other potential changes to products, processes or sources of supply as a consequence of such verification activities. Complying with these rules could adversely affect the sourcing, supply and pricing of materials used in our products and result in substantial additional costs. As there may be only a limited

number of suppliers offering “conflict free” conflict minerals, we cannot be sure that we will be able to obtain necessary conflict minerals from such suppliers in sufficient quantities or at competitive prices. Also, we may face reputational challenges if we determine that certain of our products contain minerals not determined to be conflict free or if we are unable to sufficiently verify the origins for all conflict minerals used in our products through the procedures we may implement. In addition, there is uncertainty about the future of the regulations related to conflict minerals as a result of legal challenges and statements by the SEC. If we are unable to comply with these rules, we could be subject to enforcement actions by the Securities and Exchange Commission

and liability under the Securities Exchange Act of 1934, as amended, which could result in material adverse consequences to our business, as well as significant fines and penalties.

If securities or industry analysts do not publish research or reports about our business, or if they issue an adverse opinion regarding our stock, our stock price and trading volume could decline.

The trading market for our common stock is influenced by the research and reports that industry or securities analysts publish about us or our business. If any of the analysts who cover us issue an adverse opinion regarding our stock, our stock price would likely decline. If one or more of these analysts ceases coverage of our company or fails to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline.

We do not currently intend to pay dividends on our common stock and, consequently, your ability to achieve a return on your investment will depend on appreciation in the price of our common stock.

We do not intend to declare and pay dividends on our capital stock for the foreseeable future. We currently intend to invest our future earnings, if any, to fund our growth. Additionally, the terms of our credit agreement also restrict our ability to pay dividends. Therefore, you are not likely to receive any dividends on your common stock for the foreseeable future.

From time to time, we may become involved in other litigation and regulatory proceedings, which could require significant attention from our management and result in significant expense to us and disruptions to our business.

In addition to any litigation related to our intellectual property rights, we may in the future be named as a defendant from time to time in other lawsuits and regulatory actions relating to our business, such as commercial contract claims, environmental compliance claims, employment claims and tax examinations, some of which may claim significant damages or cause us reputational harm. Due to the inherent uncertainties of litigation and regulatory proceedings, we cannot predict the ultimate outcome of any such proceeding. An unfavorable outcome could have a material adverse effect on our business, financial condition and results of operations or limit our ability to engage in certain of our business activities. In addition, regardless of the outcome of any litigation or regulatory proceeding, such proceedings are often expensive, time-consuming and disruptive to normal business operations and require significant attention from our management. As a result, any such lawsuits or proceedings could materially adversely affect our business, financial condition and results of operations.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

UCT's headquarters is located in Hayward, California and its QGT subsidiary's headquarters is located in Quakertown, Pennsylvania. These facilities provide administrative, sales and support, engineering and technology development and manufacturing operations. The leases for these facilities expire in 2021 and 2022, respectively.

The Company has manufacturing and engineering facilities in Hayward, South San Francisco and Fremont, California, Austin, Texas, Chandler, Arizona; Shanghai, China; Singapore; Cebu, Philippines and Liberec, Czech Republic. The Company has parts cleaning, analytics and engineering facilities in Colorado Springs, Colorado; Phoenix, Arizona; San Jose, California; Fremont, California; Hillsboro, Oregon; Portland, Oregon; Scarborough, Maine; Carrollton, Texas; Israel, Taiwan, South Korea and Singapore. These facilities have leases that expire on various dates through 2031 and are subject to periodic changes.

We also own buildings and land that are located in South Korea, China and the United Kingdom.

We believe that our existing facilities are well-maintained and in good operating condition.

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The table below lists our properties as of March 22, 2019:

Location	Principal Use	Square Footage	Ownership
Hayward, California	Headquarters, manufacturing, sales, engineering, technology development	148,855	Leased
South San Francisco, California	Manufacturing, engineering	123,847	Leased (1)
Fremont, California	Manufacturing, engineering	9,000	Leased
Austin, Texas	Manufacturing, engineering	56,400	Leased
Chandler, Arizona	Manufacturing	127,301	Leased
Cebu, Philippines	Manufacturing	15,726	Leased
Singapore	Manufacturing, customer support	161,814	Leased
Shanghai, China	Manufacturing	154,068	Leased
Czech Republic	Manufacturing, customer support	97,171	Leased
Quakertown, Pennsylvania	Headquarters	8,077	Leased
Colorado Springs, Colorado	Parts Cleaning	14,000	Leased
Scarborough, Maine	Parts Cleaning	20,000	Leased
San Jose, California	Parts Cleaning	20,130	Leased
Fremont, California	Parts Cleaning, R&D, Laboratory & Recycling	59,161	Leased
Hillsboro, Oregon	Parts Cleaning	61,334	Leased
Portland, Oregon	Testing & Parts Cleaning	5,156	Leased
Phoenix, Arizona	Parts Cleaning	72,884	Leased
Carrollton, Texas	Parts Cleaning	121,968	Leased
Quiryat Gat, Israel	Parts Cleaning	56,758	Leased
Fife, Scotland, United Kingdom	Parts Cleaning	26,658	Own
Singapore	Parts Cleaning	55,122	Leased
Hukou Township, Taiwan	Parts Cleaning	30,354	Leased
Tainan, Taiwan	Parts Cleaning	90,000	Leased
Gyeonggi-do, South Korea	Parts Cleaning	40,000	Leased
Gyeonggi-do, South Korea	Parts Cleaning	157,453	Own
Hwaseong-si, South Korea	Parts Cleaning	95,814	Own
Xi'an, China	Parts Cleaning	66,185	Own

(1) We lease this facility from one of our directors. We incurred rent expense resulting from the lease of this facility of \$0.3 million for each of fiscal years 2018 and 2017.

Item 3. Legal Proceedings

From time to time, we are subject to various legal proceedings and claims, either asserted or unasserted, that arise in the ordinary course of business. Although the outcome of the various legal proceedings and claims cannot be predicted with certainty, we have not had a history of outcomes to date that have been material to our statement of operations and do not believe that any of these proceedings or other claims will have a material adverse effect on our consolidated financial condition or results of operations.

Item 4. Mine Safety Disclosures

Not applicable.

PART II

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

Our common stock has been traded on the NASDAQ Global Market under the symbol "UCTT" since March 25, 2004. The following table sets forth for the periods indicated the high and low sales prices per share of our common stock as reported by the NASDAQ Global Market:

	High	Low
Fiscal year 2017		
First quarter	\$ 16.99	\$ 9.42
Second quarter	\$ 26.21	\$ 14.93
Third quarter	\$ 30.92	\$ 18.41
Fourth quarter	\$ 34.59	\$ 18.86
Fiscal year 2018		
First quarter	\$ 27.20	\$ 16.29
Second quarter	\$ 19.59	\$ 15.36
Third quarter	\$ 17.35	\$ 12.28
Fourth quarter	\$ 13.00	\$ 6.94

To date, we have not declared or paid cash dividends to our stockholders and we do not intend to do so for the foreseeable future in order to retain earnings for use in our business. Our credit facility also limits our ability to pay dividends. As of February 22, 2019, we had three stockholders of record.

Recent Sales of Unregistered Sales of Equity Securities

None.

Purchase of Equity Securities by the Issuer and Affiliated Purchasers

None.

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Item 6. Selected Consolidated Financial Data

You should read the following tables in conjunction with other information contained under “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” our consolidated financial statements and related notes and other financial information contained elsewhere in this Annual Report on Form 10-K.

Statements of Operations Data (in thousands, except per share amounts):

	Years Ended				
	12/28/2018**	12/29/2017	12/30/2016	12/25/2015*	12/26/2014
Consolidated Statements of Operations Data:					
Revenues	\$ 1,096,523	\$ 924,351	\$ 562,759	\$ 469,103	\$ 513,957
Cost of goods sold	920,682	756,722	475,976	398,073	440,824
Gross profit	175,841	167,629	86,783	71,030	73,133
Operating expenses, excluding acquisition costs	105,134	78,232	64,392	64,605	54,949
Acquisition costs	10,003	—	—	584	—
Income from operations	60,704	89,397	22,391	5,841	18,184
Interest expense and other, net	(8,436)	(2,455)	(3,444)	(2,234)	(1,854)
Income before income taxes	52,268	86,942	18,947	3,607	16,330
Income tax provision	15,319	11,857	8,896	14,339	4,973
Net income (loss)	36,949	75,085	10,051	(10,732)	11,357
Net income attributable to noncontrolling interest	353	—	—	—	—
Net income (loss) attributable to Ultra					
Clean Holdings, Inc.	\$ 36,596	\$ 75,085	\$ 10,051	\$ (10,732)	\$ 11,357
Net income (loss) per share attributable to Ultra					
Clean Holdings, Inc. common stockholders:					
Basic	\$ 0.95	\$ 2.25	\$ 0.31	\$ (0.34)	\$ 0.39
Diluted	\$ 0.94	\$ 2.19	\$ 0.30	\$ (0.34)	\$ 0.38
Shares used in computing net income (loss)					
per share:					
Basic	38,366	33,409	32,632	31,564	29,301
Diluted	38,919	34,303	33,150	31,564	29,936

Consolidated Balance Sheet Data (in thousands):

	12/28/2018**	12/29/2017	12/30/2016	12/25/2015*	12/26/2014
Cash & cash equivalents	\$ 144,145	\$ 68,306	\$ 52,465	\$ 50,103	\$ 78,997
Working capital	\$ 323,627	\$ 200,101	\$ 136,389	\$ 125,428	\$ 142,279
Total assets	\$ 965,477	\$ 563,412	\$ 380,697	\$ 336,153	\$ 296,142
Bank borrowings and long-term debt	\$ 341,220	\$ 52,274	\$ 67,750	\$ 75,539	\$ 48,155

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Other long term liabilities	\$ 43,642	\$ 6,556	\$ 3,291	\$ 3,769	\$ 2,948
Total stockholders' equity	\$ 450,988	\$ 300,305	\$ 216,131	\$ 200,943	\$ 188,552

*Includes the results of operations of Thermal and FDS for the period February 5, 2015 through December 25, 2015 and for the period from July 31, 2015 to December 25, 2015, respectively.

**Include the results of operations of QGT for the period from August 27, 2018 to December 28, 2018. See Note 5 to the Notes to Consolidated Financial Statements for further information.

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

This section and other parts of this Annual Report on Form 10-K contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. These statements involve risks and uncertainties. Forward-looking statements can also be identified by words such as “anticipate,” “believe,” “estimate,” “expect,” “intend,” “might,” “plan,” “project,” “will,” “would,” “should,” “could,” “can,” “predict,” “potential,” “continue,” “objective,” and similar. Forward-looking statements are not guarantees of future performance and our actual results may differ significantly from the results discussed in the forward-looking statements. Factors that might cause such differences include, but are not limited to, those discussed in “Item 1A — Risk Factors” above. The following discussion should be read in conjunction with the consolidated financial statement and notes thereto included in Item 8 of this report. We assume no obligation to revise or update any forward-looking statements for any reason, except as required by law.

Overview

We are a global leader in the design, engineering, and manufacture of production tools, modules and subsystems for the semiconductor capital equipment industry and industry segments with similar requirements including display, consumer and medical. We focus on providing specialized engineering and manufacturing solutions for these applications. We enable our customers to realize lower manufacturing costs and reduced design-to-delivery cycle times while maintaining high quality standards.

With our acquisition of Quantum Global Technologies, LLC (“QGT”), on August 27, 2018, a leader in parts cleaning, coating and semiconductor Fab-related analytical services, we expanded our capabilities to provide ultra-high purity parts cleaning, process tool part recoating, surface treatment, and analytical services to the semiconductor and related industries. The results of operations for 2018 and the discussion below reflect approximately four months of activity resulting from the acquisition of QGT.

In August 2018, we sold all outstanding common stock of UCT Additive Manufacturing Center PTE. LTD. (“UAMC”), our 3D printing initiative, which was set up and launched in Singapore in November of 2014 to develop additive manufacturing capabilities for our existing customer base, for \$0.1 million, in the form of \$0.3 million note receivable from the purchaser and \$0.2 of payables retained by us. As a result of this transaction, we recognized a loss of \$1.1 million.

We ship a significant number majority of our products and serviced parts to U.S. registered customers with locations both in and outside the U.S. In addition to U.S. manufacturing and service operations, we manufacture products and provide parts cleaning and other related services in our Asian and European facilities to support local and U.S. based customers. We conduct our operating activities primarily through our subsidiaries, Ultra Clean Technology Systems and Service, Inc., AIT, Ultra Clean Micro-Electronics Equipment (Shanghai) Co., Ltd., Ultra Clean Asia Pacific, Pte, Ltd., UCT Thermal Solutions, Inc., UCT Fluid Delivery Solutions s.r.o. and QGT.

Results of Operations

The following table sets forth income statement data for the periods indicated as a percentage of revenue:

	Year Ended		
	December 28, 2018	December 29, 2017	December 30, 2016
Revenues	100.0 %	100.0 %	100.0 %
Cost of goods sold	84.0	81.9	84.6
Gross profit	16.0	18.1	15.4
Operating expenses:			
Research and development	1.2	1.3	1.8
Sales and marketing	1.5	1.5	2.1
General and administrative	7.8	5.6	7.6
Total operating expenses	10.5	8.4	11.5
Income from operations	5.5	9.7	3.9
Interest and other income (expense), net	(0.8)	(0.3)	(0.6)
Income before provision for income taxes	4.7	9.4	3.3
Income tax provision	1.4	1.3	1.6
Net income	3.3	8.1	1.7
Net income attributable to noncontrolling interest	0.0	0.0	0.0
Net income attributable to Ultra Clean Holdings, Inc.	3.3 %	8.1 %	1.7 %

Fiscal Year 2018 Compared With Fiscal Year 2017

Revenues

Revenues for fiscal year 2018 increased \$172.1 million, or 18.6% to \$1,096.5 million from \$924.4 million for fiscal year 2017. The increase in revenues reflects an increase in semiconductor sales of \$163.6 million and an increase in non-semiconductor revenues of \$8.5 million. The increase in overall revenues for fiscal year 2018 compared to the same period in fiscal year 2017 was due primarily to an increase in the volume of products shipped, which was attributable to an increase in customer demand and due to the acquisition of QGT in 2018. On a geographic basis, revenues in the U.S. increased \$46.7 million to \$475.3 million, or 43.3% of revenues, for the year ended December 28, 2018 as compared to \$428.6 million, or 46.4% of revenues for the same period of 2017. Foreign revenues increased by \$125.4 million to \$621.2 million, or 56.7% of revenues, for the year ended December 28, 2018 compared to \$495.8 million, or 53.6% of revenues, for the same period of 2017. The increase in foreign revenues is due primarily to the continuing migration of certain business with a U.S. customer from our U.S. operations to our Singapore location, increased demand for our products in our foreign locations and, in part to the foreign operations of QGT.

Gross Profit

Cost of goods sold consists primarily of purchased materials, labor and overhead, including depreciation related to certain capital assets associated with the design and manufacture of products sold. Gross profit for fiscal year 2018 increased \$8.2 million to \$175.8 million, or 16.0% of revenues, from \$167.6 million, or 18.1% of revenues, for fiscal year 2017. Our gross profit increased in fiscal year 2018 from the comparable period in 2017 due to higher sales

volume. Our gross margin decreased in fiscal year 2018 from the comparable period in 2017 due mostly to a change in product mix of existing products with higher costs as well as an accelerated ramp of new products with higher costs required to meet higher customer demand. In addition, gross profit increased due to the inclusion of QGT's operations.

Research and Development Expense

Research and development expense consists primarily of activities related to new component testing and evaluation, test equipment and fixture development, product design, the advancement of cleaning and coating and analytical processes, and other product-development activities. Research and development expense for fiscal year

2018 was \$13.3 million or 1.2% of revenues, compared to \$11.7 million, or 1.3% of revenues, for fiscal year 2017. The increase in research and development expense was due to an increase in non-production related engineering work, an increase in employee incentive compensation related expenses resulting from higher operating income, severance paid to an engineering executive and the inclusion of QGT's research and development activities.

Sales and Marketing Expense

Sales and marketing expense consists primarily of salaries and commissions paid to our sales and service employees, salaries paid to our engineers who work with the sales and service employees to help determine the components and configuration requirements for new products and other costs related to the sales of our products. Sales and marketing expense increased approximately \$2.6 million, or 18.6%, to \$16.3 million, or 1.5% of revenues, compared to \$13.7 million, or 1.5% of revenues, in the comparable period of 2017. The increase in sales and marketing expense was primarily due to higher employee compensation-related expenses resulting from an increase in headcount due in part to the inclusion of QGT and due to additional QGT sales and marketing expense.

General and Administrative Expense

General and administrative expense consists primarily of salaries and overhead associated with our administrative staff and professional fees. General and administrative expense increased \$32.7 million, or 62.0%, to \$85.5 million, or 7.8% of revenues, for fiscal year 2018 compared to \$52.8 million, or 5.6% of revenues, for fiscal year 2017. The increase was primarily due to an increase in outside services resulting from the non-capitalizable implementation costs of our new enterprise reporting system, acquisition costs incurred related to the acquisition of QGT, higher employee compensation-related expenses due in part to the inclusion of QGT and other general and administrative expenses due to the inclusion of QGT.

Interest and Other Income (Expense), net

Interest and other income (expense) for fiscal year 2018 was \$(8.4) million compared to \$(2.5) million for fiscal year 2017. The increase in net expense was primarily due to an increase in interest expense as a result of a higher principal balance and interest rate on the new debt related to our acquisition of QGT and due to the loss from the disposal of UAMC, offset, in part, by \$1.0 million of business interruption insurance recorded as a result of the Cinos Korea building fire in September 2018.

Income Tax Provision

Income tax expense was \$15.3 million for fiscal year 2018 compared to \$11.9 million for fiscal year 2017. Our effective tax rate for fiscal year 2018 was 29.5% compared to 13.6% for fiscal year 2017. The change in respective rates reflects, primarily, impacts of recently enacted U.S. tax reform and changes in the geographic distribution of our worldwide earnings. Our effective tax rate was higher than the statutory rates for fiscal year 2018 primarily due to the effects of the geographic distribution of our worldwide earnings in foreign jurisdictions with different tax rates, adjustments related to U.S. tax reform, and state taxes.

For the year ended December 28, 2018, the Company concluded that a full valuation allowance against its U.S. federal and state deferred tax assets continues to be necessary. The total U.S. federal and state valuation allowance as of December 28, 2018 was \$7.7 million.

Our ability to realize deferred tax assets depends on our ability to generate sufficient future taxable income. In assessing our future taxable income, we have considered all sources of future taxable income available to realize our deferred tax assets, including the taxable income from future reversal of existing temporary differences, carry

forwards, and tax-planning strategies. If changes occur in the assumptions underlying our tax planning strategies or in the scheduling of the reversal of our deferred tax liabilities, the valuation allowance may need to be adjusted in the future.

The Company did not remit any earnings from foreign subsidiaries in 2018 and the Company has no future plans to remit earnings other than possibly remitting earnings out of its Singapore entity. We may change our intent

to reinvest our undistributed foreign earnings indefinitely, which could require us to accrue or pay taxes on some or all of these undistributed earnings.

Fiscal Year 2017 Compared With Fiscal Year 2016

Revenues

Revenues for fiscal year 2017 increased \$361.6 million, or 64.3% to \$924.4 million from \$562.8 million for fiscal year 2016. The increase in revenues reflects an increase in semiconductor revenues of \$350.6 million and an increase in non-semiconductor revenues of \$11.0 million. The increase in overall revenues for fiscal year 2017 compared to the same period in fiscal year 2016 was due primarily to an increase in the volume of products shipped, which was attributable to an increase in customer demand from 2016 levels. On a geographic basis, revenues in the U.S. increased \$136.3 million to \$428.6 million, or 46.4% of revenues, for the year ended December 29, 2017 as compared to \$292.3 million, or 52.0% of revenues for the same period of 2016. Foreign revenues increased by \$225.4 million to \$495.8 million, or 53.6% of revenues, for the year ended December 29, 2017 compared to \$270.4 million, or 48.0% of revenues, for the same period of 2016.

Gross Profit

Gross profit for fiscal year 2017 increased \$80.8 million to \$167.6 million, or 18.1% of revenues, from \$86.8 million, or 15.4% of revenues, for fiscal year 2016. Our gross profit and gross margin increased in fiscal year 2017 from the comparable period in 2016 due to higher sales volume, increased factory utilization and increased labor efficiency.

Research and Development Expense

Research and development expense for fiscal year 2017 was \$11.7 million or 1.3% of revenues, compared to \$9.9 million, or 1.8% of revenues, for fiscal year 2016. The increase in research and development expense was due to an increase in non-production related engineering work and an increase in employee incentive compensation related expenses as a result of higher operating income.

Sales and Marketing Expense

Sales and marketing expense increased approximately \$2.1 million, or 18.8%, to \$13.7 million, or 1.5% of revenues, compared to \$11.6 million, or 2.1% of revenues, in the comparable period of 2016. The increase in sales and marketing expense was primarily due to higher employee compensation-related expenses resulting from an increase in headcount and increased bonuses due to increased operating profit.

General and Administrative Expense

General and administrative expense increased \$9.9 million, or 23.1%, to \$52.8 million, or 5.6% of revenues, for fiscal year 2017 compared to \$42.9 million, or 7.6% of revenues, for fiscal year 2016. The increase was primarily due to higher employee compensation-related expenses caused by an increase in headcount and increased bonuses due to increased operating profit and an increase in outside services resulting from the non-capitalizable implementation costs of our new enterprise reporting system.

Interest and Other Income (Expense), net

Interest and other income (expense) for fiscal year 2017 was \$(2.5) million compared to \$(3.4) million for fiscal year 2016. The decrease in net expense was primarily due to a decrease of \$1.8 million related to the change in fair value of

the FDS contingent earn-out liability and due to a decrease in interest expense of \$0.5 million resulting from the overall decrease in outstanding debt in fiscal year 2017. These decreases were offset by an increase in foreign exchange loss of \$0.8 million in Czech Republic and in Asia and \$0.3 million of grant monies received in 2016 from the Singapore Economic Development Board.

Income Tax Provision

Income tax expense was \$8.9 million for fiscal year 2016 compared to \$14.3 million for fiscal year 2015. Our effective tax rate for fiscal year 2016 was 46.9% compared to 397.5% for fiscal year 2015. The change in respective

rates reflects, primarily, a charge in the fourth quarter of fiscal 2015 related to recording a full valuation allowance on our U.S. federal and state net deferred tax assets. Our effective tax rate was higher than the statutory rates for fiscal year 2016 primarily due to the geographic distribution of our worldwide earnings in foreign jurisdictions with lower tax rates as well as the impact of losses in jurisdictions with full federal and state valuation allowances.

Critical Accounting Policies, Significant Judgments and Estimates

Our Condensed Consolidated Financial Statements have been prepared in accordance with accounting principles generally accepted in the United States, which require us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenue and expenses and related disclosure at the date of our consolidated financial statements. On an on-going basis, we evaluate our estimates and judgments, including those related to revenues, inventories, goodwill and intangible assets, stock compensation and income taxes. We base our estimates and judgments on historical experience and on various other factors that we believe to be reasonable under the circumstances, the results of which form the basis of our judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates. We consider certain accounting policies related to revenue recognition, inventory valuation, accounting for income taxes, business combinations, valuation of intangible assets and goodwill, accounting for pension obligations and equity incentives to employees to be critical policies due to the estimates and judgments involved in each.

Revenue Recognition

Our revenue for fiscal years 2018, 2017 and 2016 was highly concentrated in a small number of OEM customers in the semiconductor capital equipment, consumer, medical, energy, industrial and research industries. Our standard arrangement for our customers includes a signed purchase order or contract, no right of return of delivered products and no customer acceptance provisions. We perform the following five steps to determine when to recognize revenue:

- identification of the contract(s) with customers;
- identification of the performance obligations in the contract;
- determination of the transaction price;
- allocation of the transaction price to the performance obligations in the contract; and
- recognition of revenue when, or as, a performance obligation is satisfied.

Revenue is recognized when promised goods or services (performance obligations) are transferred to a customer in an amount that reflects the consideration to which we expects to be entitled in exchange for those goods or services.

We assess collectability based on the creditworthiness of the customer and past transaction history. We perform on-going credit evaluations of, and do not require collateral from, our customers. A significant change in the liquidity or financial position of any one customer could make it more difficult for us to assess collectability.

Inventory Valuation

We write down the carrying value of our inventory to net realizable value for estimated obsolescence or unmarketable inventory in an amount equal to the difference between the cost of inventory and its estimated realizable value based upon assumptions about future demand and market conditions. We assess the valuation of all inventories, including raw materials, work-in-process, finished goods and spare parts on a periodic basis.

Obsolete inventory or inventory in excess of our estimated usage is written down to its estimated market value less costs to sell, if less than its cost. The inventory write-downs are recorded as an inventory valuation allowance established on the basis of obsolete inventory or specific identified inventory in excess of established usage. Inherent in our estimates of demand and market value in determining inventory valuation are estimates related to economic

trends, future demand for our products and technological obsolescence of our products. If actual demand and market conditions are less favorable than our projections, additional inventory write-downs may be required. If the

inventory value is written down to its net realizable value, and subsequently there is an increased demand for the inventory at a higher value, the increased value of the inventory is not realized until the inventory is sold either as a component of a subsystem or as separate inventory. For fiscal years 2018, 2017 and 2016, we wrote down \$3.3 million, \$2.4 million, and \$2.3 million, respectively.

Accounting for Income Taxes

The determination of our tax provision is highly dependent upon the geographic composition of worldwide earnings and tax regulations governing each region and is subject to judgments and estimates. Management carefully monitors the changes in many factors and adjusts the effective tax rate as required. The carrying value of our net deferred tax assets, which consist primarily of future tax deductions, assumes we will be able to generate sufficient future income to fully realize these deductions. In determining whether the realization of these deferred tax assets may be impaired, we make judgments with respect to whether we are likely to generate sufficient future taxable income to realize these assets. In order to reverse a valuation allowance, accounting principles generally accepted in the United States of America suggest that we review our recent cumulative income/loss as well as determine our ability to generate sufficient future taxable income to realize our net deferred tax assets. As of December 28, 2018, we maintained full valuation allowances on our U.S. federal and state deferred tax assets in the amount of \$7.7 million as we believe it is more likely than not that these deferred tax assets will not be realized.

In addition, the calculation of tax liabilities involves significant judgment in estimating the impact of uncertainties in the application of complex tax laws. Resolution of these uncertainties in a manner inconsistent with our expectations could have a material impact on the results of our operations and financial position. We believe we have adequately reserved for our uncertain tax position, however, no assurance can be given that the final tax outcome of these matters will not be different than what we expect. We adjust these reserves in light of changing facts and circumstances, such as the closing of a tax audit or the refinement of an estimate. To the extent that the final tax outcome of these matters is different than the amounts recorded, such differences will impact the provision for income taxes in the period in which such determination is made. The provision for income taxes includes the impact of reserve provisions and changes to reserves that are considered appropriate, as well as the related net interest.

We file income tax returns in the U.S. federal jurisdiction, various states and foreign jurisdictions. Our 2015 through 2017 federal income tax returns are open to audit through the statute of limitations by the Internal Revenue Service. The Company's 2014 through 2017 state income tax returns are open to audit by the California Franchise Tax Board. The Company is also subject to examination in various other jurisdictions for various periods.

Business Combinations

In accordance with accounting for business combinations, we allocate the purchase price of acquired companies to the tangible and intangible assets acquired and liabilities assumed based on their estimated fair values. We may engage third-party valuation firms to assist management in reviewing management's determination of the fair values of acquired intangible assets such as trade name and customer relationships. Such valuations require management to make significant estimates and assumptions. Management makes estimates of fair value based upon assumptions believed to be reasonable. These estimates are based on historical experience and information obtained from the management of the acquired companies and are inherently uncertain.

Goodwill, Intangibles Assets, and Long-lived Assets

Goodwill is measured as the excess of the cost of an acquisition over the sum of the amounts assigned to identifiable assets acquired less liabilities assumed.

We evaluate our goodwill and indefinite life trade name for impairment on an annual basis, and whenever events or changes in circumstances indicate that the carrying value may not be fully recoverable. In addition, we evaluate our identifiable intangible assets and other long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Factors we consider important which could trigger an impairment review include the following:

- Significant changes in the manner of our use of the acquired assets or the strategy of our overall business;
- Significant negative changes in revenue of specific products or services;
- Significant negative industry or economic trends;
- Significant decline in our stock price for a sustained period; and

We continually apply judgment when performing these evaluations and continuously monitor for events and circumstances that could negatively impact the key assumptions in determining fair value, including long-term revenue growth projections, undiscounted net cash flows, discount rates, recent market valuations from transactions by comparable companies, volatility in our market capitalization and general industry, market and macroeconomic conditions. It is possible that changes in such circumstances, or in the variables associated with the judgments, assumptions and estimates used in assessing fair value, would require us to record a non-cash impairment charge.

Equity Incentives to Employees

We issue restricted stock units to our employees and outside directors and provide our employees the right to purchase common stock under our employee stock purchase plan. Under current accounting guidance, stock-based compensation cost is measured at the grant date based on the fair value of the award and is recognized as expense over the service (vesting) period. See Note 11 to the Notes to Consolidated Financial Statements for a detailed description.

Unaudited Quarterly Financial Results

The following table sets forth statement of operations data for the periods indicated. The information for each of these periods is unaudited and has been prepared on the same basis as our audited consolidated financial statements included herein and includes all adjustments, consisting only of normal recurring adjustments that we consider necessary for a fair presentation of our unaudited operations data for the periods presented. Historical results are not necessarily indicative of the results to be expected in the future (in thousands, except per share data):

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Fiscal Year (1)
2018					
Revenues	\$ 314,842	\$ 290,213	\$ 234,079	\$ 257,389	\$ 1,096,523
Gross profit	\$ 48,804	\$ 46,065	\$ 34,995	\$ 45,977	\$ 175,841
Net income (loss)	\$ 24,741	\$ 18,960	\$ (5,997)	\$ (1,108)	\$ 36,596
Earnings (loss) per share — basic	\$ 0.67	\$ 0.49	\$ (0.15)	\$ (0.03)	\$ 0.95
Earnings (loss) per share — diluted	\$ 0.66	\$ 0.48	\$ (0.15)	\$ (0.03)	\$ 0.94
2017					
Revenues	\$ 204,594	\$ 228,261	\$ 242,610	\$ 248,886	\$ 924,351
Gross profit	\$ 37,495	\$ 43,371	\$ 42,696	\$ 44,067	\$ 167,629
Net income	\$ 14,341	\$ 20,179	\$ 19,716	\$ 20,849	\$ 75,085
Earnings per share — basic	\$ 0.43	\$ 0.60	\$ 0.59	\$ 0.62	\$ 2.25
Earnings per share — diluted	\$ 0.42	\$ 0.59	\$ 0.57	\$ 0.60	\$ 2.19

(1) Earnings per share is calculated independently each quarter and for the full year based upon their respective weighted average shares outstanding. Therefore, the sum of the quarterly earnings per share may not equal the annual earnings per share reported.

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Liquidity and Capital Resources

In February of 2018, we completed an underwritten public offering of 4,761,905 shares of our common stock, in which we received net proceeds of approximately \$94.3 million, after deducting the underwriting discounts and offering expenses payable by us.

In August 2018, in conjunction with the acquisition of QGT, we entered into a credit agreement with Barclays Bank that provided a Term Loan, a Revolving Credit Facility, and a Letter of Credit Facility (the "Credit Facilities"). See further discussion under Borrowing Arrangements below.

We believe we have the required capital principally to fund our working capital needs, satisfy our debt obligations, maintain our equipment and purchase new capital equipment. As of December 28, 2018, we had cash and cash equivalents of \$144.1 million compared to \$68.3 million as of December 29, 2017. Our cash and cash equivalents, cash generated from operations and amounts available under our revolving line of credit described below were our principal source of liquidity as of December 28, 2018.

For the twelve months ended December 28, 2018, we generated cash from operating activities of \$41.7 million, a decrease of \$7.2 million when compared to \$48.9 million for fiscal 2017. Operating cash flows generated in the twelve months ended December 28, 2018 reflects net income adjusted for the effect of non-cash activities, including depreciation of equipment and leasehold improvements, amortization of intangible assets and debt issuance costs, stock-based compensation, loss from disposal of assets, change in the fair value of financial instruments and changes in working capital components. The primary drivers of the decrease in cash from operating activities from fiscal 2017 to fiscal 2018 included lower net income and decreases in accounts payable, accrued compensation and related benefits and income taxes payable, offset by increases in account receivables, inventories, prepaid expenses, deferred income taxes and other non-current assets.

Cash generated from operating activities for fiscal year 2017 reflected an increase of \$31.3 million when compared to \$17.6 million for fiscal 2016. The primary drivers of the increase in cash from operating activities from fiscal 2016 to fiscal 2017 included higher net income and increases in accounts payable, accrued expenses, income taxes payable and other liabilities, offset by higher increases in inventories, prepaid expenses, deferred income taxes and other non-current assets.

Net cash used in investing activities for the twelve months ended December 28, 2018 was approximately \$345.9 million, attributable mostly to the acquisition of QGT and to the costs related to the development of the Company's new enterprise reporting system and to the expansion of our facilities in Singapore and California.

Net cash used in investing activities in fiscal year 2017 was \$16.1 million consisted mainly of purchases of equipment and leasehold improvements.

Net cash provided by financing activities for the twelve months ended December 28, 2018 was \$380.1 million, primarily due to net bank borrowings of \$288.6 million and the \$94.3 million net cash proceeds from the public offering of our common stock in February of 2018.

Net cash used in financing activities for the twelve months ended December 29, 2017, was \$17.1 million which was primarily due to principal payments on bank borrowings of \$31.2 million offset by \$15.1 million proceeds from bank borrowings.

We anticipate that our existing cash and cash equivalents balance and operating cash flow will be sufficient to service our indebtedness and meet our working capital requirements and technology development projects for at least the next

twelve months. The adequacy of these resources to meet our liquidity needs beyond that period will depend on our growth, the size and number of any acquisitions, the state of the worldwide economy, our ability to meet our financial covenants with our credit facility, the cyclical expansion or contraction of the semiconductor capital equipment industry and the other industries we serve and capital expenditures required to meet possible increased demand for our products.

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In order to expand our business or acquire additional complementary businesses or technologies, we may need to raise additional funds through equity or debt financings. If required, additional financing may not be available on terms that are favorable to us, if at all. If we raise additional funds through the issuance of equity or convertible debt securities, our stockholders' equity interest will be diluted and these securities might have rights, preferences and privileges senior to those of our current stockholders. We may also require the consent of our new lenders to raise additional funds through equity or debt financings. No assurance can be given that additional financing will be available or that, if available, such financing can be obtained on terms favorable to our stockholders and us.

In 2017, we determined that a portion of the current year and future year earnings of one of our China subsidiaries may be remitted in the future to one of our foreign subsidiaries outside of mainland China and, accordingly, we provided for the related withholding taxes in our consolidated financial statements. As of December 28, 2018, we had undistributed earnings of foreign subsidiaries that are indefinitely invested outside of the U.S. of approximately \$224.4 million. As of December 28, 2018, we have cash of approximately \$104.5 million in our foreign subsidiaries.

Borrowing Arrangements

In August 2018, we entered into a credit agreement with Barclays Bank that provided a Term Loan, a Revolving Credit Facility, and a Letter of Credit Facility (the "Credit Facilities"). We and some of our subsidiaries have agreed to secure all of their obligations under the Credit Facilities by granting a first priority lien in substantially all of their respective personal property assets (subject to certain exceptions and limitations). In August 2018, we borrowed \$350.0 million under the Term Loan and used the proceeds, together with cash on hand, to finance the acquisition of Quantum (see Note 8) and to refinance its previous credit facilities.

We had a credit facility in the U.S. that was refinanced in August 2018, under which, we and some of our subsidiaries had agreed to secure all of their obligations under a credit agreement (the "Credit Agreement") by granting a first priority lien in substantially all of their respective personal property assets (subject to certain exceptions and limitations). In August 2018, we paid \$41.6 million of principal, accrued interest, and fees in settlement of the then-outstanding term loan, revolving credit facility, interest rate swap under the Credit Agreement, and recognized \$0.1 million in expense upon extinguishment as Interest and other income (expense), net.

The Term Loan has a maturity date of August 27, 2025, with monthly interest payments in arrears, quarterly principal payments of 0.625% of the original outstanding principal balance payable beginning January 2019, with the remaining principal paid upon maturity. The Term Loan accrues interest daily at a rate equal to a base LIBOR rate determined by reference to the London interbank offered rate for dollars, plus 4.5% (subject to certain adjustments quarterly based upon the Company's consolidated leverage ratio). We may prepay the Term Loan in whole or in part without penalty after six months from issuance, before which we must pay a prepayment fee equal to 1.0% of the aggregate principal amount prepaid. As of December 28, 2018, we had an outstanding amount under the Term Loan of \$350.0 million, gross of unamortized debt issuance costs of \$11.5 million.

The Revolving Credit Facility has an initial available commitment of \$65.0 million and a maturity date of August 27, 2023. We pay a quarterly commitment fee in arrears equal to 0.25% of the average daily available commitment outstanding. As of December 28, 2018, we had zero outstanding amount under the Revolving Credit Facility. The New Credit Agreement requires that we maintain certain financial covenants including a consolidated fixed charge coverage ratio (as defined in the New Credit Agreement) as of the last day of any fiscal quarter of at least 1.25 to 1.00, and a consolidated leverage ratio (as defined in the New Credit Agreement) as of the last day of any fiscal quarter of no greater than 3.75 to 1.00. We are in compliance with all covenants for the quarter ended December 28, 2018.

The Letter of Credit Facility has an initial available commitment of \$50.0 million and a maturity date of August 27, 2023. We pay quarterly in arrears a fee equal to 2.5% (subject to certain adjustments as per the Term Loans) of the

dollar equivalent of all outstanding letters of credit, and a fronting fee equal to 0.125% of the undrawn and unexpired amount of each letter of credit. As of December 28, 2018, we have no outstanding letters of credit and the remaining available commitments was \$65.0 million.

As of December 28, 2018, FDS had an outstanding amount under its revolving credit facility of 2.4 million euros (approximately \$2.7 million) with an interest rate of 1.3% plus a variable rate based on the Euro Interbank Offered Rate.

As of December 28, 2018, our total bank debt was \$341.2 million, net of unamortized debt issuance costs of \$11.5 million. As of December 28, 2018, we had \$65.0 million and 5.9 million euros (approximately \$6.7 million) available to borrow on its revolving credit facilities in the U.S. and Czech Republic, respectively.

The fair value of our long term debt was based on Level 2 inputs, and fair value was determined using quoted prices for similar liabilities in inactive markets. The carrying value of our long term debt approximates fair value.

Capital Expenditures

Capital expenditures were \$29.2 million for the year ended December 28, 2018, primarily attributable to the expansion of our Singapore, Czech Republic and certain U.S. facilities.

Off-Balance Sheet Arrangements

During the periods presented, we did not have any relations with unconsolidated entities or financial partnerships, such as entities often referred to as structured finance or special purpose entities, which would have been established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes.

Contractual Obligations

Other than operating leases for certain equipment and real estate and purchase order commitments primarily for inventory, we have no off-balance sheet transactions or similar instruments and, other than the arrangements described under "Borrowing Arrangements" above and our stock purchase obligation resulted from the acquisition of QGT, are not a guarantor of any other entities' debt or other financial obligations. The following table summarizes our future minimum lease payments, principal payments under debt obligations and our purchase obligations for the purchase of inventory as of December 28, 2018 (in thousands):

	Total	Less than 1 Year	1 - 3 Years	3 - 5 Years	More than 5 Years
Operating leases(1)	\$ 48,082	\$ 13,630	\$ 28,367	\$ 3,660	\$ 2,425
Capital leases	4,057	643	1,915	1,108	391
Borrowing Arrangement(2)	352,737	11,487	26,250	17,500	297,500
Stock purchase obligation(3)	8,500	—	8,500	—	—
Purchase order commitments(4)	106,240	106,240	—	—	—
Total	\$ 519,616	\$ 132,000	\$ 65,032	\$ 22,268	\$ 300,316

(1)The Company leases facilities in the U.S.A. as well as internationally under non-cancellable leases that expire on various date through 2031.

(2)Amounts reflect obligations under our Term loan amounting to \$350.0 gross of \$11.5 million of unamortized debt issuance costs and \$2.7 million held by FDS, in the Czech Republic.

(3)The Company is obligated to purchase the stock owned by one of Cinoss Co., Ltd shareholder.

(4) Represents our outstanding purchase orders primarily for inventory.

Recently Issued and Adopted Accounting Pronouncement

For a description of recent accounting pronouncements, including the expected dates of adoption and estimated effects, if any, on UCT's consolidated financial statements, see Note 1, "Organization and Significant Accounting Policies," of the Notes to Consolidated Financial Statements.

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Item 7A. Quantitative and Qualitative Disclosures About Market Risk

We are exposed to financial market risks, including changes in currency exchange rates and interest rates.

Foreign Exchange Rates

We operate in international markets, which expose us to market risk associated with foreign currency exchange rate fluctuations between the U.S. Dollar and various foreign currencies. Historically, the majority of our revenue contracts and arrangements with third party suppliers are denominated in U.S. Dollars. Additionally, a portion of our expenses, primarily the cost to manufacture, cost of personnel to deliver technical support on our products and professional services, sales and sales support and research and development, are denominated in foreign currencies. Revenue resulting from selling in local currencies and costs incurred in local currencies are exposed to foreign currency exchange rate fluctuations which can affect our operating income. As exchange rates vary, operating income may differ from expectations. Increases in the value of the U.S. dollar relative to other currencies would make our products more expensive relative to competing products priced in such other currencies, which could negatively impact our ability to compete. Conversely, decreases in the value of the U.S. dollar relative to other currencies could result in our foreign suppliers raising their prices in order to continue doing business with us. However, we do not expect foreign currency exchange rate fluctuations to have a material effect on our results of operations.

FDS uses derivative instruments, such as foreign currency exchange contracts, to hedge certain exposures to fluctuations in foreign currency exchange rates. These contracts reduce, but do not entirely eliminate the impact of currency exchange rates movement on FDS' assets and liabilities.

Interest Rates

We are exposed to market risk due to the possibility of changing interest rates under our credit facilities. Our Credit Facility is comprised of a Term B loan and a revolving credit agreement with interest rates as described under Note 8 of Notes to the Consolidated Financial Statements.

At the end of fiscal 2018, we had outstanding the Term B loan of \$350.0 million. A hypothetical 10% increase in our borrowing rates at the end of fiscal 2018 could result in approximately \$2.5 million annual increase in interest expense on these existing principal balances.

The hypothetical changes and assumptions made above will be different from what actually occurs in the future. Furthermore, the computations do not anticipate actions that may be taken by our management should the hypothetical market.

Item 8. Financial Statements and Supplementary Data
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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of

Ultra Clean Holdings, Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Ultra Clean Holdings, Inc. (the “Company”) as of December 28, 2018 and December 29, 2017, the related consolidated statements of operations, comprehensive income (loss), stockholders’ equity and cash flows for each of the years ended December 28, 2018, December 29, 2017 and December 26, 2016, and the related notes (collectively referred to as the “consolidated financial statements”). We also have audited the Company’s internal control over financial reporting as of December 28, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). As discussed in Management’s Report on Internal Control over Financial Reporting, on August 27, 2018, the Company acquired Quantum Global Technologies, LLC (Quantum). For the purposes of assessing internal control over financial reporting, management excluded Quantum, whose financial statements constitute 22.2% and 7.4% of the Company’s consolidated total assets (excluding \$231.3 million of goodwill and intangible assets, net, which were integrated into the Company’s control environment), and revenues, respectively. Accordingly, our audit did not include the internal control over financial reporting of Quantum.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the consolidated financial position of the Company as of December 28, 2018 and December 29, 2017 and the consolidated results of its operations and its cash flows for each of the years ended December 28, 2018, December 29, 2017 and December 26, 2016, in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 28, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by COSO.

Basis for Opinions

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

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

was maintained in all material respects.

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

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (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 consolidated 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/ Moss Adams LLP

San Francisco, California

March 22, 2019

We have served as the Company's auditor since 2015.

Ultra Clean Holdings, Inc.

Consolidated Balance Sheets

	December 29, 2018	December 29, 2017
	(In thousands, except share and per share amounts)	
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 144,145	\$ 68,306
Accounts receivable, net of allowance of \$123 and \$69, respectively	106,956	90,213
Inventories	186,116	236,840
Prepaid expenses and other	25,708	12,089
Total current assets	462,925	407,448
Equipment, real estate and leasehold improvements, net	143,459	32,246
Goodwill	150,226	85,248
Purchased intangibles, net	193,507	31,587
Deferred tax assets, net	10,167	4,951
Other non-current assets	5,193	1,932
Total assets	\$ 965,477	\$ 563,412
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Bank borrowings	\$ 9,671	\$ 12,381
Accounts payable	99,011	173,521
Accrued compensation and related benefits	15,846	10,788
Other current liabilities	14,770	10,657
Total current liabilities	139,298	207,347
Bank borrowings, net of current portion	331,549	39,893
Deferred tax liability	15,834	9,981
Other liabilities	27,808	5,886
Total liabilities	514,489	263,107
Commitments and contingencies (See Note 14)		
Stockholders' equity:		
Preferred stock — \$0.001 par value, 10,000,000 authorized; none outstanding	—	—
Common stock — \$0.001 par value, 90,000,000 authorized; 39,065,935 and 33,664,940 shares issued and outstanding, in 2018 and 2017, respectively	40	34
Additional paid-in capital	290,424	188,639
Common shares held in treasury, at cost, 601,944 shares in 2018 and	(3,337)	(3,337)

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2017		
Retained earnings	149,718	113,122
Accumulated other comprehensive income (loss)	(547)	1,847
Ultra Clean Holdings, Inc. stockholders' equity	436,298	300,305
Noncontrolling interest	14,690	—
Total stockholders' equity	450,988	300,305
Total liabilities and stockholders' equity	\$965,477	\$ 563,412

(See notes to consolidated financial statements)

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Ultra Clean Holdings, Inc.

Consolidated Statements of Operations

	Fiscal Year Ended		
	December 28, 2018	December 29, 2017	December 30, 2016
	(In thousands, except per share amounts)		
Revenues	\$1,096,523	\$ 924,351	\$ 562,759
Cost of goods sold	920,682	756,722	475,976
Gross profit	175,841	167,629	86,783
Operating expenses:			
Research and development	13,287	11,666	9,900
Sales and marketing	16,306	13,748	11,568
General and administrative	85,544	52,818	42,924
Total operating expenses	115,137	78,232	64,392
Income from operations	60,704	89,397	22,391
Interest and other income (expense), net	(8,436)	(2,455)	(3,444)
Income before provision for income taxes	52,268	86,942	18,947
Income tax provision	15,319	11,857	8,896
Net income	36,949	75,085	10,051
Net income attributable to noncontrolling interest	353	—	—
Net income attributable to Ultra Clean Holdings, Inc.	\$36,596	\$ 75,085	\$ 10,051
Net income per share attributable to Ultra Clean Holdings, Inc.			
common stockholders:			
Basic	\$0.95	\$ 2.25	\$ 0.31
Diluted	\$0.94	\$ 2.19	\$ 0.30
Shares used in computing net income per share:			
Basic	38,366	33,409	32,632
Diluted	38,919	34,303	33,150

(See notes to consolidated financial statements)

Ultra Clean Holdings, Inc.

Consolidated Statements of Comprehensive Income (Loss)

	Fiscal Year Ended		
	December 28, 2018	December 29, 2017	December 30, 2016
	(In thousands)		
Net income attributable to Ultra Clean Holdings, Inc.	\$36,596	\$ 75,085	\$ 10,051
Other comprehensive income (loss):			
Change in cumulative translation adjustment	(1,320)	1,193	(393)
Change in pension net actuarial loss	(84)	—	—
Cash flow hedges:			
Change in fair value of derivatives	(32)	1,274	(60)
Adjustment for net gain (loss) realized and included in net income	(958)	(237)	88
Total change in unrealized gain (loss) on derivative instruments	(990)	1,037	28
Total other comprehensive income (loss), net of tax	(2,394)	2,230	(365)
Other comprehensive income (loss), net of tax, attributable to noncontrolling interest	(95)	—	—
Comprehensive income attributable to Ultra Clean Holdings, Inc.	\$34,297	\$ 77,315	\$ 9,686

(See notes to consolidated financial statements)

Ultra Clean Holdings, Inc.

Consolidated Statements of Stockholders' Equity

	Common Stock	Additional Paid-in	Retained	Accumulated Other Comprehensive (Loss)	Noncontrolling	Total
	Shares	Capital	Earnings	Income	Interests	Stockholders' Equity
	(in thousands, except share amounts)					
Balance December 25, 2015	32,279,429	32 \$ 172,943	\$ 27,986	\$ (18)	\$ —	\$ 200,943
Issuance of restricted						
common stock	52,000	—	—	—	—	—
Issuance under employee						
stock plans	761,824	1 601	—	—	—	602
Amortization of stock-based						
compensation	—	— 5,671	—	—	—	5,671
Employees' taxes paid upon						
vesting of restricted stock						
units	(136,968)	— (771)	—	—	—	(771)
Net income	—	—	10,051	—	—	10,051
Other comprehensive loss	—	—	—	(365)	—	(365)
Balance December 30, 2016	32,956,285	\$ 33 \$ 178,444	\$ 38,037	\$ (383)	\$ —	\$ 216,131
Issuance of restricted						
common stock	45,000	—	—	—	—	—
Issuance under employee						
stock plans	823,440	1 1,815	—	—	—	1,816
Amortization of stock-based						
compensation	—	— 7,757	—	—	—	7,757
Employees' taxes paid upon	(159,785)	— (2,714)	—	—	—	(2,714)
vesting of restricted stock						

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units							
Net income	—	—	—	75,085	—	—	75,085
Other comprehensive income	—	—	—	—	2,230	—	2,230
Balance December 29, 2017	33,664,940	\$34	\$185,302	\$113,122	\$1,847	\$—	\$300,305
Issuance of restricted common stock	38,010	—	—	—	—	—	—
Issuance under employee stock plans	774,376	1	284	—	—	—	285
Amortization of stock-based compensation	—	—	10,272	—	—	—	10,272
Employees' taxes paid upon vesting of restricted stock	(173,296)	—	(3,093)	—	—	—	(3,093)
Issuance of common stock in public offering	4,761,905	5	94,322				94,327
Noncontrolling interest from acquisition of QGT	—	—	—	—	—	14,337	14,337
Net income	—	—	—	36,596	—	353	36,949
Other comprehensive loss	—	—	—	—	(2,394)	—	(2,394)
Balance December 28, 2018	39,065,935	\$40	\$287,087	\$149,718	\$ (547)	\$ 14,690	\$ 450,988

(See notes to consolidated financial statements)

Ultra Clean Holdings, Inc.

Consolidated Statements of Cash Flows

	Fiscal Year Ended		
	December 31, 2018	December 29, 2017	December 30, 2016
	(In thousands)		
Cash flows from operating activities:			
Net income including noncontrolling interests	\$36,949	\$ 75,085	\$ 10,051
Adjustments to reconcile net income to net cash provided by operating activities (excluding assets acquired, liabilities assumed and noncontrolling interests at acquisition):			
Depreciation and amortization	11,535	5,275	5,981
Amortization of finite-lived intangibles	9,580	5,437	5,758
Amortization of debt issuance costs	792	153	153
Excess tax benefit from stock-based compensation	—	—	771
Stock-based compensation	10,272	7,757	5,671
Loss on the disposal of assets and business	1,011	72	169
Change in the fair value of financial instruments	(319)	(278)	1,446
Changes in assets and liabilities, net of effects of acquisitions:			
Accounts receivable	7,237	(14,930)	(15,834)
Inventories	50,151	(131,874)	(31,516)
Prepaid expenses and other	2,614	(4,911)	1,709
Deferred income taxes	(82)	(3,755)	3,534
Other non-current assets	(353)	(582)	(45)
Accounts payable	(83,195)	99,569	31,705
Accrued compensation and related benefits	(2,795)	2,777	1,397
Income taxes payable	798	8,177	(16)
Other liabilities	(2,486)	933	(3,357)
Net cash provided by operating activities	41,709	48,905	17,577
Cash flows from investing activities:			
Purchases of equipment and leasehold improvements	(26,152)	(16,149)	(7,278)
Acquisition of QGT, net of cash acquired	(319,781)	—	—
Net cash used in investing activities	(345,933)	(16,149)	(7,278)
Cash flows from financing activities:			
Proceeds from bank borrowings	387,054	15,076	6,657
Proceeds from issuance of common stock	94,614	1,816	602
Principal payments on bank borrowings	(86,354)	(31,248)	(14,341)
Payments of debt issuance costs	(12,144)	—	—
Employees' taxes paid upon vesting of restricted stock units	(3,095)	(2,714)	(771)
Net cash provided (used) in financing activities	380,075	(17,070)	(7,853)
Effect of exchange rate changes on cash and cash equivalents	(12)	155	(84)
Net increase in cash and cash equivalents	75,839	15,841	2,362
Cash and cash equivalents at beginning of period	68,306	52,465	50,103

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Cash and cash equivalents at end of period	\$144,145	\$ 68,306	\$ 52,465
Supplemental cash flow information:			
Income taxes paid	\$14,589	\$ 7,614	\$ 4,463
Income tax refunds	\$43	\$ 71	\$ 646
Interest paid	\$7,146	\$ 2,216	\$ 2,505
Non-cash investing and financing activities:			
Property and equipment purchased included in accounts payable and other liabilities	\$5,592	\$ 2,558	\$ 701
Impairment loss due to a facility fire covered by insurance	\$5,997	\$ —	\$ —
Note receivable received in exchange for sale of UAMC	\$291	\$ —	\$ —
Fair value of earn-out payment related to QGT acquisition	\$4,163	\$ —	\$ —

(See notes to consolidated financial statements)

Ultra Clean Holdings, Inc.

Notes to Consolidated Financial Statements

1. Organization and Significant Accounting Policies

Organization — Ultra Clean Holdings, Inc. (the “Company” or “UCT”) was founded in November 2002 for the purpose of acquiring Ultra Clean Technology Systems and Service, Inc. Ultra Clean Technology Systems and Service, Inc. was founded in 1991 by Mitsubishi Corporation and was operated as a subsidiary of Mitsubishi until November 2002, when it was acquired by UCT. UCT became a publicly traded company in March 2004. Ultra Clean Technology (Shanghai) Co., Ltd (“UCTS”) and Ultra Clean Micro-Electronics Equipment (Shanghai) Co., Ltd. (“UCME”) were established in 2005 and 2007, respectively, to facilitate the Company’s operations in China. In December 2015, UCTS merged into UCME. Ultra Clean Asia Pacific, Pte, Ltd. (Singapore) was established in fiscal year 2008 to facilitate the Company’s operations in Singapore. In July 2012, UCT acquired American Integration Technologies LLC (“AIT”) to add to the Company’s existing customer base in the semiconductor and medical spaces and to provide additional manufacturing capabilities. In February 2015, UCT acquired Marchi Thermal Systems, Inc. (“Marchi”), a designer and manufacturer of specialty heaters, thermocouples and temperature controllers. Marchi delivers flexible heating elements and thermal solutions to our customers. The Company believes heaters are increasingly critical in equipment design for the most advanced semiconductor nodes. In July 2015, UCT acquired MICONEX s.r.o. (“Miconex”), a privately-held provider of advanced precision fabrication of plastics, primarily for the semiconductor industry that, initially, is expected to expand the Company’s capabilities with existing customers. In May 2018, Marchi and Miconex changed their names to UCT Thermal Solutions, Inc. (“Thermal”) and to UCT Fluid Delivery Solutions s.r.o (“FDS”), respectively.

In August 2018, the Company acquired Quantum Global Technologies, LLC (“QGT”), a provider of ultra-high purity outsourced parts cleaning, process tool part recoating, surface treatment and analytical services to the semiconductor and related industries, for a total purchase price of approximately \$340.8 million. See Note 5 to the Company’s Condensed Consolidated Financial Statements for further information about the acquisition of QGT.

Principles of Consolidation — The Company’s consolidated financial statements include the accounts of the Company and its wholly-owned subsidiaries and all intercompany accounts and transactions have been eliminated in consolidation. The Company uses a 52-53 week fiscal year ending on the Friday nearest December 31. All references to quarters refer to fiscal quarters and all references to years refer to fiscal years.

Foreign Currency Translation and Remeasurement — FDS functional currency is not its local currency or the U.S. dollar. The Company remeasures the monetary assets and liabilities of FDS to its functional currency. Gains and losses from these remeasurements are recorded in interest and other income (expense), net. The Company then translates the assets and liabilities of FDS into the U.S. dollar. Gains and losses from these translations are recognized in foreign currency translation included in accumulated other comprehensive income (AOCI) within stockholders’ equity.

QGT’s international subsidiaries functional currency is its local currency. We translate the financial statements of these subsidiaries to U.S. dollars using month-end rates of exchange for assets and liabilities, and average rates of exchange for revenue, costs, and expenses. Translation gains and losses are recorded in accumulated other comprehensive (loss) income as a component of stockholders' equity.

For the Company’s foreign subsidiaries where the U.S. dollar is the functional currency, any gains and losses resulting from the translation of the assets and liabilities of these subsidiaries are recorded in interest and other income (expense), net.

Use of Accounting Estimates — The presentation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, and disclosures of contingent liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Such estimates and assumptions include reserves on inventory, valuation of deferred tax assets and impairment of goodwill and other long-lived assets. The Company bases its estimates and judgments on historical experience and on various other assumptions that it believes are reasonable under the circumstances. However, future events are subject to change and the best estimates and judgments routinely require adjustment. Actual amounts may differ from those estimates.

Concentration of Credit Risk — Financial instruments which subject the Company to concentrations of credit risk consist principally of cash and cash equivalents and accounts receivable. The Company sells its products primarily to semiconductor capital equipment manufacturers in the United States. The Company performs credit evaluations of its customers' financial condition and generally requires no collateral.

Fair Value of Measurements — The Company measures its cash equivalents and contingent earn-out liability at fair value on a recurring basis. In August 2018, the Company extinguished its debt with East West Bank thus the interest rate swap contract was consequently cancelled. Fair value is an exit price, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. As such, fair value is a market-based measurement that is determined based on assumptions that market participants would use in pricing an asset or a liability. Assets and liabilities recorded at fair value are measured and classified in accordance with a three-tier fair value hierarchy based on the observability of the inputs available in the market used to measure fair value:

Level 1 — Observable inputs that reflect quoted prices (unadjusted) for identical assets or liabilities in active markets.

Level 2 — Inputs that are based upon quoted prices for similar instruments in active markets, quoted prices for identical or similar instruments in markets that are not active, and model-based valuation techniques for which all significant inputs are observable in the market or can be derived from observable market data. Where applicable, these models project future cash flows and discount the future amounts to a present value using market-based observable inputs including interest rate curves, foreign exchange rates, and credit ratings.

Level 3 — Unobservable inputs that are supported by little or no market activities.

The fair value hierarchy requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The following table summarizes, for assets or liabilities measured at fair value, the respective fair value and the classification by level of input within the fair value hierarchy (in thousands):

Description	December 28, 2018	Fair Value Measurement at Reporting Date Using Quoted Prices in		
		Active Markets for Identical Assets (Level 1)	Significant Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Other assets:				
Forward contracts	\$ 240	\$—	\$ 240	\$ —
Other liabilities:				
Contingent earn-out liability	\$ 3,924	\$—	\$ —	\$ 3,924
Pension obligation	\$ 3,531	\$—	\$ —	\$ 3,531
Purchase obligation	\$ 8,500	\$—	\$ —	\$ 8,500

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Description	December 29, 2017	Fair Value Measurement at Reporting Date Using Quoted Prices in Active Markets for Identifiable Assets		Significant Other Observable Inputs (Level 1)		Significant Unobservable Inputs (Level 3)	
Other assets:							
Interest rate swap	\$ 30	\$ —	\$ 30	\$		\$	—
Forward contracts	\$ 1,302	\$ —	\$ 1,302	\$		\$	—

The Company's Level 3 liabilities are incurred as a result of the QGT acquisition. There were no transfers from Level 1 or Level 2. Fair value adjustments were noncash, and therefore did not impact the Company's liquidity or capital resources. Qualitative information about Level 3 fair value measurements are as follow (in thousands, except the range):

	December 28, 2018	Valuation Techniques	Unobservable Input	Range
Contingent earn-out liability	\$ 3,924	Monte carlo simulation	Revenue discount rate Internal forecasts	13.5 % 5 %
Pension obligation	\$ 3,531	Projected unit credit method	Discount rate Rate on return Salary increase rate	2.43% - 2.74% 1.37% - 1.78% 4.42 %
Purchase obligation	\$ 8,500	Discounted cash flow	EBITDA Multiple	6.21

Following is a summary of the Level 3 activity (in thousands):

	Contingent		
	earn-out liability	Purchase obligation	Pension obligation
As of December 30, 2017	\$ —	\$ —	\$ —
Increase due to acquisition of QGT	4,163	8,552	3,159
Fair value adjustments	(239)	(52)	(84)
Benefits and other adjustments	—	—	456
As of December 28, 2018	\$ 3,924	\$ 8,500	\$ 3,531

Derivative Financial Instruments — The Company recognizes derivative instruments as either assets or liabilities in the accompanying Consolidated Balance Sheets at fair value. The Company records changes in the fair value of the derivatives in the accompanying Consolidated Statements of Operations as interest and other income (expense), net, or as a component of AOCI in the accompanying Consolidated Balance Sheets.

Inventories — Inventories are stated at the lower of standard cost (which approximates actual cost on a first-in, first-out basis) or net realizable value. The Company evaluates the valuation of all inventories, including raw materials, work-in-process, finished goods and spare parts on a periodic basis. Obsolete inventory or inventory in excess of management's estimated usage is written-down to its estimated market value less costs to sell, if less than its cost. Inherent in the estimates of market value are management's estimates related to economic trends, future demand for products, and technological obsolescence of the Company's products.

Inventory write downs inherently involve judgments as to assumptions about expected future demand and the impact of market conditions on those assumptions. Although the Company believes that the assumptions it used in estimating inventory write downs are reasonable, significant changes in any one of the assumptions in the future could produce a significantly different result. There can be no assurances that future events and changing market conditions will not result in significant increases in inventory write downs.

At December 28, 2018 and December 29, 2017, inventory balances were \$186.1 million and \$236.8 million, respectively, net of reserves of \$8.9 million and \$7.9 million, respectively. The inventory write-downs are recorded as an inventory valuation allowance established on the basis of obsolete inventory or specific identified inventory in excess of estimated usage. For fiscal years 2018, 2017 and 2016, inventory write-downs were \$3.3 million, \$2.6 million and \$2.3 million.

Property and Equipment, net — Property and equipment are stated at cost, or, in the case of equipment under capital leases, the present value of future minimum lease payments at inception of the related lease. Depreciation and amortization are computed using the straight-line method and declining balance methods over the lesser of the estimated useful lives of the assets or the terms of the leases. Useful lives range from three to forty years. .

Internal use software — Direct costs incurred to develop software for internal use are capitalized and amortized over an estimated useful life of three or five years. Costs related to the design or maintenance of internal use software are expensed as incurred. Capitalized internal use software is included in computer equipment and software.

Construction in progress — Construction in progress is related to the construction or development of property and equipment that has not yet been placed in service for their intended use and is, therefore, not depreciated. Construction in progress currently includes capitalized costs related to the Company's Enterprise Resource Planning ("ERP") implementation project.

Product Warranty — The Company provides a warranty on its products for a period of up to two years, and provides for warranty costs at the time of sale based on historical activity. Determination of the warranty reserve requires the Company to make estimates of product return rates and expected costs to repair or replace the products under warranty. If actual return rates and/or repair and replacement costs differ significantly from these estimates, adjustments to recognize additional cost of sales may be required in future periods. The warranty reserve is included in other current liabilities on the consolidated balance sheets.

Income Taxes — The Company utilizes the asset and liability method of accounting for income taxes, under which deferred taxes are determined based on the temporary differences between the financial statement and tax basis of assets and liabilities using tax rates expected to be in effect during the years in which the basis differences reverse. Deferred income taxes arise from temporary differences between the tax basis of assets and liabilities and their reported amounts in the financial statements, which will result in taxable or deductible amounts in the future. In evaluating our ability to realize our deferred tax assets within the jurisdiction from which they arise, we consider all available positive and negative evidence, including scheduled reversals of deferred tax liabilities, projected future taxable income, tax-planning strategies, and results of recent operations. In projecting future taxable income, we begin with historical results and incorporate assumptions about the amount of future state, federal, and foreign pretax operating income adjusted for items that do not have tax consequences. The assumptions about future taxable income require significant judgment and are consistent with the plans and estimates we are using to manage the underlying businesses. In evaluating the objective evidence that historical results provide, we consider recent cumulative income (loss). A valuation allowance is recorded when it is more likely than not that some of the deferred tax assets will not be realized.

During the quarter ended December 28, 2018 the Company performed a twelve quarter analysis of its U.S. cumulative pretax profit position as of December 28, 2018 and, weighing both positive and negative evidence, determined that it is more likely than not that the Company will not have the ability to generate sufficient taxable income over the foreseeable future to realize its U.S. federal and state deferred tax assets. Therefore, during the quarter ended December 28, 2018, the Company continues to believe that a valuation allowance is required on its U.S. federal net deferred tax assets. The total U.S. federal and state valuation allowance as of December 28, 2018 was \$7.7 million.

The Company's ability to realize deferred tax assets depends on its ability to generate sufficient future taxable income. In assessing the Company's future taxable income, the Company considered all sources of future taxable income available to realize its deferred tax assets, including the taxable income from future reversal of existing temporary differences, carry forwards and tax-planning strategies. If changes occur in the assumptions underlying the Company's tax planning strategies or in the scheduling of the reversal of its deferred tax liabilities, the valuation allowance may need to be adjusted in the future.

The Company had a total valuation allowance on its net deferred tax assets in the amount of \$7.7 million and \$8.1 million as of December 28, 2018 and December 29, 2017, respectively.

Income tax positions must meet a more likely than not recognition threshold to be recognized. Income tax positions that previously failed to meet the more likely than not threshold are recognized in the first subsequent financial reporting period in which that threshold is met. Previously recognized tax positions that no longer meet the more likely than not threshold are derecognized in the first subsequent financial reporting period in which that threshold is no longer met. The Company recognizes potential accrued interest and penalties related to unrecognized tax benefits within the consolidated statements of income as income tax expense. The calculation of tax liabilities

involves significant judgment in estimating the impact of uncertainties in the application of complex tax laws. Resolution of these uncertainties in a manner inconsistent with the Company's expectations could have a material impact on its results of operations and financial position. Management believes that it has adequately provided for any adjustments that may result from these examinations; however, the outcome of tax audits cannot be predicted with certainty.

Revenue Recognition — See Note 3 to the Company's Consolidated Financial Statements.

Research and Development Costs — Research and development costs are expensed as incurred.

Net Income per Share — Basic net income per share is computed by dividing net income by the weighted average number of shares outstanding for the period. Diluted net income per share is calculated by dividing net income by the weighted average number of common shares outstanding and common equivalent shares from dilutive stock options and restricted stock using the treasury stock method, except when such shares are anti-dilutive (see Note 12 to the Notes to Consolidated Financial Statements).

Segments — The Financial Accounting Standards Board's (FASB) guidance regarding disclosure about segments in an enterprise and related information establishes standards for the reporting by public business enterprises of information about reportable segments, products and services, geographic areas, and major customers. The method for determining what information to report is based on the manner in which management organizes the reportable segments within the Company for making operational decisions and assessments of financial performance. The Company's chief operating decision-maker is considered to be the Chief Executive Officer. The Company operates in one reporting segment, and therefore, has one reportable segment.

Business Combinations — The Company recognizes assets acquired (including goodwill and identifiable intangible assets), liabilities assumed and noncontrolling interest at fair value on the acquisition date. Subsequent changes to the fair value of such assets acquired and liabilities assumed are recognized in earnings, after the expiration of the measurement period, a period not to exceed 12 months from the acquisition date. Acquisition-related expenses and acquisition-related restructuring costs are recognized in earnings in the period in which they are incurred.

Noncontrolling interests — Noncontrolling interests are recognized to reflect the portion of the equity of the majority-owned subsidiaries which is not attributable, directly or indirectly, to the controlling stockholder. Through the acquisition of QGT in August 2018, the Company's consolidated entities include partially-owned entities through which the Company is obligated to own 86.0% of its consolidated subsidiary, Cinos Co., Ltd ("Cinos"), a Korean company that provides outsourced cleaning and recycling of precision parts for the semiconductor industry through its operating facilities in South Korea and, through a 60.0% interest in a joint venture, Cinos Xian Clean Technology, Ltd. ("Cinos Xian"), in China. The interest held by others in Cinos and in Cinos Xian are presented as noncontrolling interests in the accompanying condensed consolidated financial statements. The noncontrolling interest will continue to be attributed its share of gains and losses even if that attribution results in a deficit noncontrolling interest balance.

Defined Benefit Plan — QGT has a noncontributory defined benefit plan covering substantially all of the employees of one of its foreign entities upon termination of their employee services. The benefits are based on expected years of service and average compensation. QGT records annual amounts relating to the defined benefit plan based on calculations that incorporate various actuarial and other assumptions, including discount rates, mortality rates, assumed rates of return, compensation increases, employee demographics, and turnover rates. QGT reviews its assumptions on an annual basis and makes modifications to those assumptions based on current asset returns, rates, and trends. The effect of modifications to those assumptions is recorded in accumulated other comprehensive income and amortized to net periodic costs over the future service period using the corridor method. The Company believes that the assumptions utilized in recording its obligations under the plan are reasonable based on its experience and

market conditions. The net period costs are recognized as employees render the services necessary to earn the post termination benefits.

Deferred Debt Issuance Costs — Debt issuance costs incurred in connection with obtaining debt financing are deferred and presented as a direct deduction from Bank Borrowings in the accompanying Condensed Consolidated

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Balance Sheets. Costs incurred in connection with revolving credit facilities and letter of credit facilities are deferred and presented as an offset to bank borrowings in the accompanying Condensed Consolidated Balance Sheets. Deferred costs are amortized on an effective interest method basis over the contractual term.

Stock-based compensation

The Company maintains stock-based compensation plans which allow for the issuance of equity-based awards to executives and certain employees. These equity-based awards include stock options, restricted stock awards and restricted stock units. The Company also maintains an employee stock purchase plan (“ESPP”) that provides for the issuance of shares to all eligible employees of the Company at a discounted price.

Stock-based compensation expense includes compensation costs related to estimated fair values of stock options, units and awards granted. Stock-based compensation expense from stock options, restricted stock units and stock awards and the related income tax benefit recognized were \$7.8 million and \$1.1 million, respectively, for fiscal year 2017, \$5.7 million and \$2.7 million, respectively, for fiscal year 2016 and \$3.7 million and \$0.5 million, respectively, for fiscal year 2015.

The estimated fair value of the Company’s equity-based awards, net of expected forfeitures, is amortized over the awards’ vesting period on a straight-line basis over a weighted average period of four years for stock options, three years for restricted stock units and one year for restricted stock awards and will be adjusted for subsequent changes in estimated forfeitures and future option grants.

The Company uses historical data to estimate pre-existing forfeitures, and records stock-based compensation for those awards that are expected to vest at the time of grant and revises those estimates in subsequent periods if actual forfeitures differ from those estimates.

The stockholders of the Company approved an increase in the number of shares available for issuance under our amended and restated stock incentive plan by 1,500,000, 3,100,000 and 2,700,000 on June 10, 2010, May 22, 2013 and May 21, 2017, respectively.

There were no employee stock option grants by the Company for years 2018, 2017 and 2016. Generally, options vest over four years and expire no later than ten years from the grant date. During fiscal years 2018, 2017 and 2016, the Company recorded \$7.3 million, \$6.7 million and \$3.0 million, respectively, of stock-based compensation expense, net of tax, associated with employee and director stock plans and employee stock purchase plan programs. As of December 28, 2018, there was \$19.4 million, net of forfeitures of \$3.6 million, of unrecognized compensation cost related to employee and director stock which is expected to be recognized on a straight-line basis over a weighted average period of approximately 1.76 years, and will be adjusted for subsequent changes in estimated forfeitures and future grants.

Total stock-based compensation during the fiscal years 2018, 2017 and 2016, respectively, to various expense categories was as follows (in thousands):

	Year Ended		
	December 28, 2018	December 29, 2017	December 30, 2016
Cost of goods sold (1)	\$ 2,103	\$ 1,499	\$ 1,254
Sales and marketing	952	617	463

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Research and development	136	219	281
General and administrative	7,081	5,422	3,673
	10,272	7,757	5,671
Income tax benefit	(3,010)	(1,055)	(2,660)
Net stock-based compensation expense	\$ 7,262	\$ 6,702	\$ 3,011

(1) Stock-based compensation expenses capitalized in inventory for fiscal years 2018, 2017 and 2016 were considered immaterial.

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Goodwill and Indefinite Lived Intangible Assets

Goodwill and indefinite-lived intangible assets are not amortized, but are reviewed for impairment annually. Purchased intangible assets are presented at cost, net of accumulated amortization, and are amortized on either a straight-line method or on an accelerated method over their estimated future discounted cash flows. The Company reviews goodwill and purchased intangible assets with indefinite lives for impairment annually and whenever events or changes in circumstances indicate the carrying value of an asset may not be recoverable, such as when reductions in demand or significant economic slowdowns in the semiconductor industry are present.

Intangible assets reviews are performed to determine whether the carrying value is impaired, based on comparisons to undiscounted expected future cash flows. If this comparison indicates that there is impairment, the impaired asset is written down to fair value, which is typically calculated using: (i) quoted market prices or (ii) discounted expected future cash flows utilizing a discount rate. See Note 6 to the Notes to Consolidated Financial Statements for further discussion.

Goodwill is recorded as the difference, if any, between the aggregate consideration paid for an acquisition and the fair value of the noncontrolling interest acquired over the fair value of the net tangible and intangible assets acquired. The Company tests goodwill for impairment at the reporting unit level (operating segment or one level below an operating segment) on an annual basis in the fourth quarter of each fiscal year or more frequently if the Company believes indicators of impairment exist. The performance of the test involves a two-step process. The first step of the impairment test involves comparing the fair values of the applicable reporting units with their aggregate carrying values, including goodwill. The Company generally determines the fair value of the Company's reporting units using the income approach methodology of valuation that includes the discounted cash flow method as well as other generally accepted valuation methodologies. If the carrying amount of a reporting unit exceeds the reporting unit's fair value, the Company performs the second step of the goodwill impairment test to determine the amount of impairment loss. The second step of the goodwill impairment test involves comparing the implied fair value of the affected reporting unit's goodwill with the carrying value of that goodwill. The Company would then record a charge based on the results of the second step.

Long-lived Assets

The Company evaluates long-lived assets for impairment whenever events or changes in circumstances indicate the carrying value of an asset group may not be recoverable. The Company assesses the fair value of the assets based on the amount of the undiscounted future cash flows that the assets are expected to generate and recognizes an impairment loss when estimated undiscounted future cash flows expected to result from the use of the asset are less than the carrying value of the asset. If the Company identifies an impairment, the Company reduces the carrying value of the group of assets to comparable market values, when available and appropriate, or to its estimated fair value based on a discounted cash flow approach.

At the end of fiscal years 2018, 2017 and 2016, the Company assessed the useful lives of its long-lived assets, including property, plant and equipment as well as its intangible assets and concluded that no impairment was required.

Non-current assets, or disposal groups comprising assets and liabilities, that are expected to be recovered primarily through sale rather than through continuing use, are classified as held for sale. Immediately before classification as held for sale or distribution, the assets, or components of a disposal group, are measured at the lower of the carrying amount and fair value less costs to sell. Impairment losses on initial classification as held for sale and subsequent gains and losses on remeasurement are recognized in the statement of operations. Gains are not recognized in excess of any cumulative impairment loss. Once classified as held for sale, intangible assets and property, plant and

equipment are no longer amortized or depreciated.

Recently Adopted Accounting Pronouncements

Effective December 30, 2017, the Company adopted FASB Accounting Standards Codification (ASC) 606, Revenue from Contracts with Customers (Topic 606) using the modified retrospective approach, which requires the recognition of the cumulative effect of initially applying the standard (if any) as an adjustment to the opening retained earnings of the fiscal year beginning December 30, 2017. The adoption of Topic 606 did not result in the recognition of a cumulative adjustment to the opening retained earnings under the modified retrospective approach, nor did it have a material effect on the Company's financial position or results of operations. The adoption of Topic 606 did, however, result in the addition of required disclosures within the notes to financial statements. This new

standard replaced the previous revenue recognition guidance under U.S. GAAP. See Note 3, Revenue Recognition in Notes to Condensed Consolidated Financial Statements.

Our implementation team consisted of senior leadership from finance, legal, sales and operations with periodic progress reporting to management and to the audit committee of our board of directors. Implementation consisted of a review of the Company's significant contracts and an evaluation of our systems and control environment to support additional disclosures under the new standard, as well as updates to our policies and procedures.

During our assessment, we considered whether the adoption would require a transition from point-in-time revenue recognition to an over-time approach for products produced by us without an alternative use, which would result in acceleration of revenue. We concluded based on enforceable rights or prevailing terms and conditions included in the agreements with our customers, an enforceable right of payment that includes a reasonable profit throughout the duration of the contract does not exist. Therefore, we will remain at a point-in-time approach and record revenue at the point control transfers to our customers.

Beginning fiscal 2018, the Company adopted Accounting Standards Update (ASU) No. 2016-15, Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments, which clarifies classification of seven different cash receipts and payments on statement of cash flows and how the predominance principle should be applied. The adoption of this guidance did not have an impact on the Company's consolidated financial statements.

Beginning fiscal 2018, the Company adopted ASU 2017-01, Business Combinations (Topic 805): Clarifying the Definition of a Business, which clarifies the definition of a business to assist entities with evaluating whether transactions should be accounted for as acquisitions (or disposals) of assets or businesses. The impact of the adoption on the Company's financial position and results of operations will be dependent upon future acquisitions or disposals, if any.

Beginning fiscal 2018, the Company adopted ASU No. 2017-09, Stock Compensation: Scope of Modification Accounting, which clarifies when changes to the terms or conditions of a share-based payment award must be accounted for as a modification. The new guidance requires the application of modification accounting if the value, vesting conditions or classification of the award changes. The impact of the adoption of this guidance will depend on whether the Company makes any future modifications of share-based payment awards.

Beginning with the Company's acquisition of QGT, the Company adopted ASU 2017-07, Compensation—Retirement Benefits (Topic 715): Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost, which requires employers to report the service cost component of net periodic pension cost in the same line item as other compensation expense arising from services rendered during the period, and also requires the other components of net periodic cost be presented in the income statement separately from the service cost component and

outside of a subtotal of income from operations. The adoption of this guidance did not have an impact on the Company's consolidated financial statements.

Recent Accounting Pronouncements Not Yet Adopted

In February 2016, the FASB issued ASU No. 2016-02, Leases (Topic 842), ("ASC 842"). ASC 842 supersedes the lease recognition requirements in ASC 840, Leases. ASC 842 clarifies the definition of a lease and requires lessees to recognize right-of-use assets and lease liabilities for all leases, including those classified as operating leases under previous lease accounting guidance. The guidance is effective for public business entities for fiscal years and interim periods beginning after December 15, 2018, with early adoption permitted. Originally, entities were required to adopt ASU 2016-02 using a modified retrospective transition method. However, in July 2018, the FASB issued ASU 2018-11, Leases (Topic 842): Targeted Improvements, which provides entities with an additional transition method. Under ASU 2018-11, entities have the option of initially applying ASC 842 at the adoption date, rather than at the beginning of the earliest period presented, and recognizing the cumulative effect of applying the new standard as an adjustment to beginning retained earnings in the year of adoption while continuing to present all prior periods under previous lease accounting guidance. The Company plans to use the optional transition method at the adoption date of December 29, 2018. The Company anticipates recording lease liabilities and right-of-use assets to the consolidated balance sheet of approximately \$38.5 – \$40.5 million. The Company does not anticipate a significant cumulative-effect adjustment to the opening balance of retained earnings, and

doesn't anticipate the standard to have a material impact on the consolidated statements of income or cash flows. The Company is evaluating the disclosure requirements and collecting the relevant data in preparation for disclosure in the first quarter 2019 consolidated financial statements, and the Company is continuing to review existing contracts for potential embedded leases.

In January 2017, the FASB issued ASU. 2017-04, Intangibles-Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment, which requires companies to perform goodwill impairment test by comparing the fair value of a reporting unit with its carrying amount. The amendment will be effective for the Company beginning in its first quarter of fiscal year 2020. The amendment is required to be adopted prospectively. Early adoption is permitted. The Company is evaluating the impact of adopting this amendment to its consolidated financial statements.

In March 2017, the FASB issued ASU 2017-07, Presentation of Net Periodic Benefit Cost Related to Defined Benefit Plans, which amends the income statement presentation requirements for the components of net periodic benefit cost for an entity's defined benefit pension and post-retirement plans. ASU 2017-07 is effective in the first quarter of the Company's fiscal 2019 with early adoption permitted. The Company is evaluating the impact of adopting this guidance on the Company's consolidated financial statements.

In August 2017, the FASB issued ASU 2017-12, Derivatives and Hedging (Topic 815): Targeted Improvements to Accounting for Hedging Activities, which improves the financial reporting of hedging relationships to better portray the economic results of an entity's risk management activities in its financial statements and simplifies the application of hedge accounting. This standard will be effective for the Company beginning in its first quarter of fiscal year 2019 with early adoption permitted. The Company is evaluating the impact of adopting this amendment to its consolidated financial statements and related disclosures.

2. Financial Instruments

Derivative Financial Instruments

The Company utilizes foreign currency forward contracts with a local financial institution in the Czech Republic to reduce the risk that its cash flows and earnings of its FDS subsidiary will be adversely affected by foreign currency exchange rate fluctuations and uses certain interest rate derivative contracts to hedge interest rate exposures on existing floating rate debt. The Company classifies its foreign currency forward contracts and interest rate derivative contracts primarily within Level 2 of the fair-value hierarchy discussed in Note 1 of the Company's Consolidated Financial Statements as the valuation inputs are based on quoted prices and market observable data of similar instruments. The Company does not use derivatives for speculative or trading purposes.

Cash Flow Hedges

In September 2015, the Company entered into an interest rate swap with East West and City National banks with a notional amount of \$20.0 million pursuant to which the Company pays the counterparty a fixed rate of 0.99% and receives interest at a variable rate equal to the LIBOR rate the Company is required to pay under its term loan. In August 2018, the Company extinguished its debt with East West Bank thus the interest rate swap contract was consequently cancelled.

In 2017, FDS entered into foreign currency forward contracts to hedge certain forecasted costs and expenses transactions denominated in currencies other than FDS' local currency. The notional principal of these contracts was approximately \$7.3 million as of December 28, 2018. These contracts have maturities of 15 months or less.

Gains or losses on the effective portion of a cash flow hedge are reflected as a component of AOCI and subsequently recorded to interest income (expense) and/or to cost of goods sold when the hedged transactions are realized. If the hedged transactions become probable of not occurring, the corresponding amounts in AOCI would be immediately reclassified to interest and other income, net. As of December 28, 2018, the effective portion of the Company's cash flow hedge before tax effect was approximately \$0.1 million, of which \$0.1 million is expected to be reclassified from AOCI into earnings within the next 12 months.

The Company records all derivatives in the Consolidated Balance Sheets at fair value. The Company's accounting treatment for these derivative instruments is based on its hedge designation. The following tables show the Company's derivative instruments at gross fair value (in thousands) as of December 28, 2018 and December 29, 2017.

Balance Sheet Location		December 28, 2018			
		Fair Value of Derivatives Designated as Hedge Instruments		Fair Value of Derivatives Not Designated as Hedge Instruments	
					Total
		Fair Value			
Derivative assets and liabilities:					
Level 2:					
Forward contracts	Prepaid expenses and other	\$ 70	126		\$ 196
Forward contracts	Other non-current assets	\$ 8	36		\$ 44

Balance Sheet Location		December 29, 2017			
		Fair Value of Derivatives Designated as Hedge Instruments		Fair Value of Derivatives Not Designated as Hedge Instruments	
					Total
		Fair Value			
Derivative assets and liabilities:					
Level 2:					
Interest rate swap	Other current assets	\$ 30	\$	—	\$ 30
Forward contracts	Prepaid expenses and other	\$ 714	\$	—	\$ 714

The effect of derivative instruments in cash flow hedging relationships on income and other comprehensive income (OCI) is summarized below (in thousands):

Derivatives in Cash Flow Hedging Relationship	Gains (Losses) Recognized in OCI	
	on Derivatives Before Tax Effect	
	(Effective Portion)	
	Twelve Months Ended	
	December 28, 2018	December 29, 2017
Interest rate swap	\$ 36	\$ 4
Forward contracts	\$ 52	\$ (1,510)

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Gains (Losses) Reclassified from AOCI into Income
(Effective Portion)

Twelve Months Ended

Income Statement Location December 28, 2018 December 29, 2017

Derivatives in Cash Flow Hedging Relationship		December 28, 2018	December 29, 2017
Interest rate swap	Interest and other income		
	(expense), net	\$ 6	\$ 18
Forward contracts	Cost of goods sold	\$ (964)	\$ (255)

There were no gains (losses) recognized in income on derivatives that are excluded from the effectiveness testing and ineffective portion of the cash flow hedge for the fiscal year ended December 28, 2018 and December 29, 2017.

The effect of derivative instruments not designated as hedging instruments on income for the fiscal years ended December 28, 2018 and December 29, 2017 is immaterial to the financial statements.

3. Revenue Recognition

On December 30, 2017, the Company adopted Topic 606 using the modified retrospective method to value those contracts which were not completed as of December 30, 2017. The adoption of Topic 606 did not have a material effect on the Company's financial position or results of operations.

Revenue is recognized when control of the promised goods or services is transferred to the Company's customers, in an amount that reflects the consideration the Company expects to be entitled to in exchange for those goods or services. The Company assesses collectability based on the credit worthiness of the customer and past transaction history. The Company performs on-going credit evaluations of customers and generally does not require collateral from customers.

The Company operates in one operating and reportable segment as the nature of the Company's products and production processes, as well as type of customers and distribution methods, is consistent among all of the Company's products. The Company sells its products primarily to customers in the semiconductor capital equipment industry. The Company's revenues are highly concentrated, and we are therefore highly dependent upon a small number of customers. Typical payment terms with our customers range from thirty to sixty days.

The Company's most significant customers (having accounted for 10% or more of related) and their related revenues as a percentage of total revenues were as follows:

	Fiscal Year Ended		
	2018	2017	2016
Lam Research Corporation	55.1 %	59.8 %	53.3 %
Applied Materials, Inc.	21.5	24.6	28.9
Total	76.6 %	84.4 %	82.2 %

Three customers' accounts receivable balances, Lam Research Corporation, Applied Materials, Inc. and ASM International, Inc., were individually greater than 10% of accounts receivable as of December 28, 2018, in the aggregate approximately 62.9% of accounts receivable. Two customers' accounts receivable balances, Lam Research Corporation and Applied Materials were individually greater than 10% of accounts receivables as of December 29, 2017, in the aggregate represented approximately 75.8% of accounts receivable.

The Company provides warranty on its products for a period of up to two years and provides for warranty costs at the time of sale based on historical activity. Determination of the warranty reserve requires the Company to make estimates of product return rates and expected costs to repair or replace the products under warranty. If actual return rates and/or repair and replacement costs differ significantly from these estimates, adjustments to recognize additional cost of sales may be required in future periods. The warranty reserve is included in other current liabilities on the Condensed Consolidated Balance Sheets and are not considered significant.

The Company's products are manufactured at its facilities in the U.S.A., China, Singapore and the Czech Republic. QGT has operations in the U.S.A., Singapore, United Kingdom, Israel, Taiwan, South Korea, and China. See Note 13 for geographical revenue details. Sales to customers are initiated through a purchase order and are governed by our standard terms and conditions, written agreements, or both. Revenue is recognized when performance obligations under the terms of an agreement with a customer are satisfied; generally, this occurs with the transfer of control of our products. Transfer of control occurs at a specific point-in-time. Based on the enforceable rights included in our

agreements or prevailing terms and conditions, products produced by the Company without an alternative use are not protected by an enforceable right of payment that includes a reasonable profit throughout the duration of the agreement. Sales with terms f.o.b. shipping point are recognized at the time of shipment. For sales transactions with terms f.o.b. destination, revenue is recorded when the product is delivered to the customer's site. Consignment sales are recognized in revenue at the earlier of the period that the goods are consumed or after a period of time subsequent to receipt by the customer as specified by terms of the agreement, provided control of the promised goods or services has transferred.

Revenue is measured as the amount of consideration we expect to receive in exchange for transferring goods or providing services. Sales, value-add, and other taxes we collect concurrent with revenue-producing activities are excluded from revenue. Certain of our customers may receive cash-based incentives, such as rebates or credits, which are accounted for as variable consideration. We estimate these amounts based on the expected amount to be provided to customers and reduce revenues recognized. As of December 28, 2018, an accrual for unpaid customer rebates of \$1.3 million is included in accrued expenses on the Company's Condensed Consolidated Balance Sheet. The adoption of Topic 606 did not have a significant impact on our estimates for variable consideration.

The following table presents the Company's revenues disaggregated by revenue source (in thousands):

	Year Ended		
	December 28, 2018	December 29, 2017	December 30, 2016
Products	\$ 1,015,560	\$ 924,351	\$ 562,759
Services	80,963	—	—
Total	\$ 1,096,523	\$ 924,351	\$ 562,759

4. Balance Sheet Information

Inventories consisted of the following (in thousands):

	December 28, 2018	December 29, 2017
Raw materials	\$ 121,383	\$ 183,457
Work in process	50,959	43,826
Finished goods	13,774	9,557
Total	\$ 186,116	\$ 236,840

Equipment and leasehold improvements, net, consisted of the following (in thousands):

	December 28, 2018	December 29, 2017
Land	\$ 4,727	\$—
Building	32,243	—
Computer equipment and software	31,342	11,672
Furniture and fixtures	5,764	3,318
Machinery and equipment	57,602	19,781
Vehicles	645	—
Leasehold improvements	38,625	22,839

	170,948	57,610
Accumulated depreciation	(42,501)	(38,879)
Construction in progress	15,012	13,515
Total	\$ 143,459	\$ 32,246

5. Acquisition and Disposal

QGT

On August 27, 2018, the Company acquired all of the outstanding preferred and common units of QGT, a provider of ultra-high purity parts cleaning, process tool part recoating, surface treatment and analytical services to the semiconductor and related industries, for total purchase consideration of \$340.8 million, including an estimated \$4.2 million in contingent consideration related to \$15.0 million of potential cash earn-out payments if the Company achieves certain specified revenue levels through December 27, 2019. In addition, the Company incurred approximately \$10.0 million of costs related to the acquisition, which were expensed as incurred and recorded as

general and administrative operating expense. The Company completed this acquisition primarily in order to diversify the Company's customer base, to create a wafer-starts-based recurring revenue stream, and to expand the Company's addressable market. The Company borrowed \$350.0 million to finance the acquisition and to refinance its existing indebtedness. See further discussion of the new borrowing arrangements in Note 8 to the Notes to Condensed Consolidated Financial Statements.

The fair value of the earn-out at the acquisition date was determined using the Monte Carlo Simulation, which incorporated risk adjusted revenue projections. These inputs are not observable in the market and thus represent a Level 3 measurement as discussed in Note 1 of the Company's Condensed Consolidated Financial Statements.

The Company has preliminarily allocated the purchase price of QGT to the tangible assets, liabilities and identifiable intangible assets acquired, based on their estimated fair values. The excess of purchase price over the aggregate fair value was recorded as goodwill. Goodwill associated with the acquisition is primarily attributable to the future technology, market presence and knowledgeable and experienced workforce. Although goodwill is not amortized for financial accounting purposes, it is amortized in its entirety for tax purposes over fifteen years. The fair value assigned to identifiable intangible assets acquired was determined using the income approach taking into account the Company's consideration of a number of inputs, including an independent third-party analysis that was based upon estimates and assumptions provided by the Company. These estimates and assumptions were determined through established and generally accepted valuation techniques. The estimated fair value of the tangible and intangible assets acquired was allocated at QGT's acquisition date.

The Merger Agreement contains customary representations and warranties between the Company and QGT, who agreed to indemnify each other for certain breaches of representations, warranties, covenants and other specified matters. Approximately \$2.3 million of the purchase price was placed in escrow as security for post-closing working capital adjustments. In addition, approximately \$3.4 million of the purchase price was placed in escrow as security for the QGT's indemnification obligations during the escrow period. The Company also obtained representation and warranty insurance as an additional source of recourse for certain losses in excess of the amount of funds in the indemnity escrow account.

The allocation of the purchase price is preliminary pending the completion of various analyses and the finalization of estimates. The primary areas of the preliminary purchase price allocation that are not yet finalized relate to the fair values of certain tangible assets and liabilities, primarily property and equipment, intangible assets, and residual goodwill. During the measurement period, which can be no more than one year from the date of acquisition, we expect to continue to obtain information to assist us in determining the final fair value of the net assets acquired at the acquisition date during the measurement period. Assets acquired and liabilities assumed are recorded based on valuations derived from estimated fair value assessments and assumptions used by the Company. Thus, the provisional measurements of fair value discussed above are subject to change. The Company expects to finalize the valuation as soon as practicable, but not later than one year from the acquisition date. While the Company believes that its estimates and assumptions underlying the valuations are reasonable, different estimates and assumptions could result in different valuations assigned to the individual assets acquired and liabilities assumed, and the resulting amount of goodwill. The following table summarizes the preliminary fair values of assets acquired and liabilities assumed at the date of acquisition (in thousands):

Fair Market Values (in thousands)	
Cash and cash equivalents	\$ 18,991
Accounts receivable	24,239
Inventories	475
Prepaid expenses and other	12,258
Property and equipment	101,057
Goodwill	64,978
Purchased intangible assets	171,500
Total assets acquired	393,498
Accounts payable	(8,996)
Accrued compensation and related benefits	(7,910)
Other current liabilities	(7,361)
Deferred tax liability	(899)
Other liabilities	(13,162)
Total liabilities assumed	(38,328)
Noncontrolling interest	(14,337)
Fair value of net assets acquired	\$340,833

	Useful	Purchased
	Life	Intangible
	(In years)	Assets
		(In thousands)
Customer relationships	10	\$ 74,800
Trade name	4	14,900
Recipes	20	73,200
Standard operating procedures	20	8,600
Total purchased intangible assets		\$ 171,500

Goodwill is not amortized but is reviewed for impairment at least annually and whenever events or changes in circumstances indicate that the carrying value of an asset may not be recoverable.

After the September 28, 2018 financial statements were issued, the Company further reviewed the fair value of the assets acquired, liabilities assumed as well as the noncontrolling interest. As a result, the fair value of the total assets acquired increased by \$0.5 million, liabilities assumed increased by \$4.0 million and noncontrolling interest increased by \$1.9 million, with the corresponding increase to goodwill.

The results of operations for the Company for the twelve months ended December 28, 2018 include operating activity for QGT since its acquisition date of August 27, 2018. For the twelve months ended December 28, 2018, revenues of approximately \$81.0 million attributable to QGT were included in the consolidated results of operations. For the twelve months ended December 28, 2018, results of operations included charges of \$5.2 million, attributable

to amortization of purchased intangible assets and \$10.0 million of deal costs associated with the acquisition. Deal costs are included in general and administrative expenses in the Company's consolidated results of operations.

	Unaudited Pro Forma Information Year Ended	
	December 28, 2018	December 29, 2017
	(In thousands, except per share amounts)	
Revenues	\$1,252,710	\$1,142,240
Net income	\$41,293	\$71,451
Basic income per share	\$1.08	\$2.14
Diluted income per share	\$1.06	\$2.08

The unaudited pro forma results above include adjustments related to the purchase price allocation and financing of the acquisition, primarily to increase amortization for the identifiable intangible assets, to increase interest expense for the additional debt incurred to complete the acquisition, to reflect the related income tax effect. The unaudited pro forma results for the twelve months period ended December 28, 2018 exclude acquisition related costs of \$10.0 million which are not expected to occur in future quarters. The unaudited pro forma condensed combined financial information has been prepared by management for illustrative purposes only and are not necessarily indicative of the condensed consolidated financial position or results of income in future periods or the results that would have been realized had UCT and QGT been a combined company during the specified periods. The unaudited pro forma condensed combined financial information does not reflect any operating efficiencies and/or cost savings that the Company may achieve with respect to the combined companies, or any liabilities that may result from integration activities.

Quantum Facility Fire

In September 2018, a fire in a facility owned by a South Korean subsidiary of QGT destroyed certain assets, including the building, acquired in the QGT acquisition. The fire's damage was estimated to be \$5.9 million. The building and related assets were fully insured, resulting in no net loss from the fire's damage. The fire also destroyed inventory owned by one of its customers. The Company is currently in the process of determining the cost of this inventory. The Company was able to minimize the impact on the Company's revenue stream by utilizing its other local facilities and moving its labor force in quick order. The Company had a \$2.0 million business interruption insurance policy at the time of the fire, of which it has accrued \$1.0 million as of December 28, 2018.

Sale of UAMC

On August 3, 2018, the Company sold its subsidiary, UAMC, for \$0.3 million, in the form of note receivable from the purchaser. UAMC was launched in November 2004 to develop additive, 3D printing manufacturing capabilities. At closing, the carry value of the UAMC assets sold were \$1.1 million. The Company also included free rent, labor and utilities for a period of six months as part of the agreement. The Company believes that the assets related to UAMC

that were sold include all key inputs and processes necessary to generate output, and, accordingly, the Company has determined that UAMC qualified as a business. As a result of the sale, the Company recognized a loss on sale of a business of \$1.1 million in the accompanying Condensed Consolidated Statements of Operations recorded in Interest and other income (expense), net.

6. Goodwill and Purchased Intangible Assets

The Company's methodology for allocating the purchase price relating to purchase acquisitions is determined through established and generally accepted valuation techniques. Goodwill is measured as the excess of the cost of the acquisition over the sum of the amounts assigned to tangible and identifiable intangible assets acquired less liabilities assumed. Goodwill and purchased intangible assets with indefinite useful lives are not amortized, but are reviewed for impairment at least annually and whenever events or changes in circumstances indicate that the carrying value of an asset may not be recoverable. If the carrying value of a reporting unit exceeds its fair value, the Company would then perform the second step of the impairment test in order to determine the implied fair value of the reporting unit's goodwill. If the Company determines that the carrying value of a reporting unit's goodwill exceeds its implied fair value, the Company would record an impairment charge equal to the difference. The process

of evaluating the potential impairment of goodwill and intangible assets requires significant judgment. The Company regularly monitors current business conditions and other factors including, but not limited to, adverse industry or economic trends and lower projections of profitability that may impact future operating results.

As part of the Company's annual testing of goodwill impairment, in the fourth quarter of fiscal 2018, the Company performed the two-step impairment test of the Company's three reporting units for potential impairment. The Company utilized the discounted cash flow method of the income approach to estimate the fair values of each of the reporting units. The estimates used in the impairment testing were consistent with the discrete forecasts that the Company uses to manage its business, and, additionally, considered the developments that occurred since the dates of the acquisitions. Under the discounted cash flow method, cash flows beyond the discrete forecasts were estimated using terminal growth rates ranging from 3.9%—5.8%, which are considered to be the long-term earnings growth rates specific to the reporting units. The estimated future cash flows were discounted to present value using discount rates between 15.0%—18.0% that were the value-weighted average of the reporting units' estimated cost of equity and debt derived using both known and estimated market metrics. These discount rates were adjusted to reflect risk factors that considered both the timing and risks associated with the estimated cash flows for each of the respective reporting units. The tax rates used in the discounted cash flows reflected the international structure currently in place, which is consistent with the market participant perspective. The Company then allocated the fair values of the reporting units to the assets and liabilities of each of the reporting units. Based on the Company's analyses, the Company concluded that the fair value of each of the reporting units was greater than their carrying amount, including goodwill, and, therefore, the second step of the goodwill impairment test was not required.

Details of aggregate goodwill of the Company are as follows (in thousands):

	Gross Amount	Accumulated Impairment*	Net Carrying Amount
Year Ended December 28, 2018			
Goodwill	\$ 184,269	\$ (34,043)	\$ 150,226
Year Ended December 29, 2017			
Goodwill	\$ 119,291	\$ (34,043)	\$ 85,248

*Represents goodwill recorded for UCT in 2002 and Sieger Engineering in 2006, which was fully impaired in prior years.

Details of goodwill and other intangible assets were as follows (in thousands):

	December 28, 2018			December 29, 2017		
	Goodwill	Intangible Assets	Total	Goodwill	Intangible Assets	Total
Carrying amount	\$ 150,226	\$ 193,507	\$ 343,733	\$ 85,248	\$ 31,587	\$ 116,835

Purchased Intangible Assets

Intangible assets are generally recorded in connection with a business acquisition. The Company evaluates the useful lives of its intangible assets each reporting period to determine whether events and circumstances require revising the remaining period of amortization. In addition, the Company reviews indefinite lived intangible assets for impairment when events or changes in circumstances indicate their carrying value may not be recoverable and tests definite lives intangible assets at least annually for impairment. Management considers such indicators as significant differences in product demand from the estimates, changes in the competitive and economic environment, technological advances,

and changes in cost structure.

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Details of purchased intangible assets were as follows (in thousands):

	As of December 28, 2018			As of December 29, 2017			Useful Life (in years)
	Gross Carrying Amount	Accumulated Amortization	Carrying Value	Gross Carrying Amount	Accumulated Amortization	Carrying Value	
AIT							
Customer relationships	\$ 19,000	\$ (18,617)	\$ 383	\$ 19,000	\$ (17,998)	\$ 1,002	7
Tradename	1,900	(1,900)	—	1,900	(1,900)	—	6
Intellectual property/know-how							
	1,600	(1,486)	114	1,600	(1,257)	343	7
Thermal							
Customer relationships	9,900	(3,877)	6,023	9,900	(2,887)	7,013	10
Tradename	1,170	(1,170)	—	1,170	(1,170)	—	6
Intellectual property/know-how							
	12,300	(5,402)	6,898	12,300	(4,023)	8,277	8-12
FDS							
Customer relationships	8,800	(4,009)	4,791	8,800	(2,835)	5,965	7.5
QGT							
Customer relationships	74,800	(2,500)	72,300	—	—	—	10
Tradename	14,900	(1,326)	13,574	—	—	—	4
Recipes	73,200	(1,220)	71,980	—	—	—	20
Standard operating procedures	8,600	(143)	8,457	—	—	—	20
UCT							
Tradename	8,987	—	8,987	8,987	—	8,987	*
Total	\$ 235,157	\$ (41,650)	\$ 193,507	\$ 63,657	\$ (32,070)	\$ 31,587	

* The Company concluded that the UCT tradename intangible asset life is indefinite and is therefore not amortized but is reviewed for impairment at least annually and whenever events or changes in circumstances indicate that the carrying value of an asset may not be recoverable.

The Company amortizes its intangible assets for AIT, Thermal, FDS and QGT on a straight-line or accelerated basis over the estimated economic life of the assets. Amortization expense was approximately \$9.6 million for the year ended December 28, 2018, \$5.4 million for the year ended December 29, 2017, and \$5.8 million for the year ended December 30, 2016.

In the fourth quarter of 2017 the Company wrote off the tradename acquired from Thermal of \$0.5 million as the Company no longer believed that these tradenames have value. The Company also carries a UCT trade-name intangible asset of \$9.0 million as a result of a previous acquisition. The Company concluded that the UCT trade-name intangible asset life is indefinite and is therefore not amortized. The Company also concluded that the UCT trade-name as of December 28, 2018 is not impaired as there were no new events or changes in circumstances that would indicate that its carrying amount may not be recoverable.

	Amortization Expense
2019	\$ 19,329

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2020	18,649
2021	18,409
2022	18,135
2023	13,063
2024 and thereafter	96,935
Total	\$ 184,520

7. Noncontrolling interest

QGT owns 51.0% of the outstanding shares of Cinos Co., Ltd., a South Korean company that provides outsourced cleaning and recycling of precision parts for the semiconductor industry through its operating facilities in South Korea and, through a 60.0% interest in a joint venture (Cinos Xian Clean Technology, Ltd.), in China. QGT is obligated to purchase shares held by two other shareholders of Cinos Co., Ltd. representing a combined 35.0% interest. QGT accounted for this unconditional obligation as an assumed liability and derecognized any noncontrolling interest related to the 35%, which brings its controlling interest up to 86%.

The carrying value of the remaining 14.0% interest held by others in Cinos Co., Ltd. and the 40.0% interest in the China joint venture are presented as noncontrolling interests in the accompanying consolidated financial statements. The fair values of the noncontrolling interests were estimated based on the values of Cinos Co., Ltd. and Cinos Xian Clean Technology, Ltd. on a 100.0% basis. The values were calculated based on the pro-rata portion of total forecasted Q4 2018 QGT earnings before interest expense, taxes, depreciation and amortization ("EBITDA") contributed by each entity. Management indicated that each entity's pro-rata portion of EBITDA was reasonably reflective of each entity's invested capital value at the acquisition date.

The Company is obligated to purchase stock owned by a Cinos Co., Ltd. shareholder at a fixed price per share, while the purchase price per share for the other shareholder is the greater of the then fair value of the stock and the fixed price per share (floor). The Company has a firm obligation to purchase the shares and a call option, while the two shareholders have a put option. Accordingly, the fair value of the obligation of \$8.5 million has been recorded as a non-current liability in the accompanying consolidated balance sheets and represents a Level 3 measurement as discussed in Note 1 of the Company's Condensed Consolidated Financial Statements. The agreement with Cinos Co., Ltd. allows for the purchase obligation to become due at various times through December 2022.

8. Borrowing Arrangements

In August 2018, the Company entered into a credit agreement with Barclays Bank that provided a Term Loan, a Revolving Credit Facility, and a Letter of Credit Facility (the "Credit Facilities"). The Company and certain of its subsidiaries have agreed to secure all of their obligations under the Credit Facilities by granting a first priority lien in substantially all of their respective personal property assets (subject to certain exceptions and limitations). In August 2018, the Company borrowed \$350.0 million under the Term Loan and used the proceeds, together with cash on hand, to finance the acquisition of Quantum (see Note 5) and to refinance its previous credit facilities.

The Company had a credit facility in the U.S. that was refinanced in August 2018, under which, the Company and certain of its subsidiaries had agreed to secure all of their obligations under a credit agreement (the "Credit Agreement") by granting a first priority lien in substantially all of their respective personal property assets (subject to certain exceptions and limitations). In August 2018, the Company paid \$41.6 million of principal, accrued interest, and fees in settlement of the then-outstanding term loan, revolving credit facility, interest rate swap under the Credit Agreement, and recognized \$0.1 million in expense upon extinguishment as Interest and other income (expense), net.

The Term Loan has a maturity date of August 27, 2025, with monthly interest payments in arrears, quarterly principal payments of 0.625% of the original outstanding principal balance payable beginning January 2019, with the remaining principal paid upon maturity. The Term Loan accrues interest at a rate equal to a base LIBOR rate determined by reference to the London interbank offered rate for dollars, plus 4.5% (subject to certain adjustments quarterly based upon the Company's consolidated leverage ratio). The Company may prepay the Term Loan in whole or in part without penalty after six months from issuance, before which the Company must pay a prepayment fee equal to 1.0% of the aggregate principal amount prepaid. As of December 28, 2018, the Company had an outstanding amount under the Term Loan of \$350.0 million, gross of unamortized debt issuance costs of \$11.5 million.

The Revolving Credit Facility has an initial available commitment of \$65.0 million and a maturity date of August 27, 2023. The Company pays a quarterly commitment fee in arrears equal to 0.25% of the average daily available commitment outstanding. As of December 28, 2018, the Company had zero outstanding amount under the Revolving Credit Facility. The New Credit Agreement requires the Company to maintain certain financial covenants

including a consolidated fixed charge coverage ratio (as defined in the New Credit Agreement) as of the last day of any fiscal quarter of at least 1.25 to 1.00, and a consolidated leverage ratio (as defined in the New Credit Agreement) as of the last day of any fiscal quarter of no greater than 3.75 to 1.00. The Company was in compliance with all covenants for the quarter ended December 28, 2018.

The Letter of Credit Facility has an initial available commitment of \$50.0 million and a maturity date of August 27, 2023. The Company pays quarterly in arrears a fee equal to 2.5% (subject to certain adjustments as per the Term Loans) of the dollar equivalent of all outstanding letters of credit, and a fronting fee equal to 0.125% of the undrawn and unexpired amount of each letter of credit. As of September 28, 2018, the Company's outstanding letters of credit and remaining available commitments was none and \$65.0 million.

As of December 28, 2018, FDS had outstanding amount under a revolving credit facility of 2.4 million euros (approximately \$2.7 million) with an interest rate of 1.3% plus a variable rate based on the Euro Interbank Offered Rate.

As of December 28, 2018, the Company's total bank debt was \$341.2 million, net of unamortized debt issuance costs of \$11.5 million. As of December 28, 2018, the Company had \$65.0 million and 5.9 million euros (approximately \$6.7 million) available to borrow on its revolving credit facilities in the U.S. and Czech Republic, respectively.

The fair value of the Company's long term debt was based on Level 2 inputs, and fair value was determined using quoted prices for similar liabilities in inactive markets. The Company's carrying value approximates fair value for the Company's long term debt.

9. Income Taxes

U.S. and foreign components of income before income taxes were (in thousands):

	Year Ended		
	December 28, 2018	December 29, 2017	December 30, 2016
U.S. operations	\$ (5,075)	\$ 8,869	\$ (17,459)
Foreign operations	57,343	78,073	36,406
Total pretax income	\$ 52,268	\$ 86,942	\$ 18,947

The provision for income taxes consisted of the following (in thousands):

	Year Ended		
	December 28, 2018	December 29, 2017	December 30, 2016
Current:			
Federal	\$ 2,298	\$ 3,662	\$ —
State	663	240	110

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Foreign	12,264	11,719	5,321
Total current	15,225	15,621	5,431
Deferred:			
Federal	234	(5,556)	1,706
State	77	176	202
Foreign	(217)	1,616	1,557
Total deferred	94	(3,764)	3,465
Total provision \$	\$ 15,319	\$ 11,857	\$ 8,896

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	Year Ended	
	December 28, 2018	December 29, 2017
Net non-current deferred tax asset:		
Inventory valuation and basis difference	\$ 3,305	\$ 2,703
State taxes	369	50
Stock compensation	1,679	1,398
Other timing differences	3,363	1,148
Intangibles	6,286	3,387
Net operating losses	2,239	3,055
Tax credits	626	—
	17,867	11,741
Valuation allowance	(7,700)	(8,064)
Net non-current deferred tax asset	10,167	3,677
Total deferred tax asset	10,167	3,677
Non-current deferred tax liability:		
Undistributed earnings	(2,516)	(2,516)
Depreciation	(6,374)	302
Goodwill	(6,944)	(6,493)
Net deferred tax liability	\$ (5,667)	\$ (5,030)

The effective tax rate differs from the U.S. federal statutory tax rate as follows:

	Year Ended					
	December 28, 2018		December 29, 2017		December 30, 2016	
Federal income tax provision at						
statutory rate	21.0	%	35.0	%	34.0	%
State income taxes, net of federal						
benefit	2.0	%	0.3	%	(0.6))%
Effect of foreign operations	—	%	(18.7))%	(15.3))%
Change in valuation allowance	(0.1))%	(19.8))%	30.8	%
Foreign income inclusions	2.1	%	—	%	—	%
Acquisition related costs	—	%	—	%	1.0	%
Adjustment for changes in tax law	3.6	%	15.8	%	—	%
Other	0.7	%	1.0	%	(3.0))%
Effective Tax Rate	29.3	%	13.6	%	46.9	%

The Company earns a significant amount of its operating income outside the United States, which is deemed to be indefinitely reinvested in foreign jurisdictions, except as disclosed below. As a result, most of the Company's cash and cash equivalents are held by foreign subsidiaries. The Company currently does not intend nor foresee a need to repatriate any other funds to the U.S. The Company expects domestic cash and cash flows from operations to continue to be sufficient to fund its domestic operating activities and cash commitments for investing and financing activities,

such as debt repayment and capital expenditures, for the foreseeable future. If the Company should require more capital in the U.S. than is generated by its domestic operations, for example to fund significant discretionary activities such as business acquisitions, the Company could raise capital in the United States through debt or equity issuances. These alternatives could result in higher effective tax rates, increased interest expense, or dilution of our earnings. The Company has borrowed funds domestically and continues to believe it has the ability to do so at reasonable interest rates. The Company does not provide for U.S. taxes on its undistributed earnings of foreign subsidiaries that it intends to invest indefinitely outside the U.S., unless such taxes are otherwise required under U.S. tax law. In 2017, the Company determined that a portion of the current year earnings of one of its China subsidiaries may be remitted in the future to one of its foreign subsidiaries outside of mainland China and, accordingly, the Company provided for the related withholding taxes in its consolidated financial statements. As of December 28, 2018, the Company had undistributed earnings of foreign subsidiaries that are indefinitely invested

outside of the U.S. of approximately \$224.4 million. If the Company were to distribute these earnings to the United States, these earnings could be subject to withholding taxes in the countries where the cash was earned.

On December 22, 2017, the 2017 Tax Cuts and Jobs Act (Tax Act) was enacted into law and the new legislation contains several key tax provisions that affected us, including a one-time mandatory transition tax on accumulated foreign earnings and a reduction of the corporate income tax rate to 21% effective January 1, 2018, among others. We were required to recognize the effect of the tax law changes in the period of enactment, such as determining the transition tax, remeasuring our U.S. deferred tax assets and liabilities as well as reassessing the net realizability of our deferred tax assets and liabilities. In December 2017, the SEC staff issued Staff Accounting Bulletin No. 118, Income Tax Accounting Implications of the Tax Cuts and Jobs Act (SAB 118), which allowed us to record provisional amounts during a measurement period not to extend beyond one year of the enactment date. As a result, we previously provided a provisional estimate of the effect of the Tax Act in our financial statements. In 2018, we completed our analysis to determine the effect of the Tax Act and recorded an additional \$2.2 million of tax expense.

The following table summarizes the activity related to the Company's unrecognized tax benefits (in thousands):

Balance as of December 30, 2016	\$ 298
Increases related to current year tax positions	17
Expiration of the statute of limitations for the	
assessment of taxes	(13)
Balance as of December 29, 2017	\$ 302
Increases related to current year tax positions	723
Expiration of the statute of limitations for the	
assessment of taxes	(13)
Balance as of December 28, 2018	\$ 1,012

The Company's gross liability for unrecognized tax benefits as of December 28, 2018 and December 29, 2017 was \$1.0 million and \$0.3 million, respectively. Increases or decreases to interest and penalties on uncertain tax positions are included in the income tax provision in the Consolidated Statements of Operations. Interest related to uncertain tax positions for the periods ended December 28, 2018, December 29, 2017 and December 30, 2016 were \$0.1 million, \$0.0 million, and \$0.0 million, respectively. Although it is possible some of the unrecognized tax benefits could be settled within the next twelve months, the Company cannot reasonably estimate the outcome at this time.

As of December 28, 2018, the Company had California net operating loss carryforwards ("NOLs") of approximately \$22.1 million. The California NOLs begin expiring after 2031.

The Company files income tax returns in the U.S. federal jurisdiction, various states and foreign jurisdictions. The Company's 2015 through 2017 federal income tax returns are open to audit through the statute of limitations by the Internal Revenue Service. The Company's 2014 through 2017 state income tax returns are open to audit by the California Franchise Tax Board. The Company is also subject to examination in various other jurisdictions for various

periods.

10. Stockholders' Equity

Stock Repurchase Plan — On July 24, 2008, the Board of Directors approved a stock repurchase program for up to \$10.0 million. The Company commenced the repurchase of its common stock on August 4, 2008. The total number of shares repurchased and related cost of the stock repurchase program were 601,994 shares at a cost of \$3,337,000, or an average cost of \$5.54 per share. The Company has not repurchased stock during any of the fiscal years after 2008.

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In February of 2018, the Company completed an underwritten public offering of 4,761,905 shares of its common stock with net proceeds of approximately \$94.3 million, after deducting the underwriting discounts and offering expenses of \$0.7 million.

11. Employee Benefit Plans

Stock Options — On February 20, 2003, the Company adopted the 2003 Stock Incentive Plan (the “2003 Incentive Plan”) which was subsequently amended and restated. The Company has reserved 4,515,239 shares of its common stock for issuance under the 2003 Incentive Plan. The 2003 Incentive Plan provides for the issuance of options and other stock-based awards. Options are generally granted at fair value at the date of grant as determined by the Board of Directors and have terms up to ten years and generally vest over four years.

The stockholders of the Company approved amendments to the Company’s 2003 Stock Incentive Plan, which included an increase in shares available for issuance by 1,500,000, 3,100,000 and 2,700,000 common shares which are more fully described in the Company’s definitive proxy statements filed on April 23, 2010, May 27, 2013 and May 21, 2017, respectively. At December 28, 2018, 1,299,197 shares were available for future grants under the 2003 Incentive Plan.

Option activity under the 2003 Incentive Plan is as follows:

	Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life	Aggregate Intrinsic Value (in thousands)
Outstanding, December 25, 2015	315,648	\$ 10.02	2.06	\$ 216
Exercised	(101,700)	3.91		
Cancelled	(77,489)	12.54		
Outstanding, December 30, 2016	136,459	\$ 13.15	0.57	\$ 135
Exercised	(113,362)	13.96		
Cancelled	(13,825)	14.56		
Outstanding, December 29, 2017	9,272	\$ 1.17	1.24	\$ 203
Exercised	(5,000)	1.17		
Outstanding, December 28, 2018	4,272	\$ 1.17	0.24	\$ 30
Options exercisable and expected to vest, December 28, 2018	4,272	\$ 1.17	0.24	\$ 30

The following table summarizes information with respect to options outstanding and exercisable at December 28, 2018:

Shares	Weighted Average Remaining Average	Weighted Average Exercise	Shares	Weighted Average Exercise
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Range of Exercise Price	Outstanding	Life (Years)	Price	Exercisable	Price
\$1.17	4,272	0.24	\$ 1.17	4,272	\$ 1.17

For the fiscal years 2018, 2017 and 2016, the intrinsic value of the Company's exercised stock options was \$30.0 thousand, \$0.2 million and \$0.1 million respectively. There was no stock-based compensation expense for fiscal year 2018, 2017 and 2016 attributable to stock options as all outstanding options were fully vested at the beginning of the 2014 fiscal year.

Restricted Stock Units and Restricted Stock Awards — In fiscal years 2018, 2017 and 2016, the Company granted 38,010, 45,000 and 52,000 shares, respectively, of common stock to its board members under the 2003 Incentive Plan. These Restricted Share Awards (RSAs) vest on the earlier of 1) the next Annual Shareholder Meeting, or 2) 365 days from date of grant. The total unamortized expense of the Company's unvested RSAs as of December 28,

2018, is approximately \$0.3 million. During the first quarter of fiscal year 2008, the Company began granting stock awards in the forms of Restricted Stock Units (RSUs) and Performance Stock Units (PSUs) to its employees as part of the Company’s long term equity compensation plan. These stock awards are granted to employees with a unit purchase price of zero dollars and typically vest over three years, subject to the employee’s continued service with the Company and, in the case of PSUs, subject to achieving certain performance goals. The expected cost of the grant is recognized over the service period, and is reduced for estimated forfeitures and, in the case of PSUs, is reduced based on estimated achievement of performance goals. During the year ended December 28, 2018, the Company approved and granted 938,464 RSU’s to employees with a weighted average grant date fair value of \$15.78 per share and 87,050 PSUs with a weighted average grant date fair value of \$19.25 per share. As of December 28, 2018, \$15.6 million of unrecognized stock-based compensation cost, net of estimated forfeitures, related to RSUs remains to be amortized and is expected to be recognized over an estimated period of 1.8 years. The unvested amount is subject to forfeiture, until fully vested. At December 28, 2018, 1,777,379 shares were subject to forfeiture.

The following table summarizes the Company’s restricted stock unit and restricted stock award activity through the year ended December 28, 2018 :

	Number of Shares	Aggregate Intrinsic Value (in thousands)
Unvested restricted stock units and restricted stock awards		
at December 30, 2016	1,757,507	\$ 16,466
Granted	760,180	
Vested	(759,378)	
Forfeited	(81,997)	
Unvested restricted stock units and restricted stock awards at December 29, 2017		
	1,676,312	\$ 38,706
Granted	1,063,524	
Vested	(793,045)	
Forfeited	(169,412)	
Unvested restricted stock units and restricted stock awards at December 28, 2018		
	1,777,379	\$ 14,592
Vested and expected to vest restricted stock units and restricted stock awards		
	1,512,337	\$ 12,415

Employee Stock Purchase Plan — In 2004 the Company adopted an Employee Stock Purchase Plan (“ESPP”) and is authorized to issue 555,343 shares of common stock under the ESPP. The ESPP permits employees to purchase common stock at a discount through payroll withholdings at certain specified dates (purchase period) within a defined offering period. The purchase price is 95% of the fair market value of the common stock at the end of the purchase period and is intended to qualify as an “employee stock purchase plan” under Section 423 of the Internal Revenue Code. There were 21,331 shares issued under the ESPP during the year ended December 28, 2018.

Employee Savings and Retirement Plan — The Company sponsors a 401(k) savings and retirement plan (the “401(k) Plan”) for all employees who meet certain eligibility requirements. Participants could elect to contribute to the 401(k) Plan, on a pre-tax basis, up to 25% of their salary to a maximum of \$18,500. The Company may make matching contributions of up to 3% of employee contributions based upon eligibility. The Company made approximately \$1.2 million, \$1.2 million, and \$1.1 million discretionary employer contributions to the 401(k) Plan in the years ended December 28, 2018, December 29, 2017 and December 30, 2016, respectively.

Defined benefit plan

The Company’s subsidiary (Cinos Co., Ltd.) has a noncontributory defined benefit pension plan covering substantially all of its employees upon their retirement. The benefits are based on expected years of service and average compensation. The net period costs are recognized as employees render the services necessary to earn the postretirement benefits. The Company records annual amounts relating to the pension plan based on calculations

that incorporate various actuarial and other assumptions, including discount rates, mortality, assumed rates of return, compensation increases and turnover rates. The Company reviews its assumptions on an annual basis and makes modifications to the assumptions based on current / expected of rates of return and trends when it is appropriate to do so. The effect of modifications to those assumptions is recorded in accumulated other comprehensive income and amortized to net periodic cost over future periods using the corridor method. The Company believes that the assumptions utilized in recording its obligations under the plan are reasonable based on its experience and market conditions.

The benefit obligation of the plan as of December 28, 2018 is \$7.2 million and the fair value of the benefit plan assets, which are invested in several fixed deposit accounts with a bank is \$3.7 million as of December 28, 2018. The unfunded balance of the plan is \$3.5 million as of December 28, 2018, which has been accrued for by the Company and are included in other long-term liabilities. Amounts recognized in accumulated other comprehensive income as of December 28, 2018 is \$0.1 million. Since acquisition, the contributions to the plan by the Company and its subsidiaries during the year ended December 28, 2018 was \$0.3 million. The benefits expected to be paid from the pension plan in each year from 2019-2023 are \$0.8 million, \$0.8 million, \$1.3 million, \$0.5 million and \$0.4 million, respectively. The aggregate benefits expected to be paid in the five years from 2024-2028 are \$1.6 million.

12. Net Income Per Share

The following is a reconciliation of the numerators and denominators used in computing basic and diluted net income per share (in thousands):

	Year Ended		
	December 28, 2018	December 29, 2017	December 30, 2016
Numerator:			
Net income attributable to Ultra Clean Holdings, Inc.	\$36,596	\$ 75,085	\$ 10,051
Denominator:			
Shares used in computation — basic:			
Weighted average common shares outstanding	38,366	33,409	32,632
Shares used in computation — diluted:			
Weighted average common shares outstanding	38,366	33,409	32,632
Dilutive effect of common shares outstanding subject			
to repurchase	548	878	485
Dilutive effect of options outstanding	5	16	33
Shares used in computing diluted net income			
per share	38,919	34,303	33,150
Net income per share attributable to Ultra Clean Holdings, Inc. — basic	\$0.95	\$ 2.25	\$ 0.31
Net income per share attributable to Ultra Clean Holdings, Inc. — diluted	\$0.94	\$ 2.19	\$ 0.30

The Company had securities outstanding which could potentially dilute basic earnings per share in the future, but the incremental shares from the assumed exercise of these securities were excluded in the computation of diluted net

income per share, as their effect would have been anti-dilutive. Such outstanding securities consist of the following (in thousands):

	Year Ended		
	December 28, 2018	December 29, 2017	December 30, 2016
Outstanding options	none	none	174

13. Geographical Information

The Company's principal markets include North America, Asia and Europe. Revenues by geographic area represent revenues to unaffiliated customers and are based upon the location to which the products and services were transferred. The following table sets forth revenue by geographic area (in thousands):

	Year Ended		
	December 28, 2018	December 29, 2017	December 30, 2016
United States	\$602,214	\$ 512,153	\$ 308,129
China	42,133	36,893	13,152
Singapore	315,254	287,887	175,843
Austria	58,153	34,546	35,729
Korea	45,602	30,073	13,471
Others	33,167	22,799	16,435
Total	\$1,096,523	\$ 924,351	\$ 562,759

At December 28, 2018 and December 29, 2017, approximately \$86.3 million and \$11.9 million, respectively, of the Company's long-lived assets were internationally and the remaining balances were located in the United States.

14. Commitments and Contingencies

The Company had commitments to purchase inventory totaling approximately \$106.2 million at December 28, 2018.

The Company leases properties domestically and internationally. The Company leases certain of its facilities under non-cancelable leases, which expire on various dates through 2031. Total rent expense for fiscal years 2018, 2017 and 2016, was \$9.7 million, \$6.9 million and \$6.3 million, respectively.

As of December 28, 2018, future minimum payments under these operating leases were as follows (in thousands):

Fiscal year	
2019	\$ 13,630
2020	11,802
2021	9,891
2022	6,674
2023	2,498
Thereafter	3,587
Total minimum lease payments	\$48,082

From time to time, the Company is subject to various legal proceedings and claims, either asserted or unasserted, that arise in the ordinary course of business. Although the outcome of the various legal proceedings and claims individually or in the aggregate cannot be predicted with certainty, the Company has not had a history of outcomes to date that have been material to the statement of operations and does not believe that any of these proceedings or other claims will have a material adverse effect on its consolidated financial condition, results of operations or cash flows.

In 2017, the former shareholders of FDS disputed the Company's determination that FDS failed to achieve the specified performance target applicable to the potential cash "earn-out" payments under the acquisition agreement for the second annual performance period ended July 2017 (the "Performance Target"). The Company expects the dispute to be resolved pursuant to the dispute resolution provisions of the acquisition agreement. The Company believes that FDS did not achieve the Performance Target, and therefore no earn-out payment is owed by the Company. However, there can be no assurance that the dispute will be resolved in the Company's favor. If the dispute is resolved adversely to the Company, the Company would expect to record a charge to Interest and Other Income (Expense), of not more than \$1.0 million.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure
Not Applicable

Item 9A. Controls and Procedures
Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our chief executive officer (“CEO”) and our chief financial officer (“CFO”), evaluated the effectiveness of our disclosure controls and procedures as defined in Rules 13a-15(e) and 15d-15(e) of the Securities Exchange Act of 1934, as amended (the “Exchange Act”) as of December 28, 2018. Based upon the evaluation, our management, including our CEO and our CFO, concluded that the design and operation of our disclosure controls and procedures were effective at the reasonable assurance level to ensure that information required to be disclosed by us in reports that we file or submit under the Exchange Act (i) is recorded, processed, summarized and reported within the time periods specified in Securities and Exchange Commission rules and forms and (ii) is accumulated and communicated to our management, including our CEO and CFO, as appropriate to allow timely decisions regarding required disclosure.

Changes in Internal Control Over Financial Reporting

As required by Rule 13a-15(d) of the Exchange Act, our management, including our CEO and CFO, conducted an evaluation of our “internal control over financial reporting” as defined in Exchange Act Rule 13a-15(f) to determine whether any changes in our internal control over financial reporting occurring during the fourth quarter of fiscal year 2018 that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting. Based on that evaluation, there have been no such changes during the fourth quarter of fiscal year 2018.

Management’s Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined under Rule 13a-15(f) promulgated under the Exchange Act. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Under the supervision and with the participation of our management, including our principal executive officer and principal financial officers, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework in Internal Control — Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013). The objective of this evaluation was to determine whether the Company’s internal control over financial reporting was effective as of December 28, 2018. Our assessment also excluded internal control over financial reporting at Quantum Global Technologies, LLC, which was acquired on August 27, 2018 and whose financial statements constitute 22.2% and 7.4% of the Company’s consolidated total assets (excluding \$231.3 million of goodwill and intangible assets, net) and revenue, respectively for the year ended December 28, 2018. We will include this acquired entity in our assessment of the effectiveness of internal controls over financial reporting in the fiscal year 2019 annual management report, the annual management report following the first anniversary of the acquisition. Based on our evaluation under the framework set forth in Internal Control — Integrated Framework (2013), our management concluded that our internal control over financial reporting was effective as of December 28, 2018.

The effectiveness of our internal control over financial reporting as of December 28, 2018 has been audited by Moss Adams LLP, an independent registered public accounting firm, as stated in their report which appears in this Form 10-K.

Item 9B. Other Information

None.

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PART III

Pursuant to Paragraph G(3) of the General Instructions to Form 10-K, portions of the information required by Part III of Form 10-K are incorporated by reference from our definitive Proxy Statement to be filed with the SEC in connection with our 2019 Annual Meeting of Stockholders.

Item 10. Directors and Executive Officers of the Registrant

The information required by this item concerning directors, including our audit committee financial expert, is incorporated by reference to the section entitled, “Election of Directors” in our Proxy Statement for the 2019 Annual Meeting of Stockholders.

For information with respect to Executive Officers, see Part I, Item 1 of this Annual Report on Form 10-K, under “Executive Officers.”

The information required by this item with respect to Section 16(a) beneficial reporting compliance is incorporated by reference to the section entitled, “Section 16(a) Beneficial Ownership Reporting Compliance” in our Proxy Statement for the 2019 Annual Meeting of Stockholders.

We have adopted a code of ethics that is designed to qualify as a “code of ethics” within the meaning of Section 406 of the Sarbanes-Oxley Act of 2002 and the rules promulgated thereunder. This code of ethics is available on our website at www.uct.com. To the extent required by law, any amendments to, or waivers from, any provision of the code of ethics will be promptly disclosed to the public. To the extent permitted by such legal requirements, we intend to make such public disclosure by posting the relative material on our website in accordance with SEC rules.

Item 11. Executive Compensation

The information required by this item regarding the security ownership of certain beneficial owners is incorporated by reference to the sections entitled “Executive Officer Compensation” and “Election of Directors” in our Proxy Statement for the 2019 Annual Meeting of Stockholders.

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 sections entitled “Security Ownership of Certain Beneficial Owners and Management” in our Proxy Statement for the 2019 Annual Meeting of Stockholders.

The table below summarizes our equity plan information as of December 28, 2018:

Plan Category	(a) Number of Securities to be Issued Upon Exercise/Vest of Outstanding Options, Awards Warrants and Rights	(b) Weighted-Average Exercise Price of Outstanding Options, Warrants and Rights	(c) (1) Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans (Excluding Securities Reflected in Column (a))
Equity compensation plans approved by security holders:	1,781,651	\$ 1.17	1,299,197

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Equity compensation plans not approved by security holders	—	—	—
Total	1,781,651	\$ 1.17	1,299,197

(1) Consists of the 2003 Stock Incentive Plan, as amended, and, for purposes of column (c), the Employee Stock Purchase Plan. Since restricted stock units do not have an exercise price, they are excluded from the calculations in column (b) of the table above.

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Item 13. Certain Relationships and Related Transactions

The information required by this item is incorporated by reference to the section entitled “Certain Relationships and Related Party Transactions” in our Proxy Statement for the 2019 Annual Meeting of Stockholders.

Item 14. Principal Accountant Fees and Services

The information required by this item is incorporated by reference to the section entitled “Ratification of the Appointment of Our Independent Registered Public Accounting Firm” in our Proxy Statement for the 2019 Annual Meeting of Stockholders.

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Part IV

Item 15. Exhibits, Financial Statement Schedules

(a) The following documents are filed as part of this Form 10-K:

1. Financial Statements:

	Form 10-K
	Page No.
<u>Report of Independent Registered Public Accounting Firm</u>	46
<u>Consolidated Balance Sheets</u>	48
<u>Consolidated Statements of Operations</u>	49
<u>Consolidated Statements of Comprehensive Income (Loss)</u>	50
<u>Consolidated Statements of Stockholders' Equity</u>	51
<u>Consolidated Statements of Cash Flows</u>	52
<u>Notes to Consolidated Financial Statements</u>	53

2. Financial statement schedules not listed have been omitted because they are not applicable or required, or the information required to be set forth therein is included in the Consolidated Financial Statements or Notes thereto.

3. Exhibits

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Exhibit Index

Exhibit					Filed
Number	Description	Form	File No.	Filing Date	Exhibit Herewith
2.1	<u>Agreement and Plan of Merger, dated as of July 24, 2018, among Quantum Global Technologies, LLC, Ultra Clean Holdings, Inc., Falcon Merger Subsidiary, LLC and G-Squared Partners, LLC (as the representative of the unitholders of the Company)</u>	8-K	000-50646	July 25, 2018	2.1
3.1	<u>Amended and Restated Certificate of Incorporation of Ultra Clean Holdings, Inc.</u>	S-1/A	333-11904	March 2, 2004	3.1
3.2	<u>Amended and Restated Bylaws of Ultra Clean Holdings, Inc.</u>	10-Q	000-50646	May 2, 2016	3.1
4.1	<u>Specimen Stock Certificate</u>	S-1/A	333-11904	March 8, 2004	4.1
4.2	<u>Form of Indenture between Ultra Clean Holdings, Inc. and the trustee to be named therein</u>	S-3ASR	333-222436	January 5, 2018	4.3
10.1†	<u>Ultra Clean Holdings, Inc. 2003 Amended and Restated Stock Incentive Plan (as amended)</u>	S-8	333-219447	July 25, 2017	99.1
10.2†	<u>Form of Stock Option Agreement</u>	S-1/A	333-11904	March 8, 2004	10.6
10.3†	<u>Form of Award Agreement</u>	S-1/A	333-11904	March 8, 2004	10.13
10.4†	<u>Form of Restricted Stock Unit Award Agreement</u>	10-K	000-50646	March 12, 2008	10.18
10.5†	<u>Employee Stock Purchase Plan (restated as of October 21, 2004)</u>	10-Q	000-50646	November 8, 2004	10.9.1
10.6†	<u>Form of Indemnification Agreement between Ultra Clean Holdings, Inc. and each of its directors and executive officers</u>	S-1/A	333-11904	March 2, 2004	10.10
10.7†	<u>Severance Policy for Executive Officers (revised)</u>	10-K	000-50646	March 19, 2009	10.16
10.8†	<u>Letter Agreement between Ultra Clean Holdings, Inc. and Lavi Lev dated November 18, 2011</u>	10-Q	000-50646	May 3, 2013	10.1

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10.9†	<u>Offer Letter between Ultra Clean Holdings, Inc. and James P. Scholhamer dated January 3, 2015</u>	8-K	000-50646	January 5, 2015	99.1
10.10†	<u>Change in Control Severance Agreement dated as of January 19, 2015 by and between Ultra Clean Holdings, Inc. and James P. Scholhamer</u>	10-K	000-50646	March 11, 2015	10.18
10.11†	<u>Promotion Letter between Ultra Clean Holdings, Inc. and Sheri Savage (previously Sheri Brumm) dated February 18, 2016</u>	10-K	000-50646	March 9, 2016	10.18
10.12†	<u>Offer Letter between Ultra Clean Holdings, Inc. and Sheri Savage (previously Sheri Brumm dated July 7, 2016)</u>	8-K	000-50646	July 12, 2016	99.1

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Exhibit					Filed
Number	Description	Form	File No.	Filing Date	Exhibit Herewith
10.13†	<u>Change in Control Severance Agreement between Ultra Clean Holdings, Inc. and Sheri Savage (previously Sheri Brumm dated July 7, 2016)</u>	8-K	000-50646	July 12, 2016	99.2
10.14†	<u>Amendment to Offer Letter and Change in Control Severance Agreement dated as of July 25, 2017 by and between Ultra Clean Holdings, Inc. and James P. Scholhamer</u>	10-Q	000-50646	August 9, 2017	10.2
10.15†	<u>Letter Agreement between the Company and Mr. Lev dated February 6, 2018</u>	8-K	000-50646	February 12, 2018	99.1
10.16†	<u>Form of Consulting Agreement</u>	10-Q	000-50646	August 8, 2018	10.1
10.17	<u>Credit Agreement, dated as of August 27, 2018, among Ultra Clean Holdings, Inc., Barclays Bank PLC, as administrative agent, and the lenders party thereto</u>	8-K	000-50646	August 27, 2018	10.1
10.18	<u>Guarantee and Collateral Agreement in favor of Barclays Bank PLC and the other Lenders party thereto, dated as of August 27, 2018, made by Ultra Clean Holdings, Inc. and the other Grantors referred to therein and from time to time party thereto</u>	8-K	000-50646	August 27, 2018	10.2
10.19	<u>Amendment Agreement, dated as of October 1, 2018, among Ultra Clean Holdings, Inc., any Subsidiary Borrowers, Barclays Bank PLC, as administrative agent, and the lenders party thereto</u>	8-K	000-50646	October 4, 2018	10.1
10.20†	<u>Severance Benefits for Executive Officers Policy (amended as of October 26, 2018)</u>	8-K	000-50646	November 11, 2018	10.1
10.21†	<u>Form of Change in Control Severance Agreement for Executive Officers</u>	8-K	000-50646	November 11, 2018	10.2
12.1	<u>Computation of Consolidated Ratio of Earnings to Fixed Charges</u>				X
21.1	<u>Subsidiaries of Ultra Clean Holdings, Inc.</u>				X
23.1	<u>Consent of Moss Adams LLP, Independent Registered Public Accounting Firm</u>				X
24.1	<u>Power of Attorney (included on signature page)</u>				X
31.1	<u>Certification of Chief Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002</u>				X
31.2	<u>Certification of Chief Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002</u>				X
32.1	<u>Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906</u>				X

of the Sarbanes-Oxley Act of 2002

32.2 Certification of Chief Financial Officer pursuant to 18 X
U.S.C. Section 1350, as adopted pursuant to Section 906
of the Sarbanes-Oxley Act of 2002

101.INS XBRL Instance Document X

101.SCH XBRL Taxonomy Extension Schema Document X

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Exhibit				Filed
Number	Description	File Form No.	Filing Date	Exhibit Herewith
101.CAL	XBRL Taxonomy Calculation Linkbase Document			X
101.DEF	XBRL Taxonomy Definition Linkbase Document			X
101.LAB	XBRL Taxonomy Label Linkbase Document			X
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document			X

Denotes management contract or compensatory plan.

Item 16. Form 10-K Summary

None

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SIGNATURES

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

Ultra Clean Holdings, Inc.

By: /S/ JAMES P. SCHOLHAMER
James P. Scholhamer
Chief Executive Officer

Date: March 22, 2019

KNOW ALL PERSONS BY THESE PRESENTS , that each person whose signature appears below constitutes and appoints James P. Scholhamer and Sheri Savage, and each of them, as his or her true and lawful attorneys-in-fact and agents, with full power of substitution and re-substitution, for him or her 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 other documents in connection therewith, with the Securities and Exchange Commission hereby ratifying and confirming that each of said attorneys-in-fact and agents, or his substitute or substitutes, 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.

Signature	Title	Date
/S/ CLARENCE L. GRANGER Clarence L. Granger	Chairman	March 22, 2019
/S/ JAMES P. SCHOLHAMER James P. Scholhamer	Chief Executive Officer and Director (Principal Executive Officer)	March 22, 2019
/S/ SHERI SAVAGE Sheri Savage	Chief Financial Officer and Secretary (Principal Financial Officer and Principal Accounting Officer)	March 22, 2019
/S/ LEONID MEZHVINSKY Leonid Mezhvinsky	Director	March 22, 2019
/S/ EMILY M. LIGGETT Emily M. Liggett	Director	March 22, 2019

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/S/ THOMAS T. EDMAN	Director	March 22, 2019
Thomas T. Edman		
/S/ BARBARA V. SCHERER	Director	March 22, 2019
Barbara V. Scherer		
/S/ DAVID T. IBNALE	Director	March 22, 2019
David T. IbnAle		
/S/ ERNEST E. MADDOCK	Director	March 22, 2019
Ernest E. Maddock		