

VEECO INSTRUMENTS INC  
Form 10-K  
February 21, 2018  
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**UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION**

Washington, D.C. 20549

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**FORM 10-K**

(Mark One)

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

For the fiscal year ended December 31, 2017

OR

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

Commission file number 0-16244

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**VEECO INSTRUMENTS INC.**

(Exact Name of Registrant as Specified in Its Charter)

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**Delaware**

(State or Other Jurisdiction of Incorporation or Organization)

**11-2989601**

(I.R.S. Employer Identification No.)

**Terminal Drive  
Plainview, New York**

(Address of Principal Executive Offices)

**11803**

(Zip Code)

Registrant's telephone number, including area code:

**(516) 677-0200**

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

(Title of each class)  
**Common Stock, par value \$0.01 per share**

(Name of each exchange on which registered)  
**The NASDAQ Stock Market**

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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes  No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of Registrant's knowledge, in definitive proxy or information statements incorporated by references in Part III of this Form 10-K or any amendment to this Form 10-K.

Indicate by check mark whether the Registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the definitions of large accelerated filer, accelerated filer, smaller reporting company, and

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emerging growth company  in Rule 12b-2 of the Exchange Act.

Large accelerated filer

Accelerated filer

Non-accelerated filer  (Do not check if a smaller reporting company)

Smaller reporting company

Emerging growth company

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

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

The aggregate market value of the common stock held by non-affiliates of the registrant at June 30, 2017 (the last business day of the registrant's most recently completed second quarter) was \$1,328,017,475 based on the closing price of \$27.85 on the NASDAQ Stock Market on that date.

The number of shares of each of the registrant's classes of common stock outstanding on February 14, 2018 was 48,156,865 shares of common stock, par value \$0.01 per share.

**DOCUMENTS INCORPORATED BY REFERENCE**

Certain portions of the definitive Proxy Statement to be used in connection with the Registrant's 2018 Annual Meeting of Stockholders are incorporated by reference into Part III of this Form 10-K.

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This Annual Report on Form 10-K ( Form 10-K ) contains certain forward-looking information relating to Veeco Instruments Inc. (together with its consolidated subsidiaries, Veeco, the Company, Registrant, we, our, or us, unless the context indicates otherwise) that is based on the of, and assumptions made by, our management as well as information currently available to management. When used in this Form 10-K, the words believes, anticipates, expects, estimates, targets, plans, intends, will, and similar expressions relating to the future are intended to represent forward-looking information. Discussions containing such forward-looking statements may be found in Part I, Items 1 and 3, Part II, Items 7 and 7A hereof, as well as within this Form 10-K generally. This forward-looking information reflects our current views with respect to future events and is subject to certain risks, uncertainties, and assumptions, some of which are described under the caption Risk Factors in Part I, Item 1A, and elsewhere in this Form 10-K. Should one or more of these risks or uncertainties occur, or should our assumptions prove incorrect, actual results may vary materially from the forward-looking information described in this Form 10-K as believed, anticipated, expected, estimated, targeted, planned, or similarly identified. We do not undertake any obligation to update any forward-looking statements to reflect future events or circumstances after the date of such statements.

**PART I**

**Item 1. Business**

**Recent Developments**

On May 26, 2017, we completed the acquisition of Ultratech, Inc. ( Ultratech ). Ultratech develops, manufactures, sells, and supports lithography, laser annealing, and inspection equipment for manufacturers of semiconductor devices, including front-end semiconductor manufacturing and advanced packaging. Ultratech also develops, manufactures, sells, and supports atomic layer deposition ( ALD ) equipment for scientific and industrial applications. Ultratech s customers are primarily located throughout the United States, Europe, China, Japan, Taiwan, Singapore, and Korea. With the addition of Ultratech, we establish ourselves as a leading equipment supplier in the advanced packaging market, forming a strong technology portfolio to address critical advanced packaging applications, as well as greatly increasing our critical mass in the front-end semiconductor market. The results of Ultratech s operations have been included in the consolidated financial statements since the date of acquisition.

**Business Description and Overview**

Headquartered in Plainview, New York, we were organized as a Delaware corporation in 1989. We develop, manufacture, sell, and support semiconductor process equipment to meet the demands of key global trends such as enhancing mobility, increasing connectivity, and improving energy efficiency. Our primary technologies include metal organic chemical vapor deposition, advanced packaging lithography, wet etch and clean, laser annealing, ion beam, molecular beam epitaxy, wafer inspection, and atomic layer deposition systems. These technologies play an integral role in producing Light Emitting Diodes ( LEDs ) for solid-state lighting and displays, and in the fabrication and packaging of advanced semiconductor devices. We have sales and service operations across the Asia-Pacific region, Europe, and North America to address our customers needs.

We are focused on:

- Providing differentiated semiconductor process equipment to address customers' current production requirements and next generation product development roadmaps;
- Investing to win through focused research and development in markets that we believe provide significant growth opportunities or are at an inflection point in semiconductor process equipment requirements, including LED, power electronics, photonics, front-end semiconductor, and advanced packaging technologies;
- Leveraging our sales channel and local process applications support teams to build strong strategic relationships with technology leaders;

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- Expanding our services portfolio to improve the performance of our systems, including spare parts, upgrades, and consumables to drive growth, reduce our customers' cost of ownership, and improve customer satisfaction;
- Cross-selling our product portfolio across our broad customer base and end markets to both maximize sales opportunities and diversify our business;
- Utilizing a combination of outsourced and internal manufacturing strategies to flex manufacturing capacity through industry investment cycles without compromising quality or performance; and
- Pursuing partnerships and acquisitions to expand our product portfolio into new and adjacent markets to drive sales growth.

Our products are sold to semiconductor and advanced packaging device manufacturers in the following four markets: Advanced Packaging, MEMS & RF Filters; LED Lighting, Display & Compound Semiconductor; Front-End Semiconductor; and Scientific & Industrial.

**Markets**

Our systems are used in the creation of a broad range of microelectronic components, including LEDs, micro-electro mechanical systems ( MEMS ), radio frequency ( RF ) filters, power electronics, thin film magnetic heads ( TFMHs ), laser diodes, 3D NAND logic, and other semiconductor devices. In addition to the creation of microelectronic components, our systems are used in the advanced packaging of such components in applications such as flip chip, Fan out Wafer Level Packaging ( FOWLP ), and other wafer level packaging approaches. Our customers who manufacture these devices invest in our systems to develop next generation products and deliver more efficient, cost effective, and advanced technological solutions. We operate in a cyclical business environment, and our customers' buying patterns are dependent upon industry trends. Our products are sold into multiple markets, and the following discussion focuses on the trends that most influence our business within each of those markets.

*Advanced Packaging, MEMS & RF Filters*

Advanced Packaging includes a portfolio of wafer-level assembly technologies that enable the miniaturization and performance improvement of electronic products, such as smartphones, smartwatches, and other mobile applications.



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Demand for higher performance, increased functionality, smaller form factors, and lower power consumption in mobile devices, consumer electronics, and high performance computing is driving the adoption of advanced packaging technologies. Semiconductor Foundries ( Foundries ), Independent Device Manufacturers ( IDMs ) and Outsourced Semiconductor Assembly and Test ( OSAT ) companies are implementing multiple advanced packaging approaches including FOWLP, recently deployed in high-volume manufacturing, and Through Silicon Via ( TSV ) to enable stacked memory, 2.5D, and 3D packaging devices. This increasing demand trend in Advanced Packaging is encouraging as our Lithography and Precision Surface Processing ( PSP ) products enable the process steps for Advanced Packaging.

MEMS devices are used for an increasing number of applications, including accelerometers for automobile airbags, pressure sensors for medical uses, and gyroscopes for a variety of consumer products, such as gaming consoles and mobile devices.

One of the fastest growing MEMS applications has been RF filters for mobile devices, driven by increasingly complex wireless standards, the exponential growth of mobile data, and carrier aggregation. In order to address these growing demands, the number of discrete RF filters in an average smartphone is expected to double from 50 to 100 by 2020. These trends are positive for us, particularly for our PSP products, where our technology is enabling some of the most challenging process steps, as well as our Ion Beam Etch ( IBE ) and Molecular Beam Epitaxy ( MBE ) products, which are used to create Bulk Acoustic Wave ( BAW ) and Surface Acoustic Wave ( SAW ) RF filters.

### *LED Lighting, Display & Compound Semiconductor*

LED Lighting technology has existed for more than 50 years; however, commercial adoption of LEDs was limited to niche applications until the most recent decade. In the early 1990 s, researchers developed a process utilizing Gallium Nitride ( GaN ) that created a low cost blue LED to produce white light. With that breakthrough, the LED industry started, and the number of applications for LEDs began to expand.

Since that time, the LED industry has experienced multiple growth cycles brought on by the adoption of LED technology for consumer and commercial applications. The first wave of LED growth was driven by mobile phones, which implemented the use of LED technology for display backlighting. The LED industry experienced its second period of rapid growth as LEDs were adopted for TV display backlighting. The adoption of LEDs for solid state, general lighting gave rise to a third wave of demand. There is a broader fourth wave of compound semiconductor growth including LEDs, driven by ROY LED applications, optical communication and industrial applications requiring laser diodes, 3D sensing vertical-cavity surface emitting lasers ( VCSELs ), micro-LED displays, 5G RF infrastructure adoption, and power electronics.

Our metal organic chemical vapor deposition ( MOCVD ) technology is at the core of the manufacturing process for GaN-based LEDs. We have benefited with each growth cycle, as LED producers invest in MOCVD process equipment to capture share in these markets. Demand for our equipment has historically been cyclical in nature, influenced by multiple factors, including: macroeconomic conditions; prices for LED chips; supply and demand dynamics; and our customers' manufacturing plans. However, we expect the ongoing adoption of LED lighting to be a major driver in the need for additional MOCVD capacity over the next several years.

MOCVD technology is equally important in the manufacturing of red, orange, and yellow ( ROY ) LEDs, which are used increasingly for fine-pitch digital signage and automotive lighting applications. For these applications, our MOCVD technology is used to deposit highly uniform Arsenic Phosphide ( AsP ) films which create amber and red hues. AsP MOCVD technology is also used to produce multiple other devices in the photonics market such as infrared LEDs and VCSELs used for optical data communication and 3D sensing. In addition to film deposition, photonics manufacturers also employ cleaning and etching process steps. Our PSP wet etch and clean technologies provide such cleaning and processing capabilities to photonics customers.

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The Display market refers to LEDs or micro LEDs used directly for displays. Additionally, organic light emitting diode ( OLED ) displays are part of the Display market and are used in applications such as digital signage, smartphones,

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wearable and tablet displays, and TVs. Our MOCVD systems and MBE source technology is ideally suited for the display market.

The Compound Semiconductor market refers to GaN-on-Silicon based power electronic devices and radio frequency devices. Our MOCVD and PSP technologies are crucial in the manufacturing of GaN-on-Silicon based power electronic devices. Global demand is increasing for advanced power electronics with greater energy efficiency, smaller footprints, higher operating temperatures, faster switching capabilities, and greater reliability. These devices support many needs, including more efficient IT servers, electrical motors, electric vehicles, wind turbines, and photovoltaic power inverters. While silicon-based transistors are widely used in power electronic devices today, GaN-on-Silicon based power electronics developed on MOCVD tools can potentially deliver higher performance (e.g., smaller power supply form factors, higher efficiency, and faster switching speeds). In addition to depositing the critical GaN layer with our MOCVD products, our PSP products address multiple etch and clean steps required to manufacture these advanced power electronics devices. In recent years, global industry leaders in power electronics have focused on research and development programs to commercialize this new technology. Device manufacturers will likely begin to transition from development to production of these devices over the next couple of years; we can benefit from this transition as our customers invest in process equipment to support this production ramp-up.

The Radio Frequency device portion of the Compound Semiconductor market is driven by demand for RF power amplifiers in mobile devices. Our PSP products are used for process steps such as metal lift off and photo resist strip for RF devices such as heterojunction bipolar transistors ( HBTs ) used in smartphones.

*Front-End Semiconductor*

Front-End Semiconductor refers to early process steps where transistors are formed directly on silicon. There are many different process steps in forming integrated circuits, such as Deposition, Etching, Masking, and Doping, where the microchips are created but still remain on the silicon wafer. Our Laser Spike Anneal products are well suited to assist our customers in the doping process. Our IBE for front-end semiconductor applications has been demonstrated in Spin Torque Transfer Magnetic Random Access Memory ( STT-MRAM ) applications. MRAM has many benefits over traditional random access memory such as its non-volatility, speed, endurance, and power consumption. Our Ion Beam Deposition ( IBD ) products are well suited for the manufacture of Extreme Ultraviolet ( EUV ) mask blanks. Our ability to precisely deposit high quality films with extremely low particulate levels make our IBD technology ideal for manufacturing defect-free EUV photomask blanks. The front-end semiconductor industry is expected to adopt EUV lithography to meet future device requirements. Future growth will depend on overall adoption of EUV technology. And lastly, our 3D inspection products are used for shape inspection of 3D topographies in memory and logic applications, which helps our customers improve their lithography and deposition processes.

*Scientific & Industrial*

The Scientific and Industrial markets include advanced materials research and a broad range of manufacturing applications including high-power fiber lasers, infrared detectors, thin film magnetic heads on HDDs, and optical coatings.

Our MBE systems are used by scientific research organizations and universities to drive new discoveries in the areas of materials science. MBE enables precise epitaxial crystal growth for a wide variety of materials, which supports the development of new performance materials used for emerging technologies. MBE technology is also used in the

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manufacturing of products such as high-power lasers and infrared sensors. Our tools create highly uniform Gallium-Arsenide ( GaAs ) or Indium-Phosphide ( InP ) film layers, which are critical to the performance of these devices. Our PSP products are also used in the manufacture of infrared sensors.

Our Ion Beam Deposition, Ion Beam Etch, Physical Vapor Deposition ( PVD ), and lapping and dicing tools are used in data storage applications, including HDDs that will continue to provide significant value for mass storage and will remain an important part of large capacity storage applications. This is especially true for data center applications where large volumes of data storage are required to serve an increasingly mobile population. In addition, our IBD tools are used to produce high quality optical films for multiple applications including laser mirrors, optical filters, and anti-reflective coatings. Our tools deposit thin layers of advanced materials on various substrates to alter how light is reflected and transmitted.

Our ALD tools are sold into a variety of Scientific & Industrial market applications such as optical, semi/nano-electronics, MEMS, nanostructures, and biomedical.

**System products**

*Metal Organic Chemical Vapor Deposition Systems*

We are the world's leading supplier of MOCVD systems. MOCVD production systems are used to make GaN-based devices (such as blue and green LEDs) and AsP-based devices (such as ROY LEDs), which are used in television and computer display backlighting, general illumination, large area signage, specialty illumination, power electronics, and many other applications. Our TurboDisc® EPIK® line of MOCVD systems enables cost per wafer savings for our customers with a combined advantage of best operating uptime, low maintenance costs, and best-in-class wafer uniformity and yield. In 2016, we introduced the TurboDisc K475i AsP MOCVD system, which offers best-in-class productivity and yields for ROY LEDs, infra-red LEDs, and high-efficiency triple junction photovoltaic solar cell applications. Our Propel PowerGaN MOCVD System ( Propel ) enables the development of highly-efficient GaN-based power electronic devices that have the potential to accelerate the industry's transition from research and development to high volume production. The Propel system offers 200mm technology and incorporates single-wafer reactor technology for outstanding film uniformity, yield, and device performance.

*Advanced Packaging Lithography*

We have a leading position in the Advanced Packaging lithography equipment market. The Advanced Packaging market is driven by the need for improved performance, reduced power consumption, and smaller geometries for mobile and automotive applications. In turn, these applications continue to demand increasingly complex packaging techniques from IDMs, Foundries, and OSATs. Our Advanced Packaging tools are designed to optimize productivity for leading-edge 200mm and 300mm Advanced Packaging applications by enabling extremely reliable, cost-effective, high-volume manufacturing solutions. Our best-in-class yield coupled with outstanding resolution and depth of focus

addresses all leading edge requirements for Advanced Packaging applications such as redistribution layers ( RDLs ), Copper Pillar, Micro-Bump, FOWLP, interposers, and TSVs to provide the lowest cost of ownership in the industry.

*Precision Surface Processing Systems (Wet Etch and Clean)*

Our PSP systems offer single wafer wet etch, clean, and surface preparation solutions which target high growth segments in advanced packaging, MEMS, LEDs, and compound semiconductor markets. The WaferStorm platform is based on PSP's unique ImmJET technology, which provides improved performance at a lower cost of ownership than conventional wet bench-only or spray-only approaches. This highly flexible platform targets solvent based cleaning applications that require a significant level of process control and flexibility. The WaferEtch® platform provides highly uniform, selective etching with onboard end point detection for improved process control and yield in bumping applications. In addition, PSP has developed a state-of-the-art solution with the WaferEtch platform to address the

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requirements of TSV reveal, in which the backside of a wafer is thinned to reveal the copper interconnects. PSP's TSV technology offers a significant cost of ownership reduction compared with dry etch processing by replacing up to four separate process steps.

*Laser Annealing Systems*

The progression of Moore's law has led semiconductor manufacturers to implement a variety of material and process changes to overcome the technical hurdles related to shrinking of feature sizes in integrated circuits. Along with new materials and smaller dimensions have come new process challenges. One such challenge has been new constraints on thermal annealing processes. One example is the thermal annealing of dopants for activation, in order to form the transistor junction, critical to the function and performance of a complementary metal-oxide semiconductor (CMOS) logic integrated circuit. In this and other thermal process steps, traditional lamp-based annealing techniques have challenges meeting the thermal budget (time/temperature regime) required by new materials and designs. Our Laser Spike Anneal (LSA) systems meet the industry demand for millisecond time-scale annealing, heating the wafer up to temperatures just below the Silicon melting point over a range of ultra-short timeframes (microseconds to milliseconds), enabling thermal annealing solutions at the 65nm technology node and below. This advanced annealing technology provides solutions to the difficult challenge of fabricating ultra-shallow junctions and highly activated source/drain contacts at these advanced logic nodes. In addition, our proprietary hardware design enables outstanding temperature uniformity across the wafer and die, by minimizing the pattern-density effect, thus reducing absorption variations.

We have also developed a next generation melt anneal technology targeted for annealing advanced logic devices at 7nm and below. As FinFET devices scale below the 10nm node, achieving the performance targets has become a challenge. To continue the roadmap, the industry is looking at new materials and the use of thermal processes that require nanosecond time-scale thermal annealing with temperatures exceeding the melting point. To help address this concern we have developed a unique (and patented) approach to nanosecond-scale thermal annealing. Our design utilizes two lasers; a millisecond laser as a low thermal budget localized preheat and a nanosecond laser on top of the millisecond laser to

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raise the peak temperature to the melt temperature of the material being processed beyond silicon melt. Similar to LSA, the melt system architecture is targeted to reduce pattern effects and increase the process window. It is believed that nanosecond annealing will be required to meet the device targets at 7nm and below; the initial application being explored by customers is contact annealing aimed to improve reduce source/drain contact resistance, which has become a performance bottleneck at the most advanced FinFET nodes, and as devices continue to scale, we see the application space for our melt product expanding.

*Ion Beam Etch and Deposition Systems*

Our NEXUS® IBD systems utilize ion beam technology to deposit precise layers of thin films. IBD systems deposit high purity thin film layers and provide excellent uniformity and repeatability. Our NEXUS IBE systems utilize a charged particle beam consisting of ions to etch precise, complex features. The NEXUS systems may be included on our cluster system platform to allow either parallel or sequential deposition/etch processes. These systems are used primarily by data storage, semiconductor, and telecommunications device manufacturers in the fabrication of discrete and integrated microelectronic devices.

Our SPECTOR® Ion Beam Sputtering system was developed for high precision coatings and offers manufacturers state of the art optical thickness monitoring, improved productivity, and target material utilization, for cutting-edge optical interference coating applications. We also provide a broad array of ion beam sources. These technologies are applicable in the HDD industry as well as for optical coatings and other end markets.

*Molecular Beam Epitaxy Systems*

Molecular beam epitaxy is the process of precisely depositing epitaxially-aligned atomically-thin crystalline layers, or epilayers, of elemental materials onto a substrate in an ultra-high vacuum environment. We are the leading supplier of MBE systems worldwide.

Our MBE systems, sources, and components are used to develop and manufacture compound semiconductor devices in a wide variety of applications such as high-power fiber lasers, infrared detectors, mobile phones, radar systems, high efficiency solar cells, and basic materials science research. For many compound semiconductors, MBE is the critical step of the fabrication process, ultimately determining device functionality and overall performance. We offer a full complement of MBE systems customized for the specific end application depositing on single 3" substrates up to fully automated production systems that can deposit on seven 6" substrates simultaneously. The GENxplor® MBE system creates high quality epitaxial layers and is ideal for cutting-edge research on a wide variety of materials including gallium arsenide, antimonides, nitrides, and oxides. The GENxcel® MBE system extends the same performance of the GENxplor to 4" diameter substrates.

*3D Wafer Inspection Systems*



As the semiconductor industry continues its pursuit of increased productivity and performance by shrinking device dimensions along Moore's law, manufacturers are running into bottlenecks limited by fundamental materials properties and lithographic resolution. The industry has opted for 3D integration schemes to circumvent these limitations (e.g. Vertical NAND, HBR DRAM, Logic FinFET). The high volume manufacturing ramp of these 3D schemes requires low cost, high performance 3D wafer inspection systems. The Superfast 3D Wafer Inspection System is a Coherent Gradient Sensing (CGS) based 3D wafer inspection system that enables the wafer fab to inspect the patterned wafer at key processing steps, enabling statistical process control as well as advanced process control (APC) for topography, displacement, and stress.

#### *Atomic Layer Deposition and Other Deposition Systems*

ALD is a thin-film deposition method in which a film is deposited on a substrate uniformly with precise control down to the atomic scale. Veeco offers a full suite of ALD systems for non-semiconductor front-end production applications across a wide range of markets and applications such as energy, optical, electronics, MEMS, nanostructures, and biomedical.

Other deposition systems including Physical Vapor Deposition, Diamond-Like Carbon Deposition, and Chemical Vapor Deposition Systems. In addition, our Optium® products generally are used in back-end applications in data storage fabrication facilities where TFMHs or sliders are fabricated. This equipment includes lapping tools, which enable precise material removal within three nanometers, which is necessary for advanced TFMHs. We also manufacture dicing tools that cut wafers into row bars and TFMHs.

#### **Sales and Service**

We sell our products and services worldwide primarily through various strategically located facilities in the United States, Europe, and the Asia-Pacific region. We believe that our customer service organization is a significant factor in our success. We provide service and support on a warranty, service contract, and an individual service-call basis. We believe that offering timely support creates stronger relationships with customers and provides us with a significant competitive advantage. Revenue from the sales of parts, upgrades, service, and support represented approximately 27%, 28%, and 22% of our net sales for the years ended December 31, 2017, 2016, and 2015, respectively. Parts and upgrade sales represented approximately 22%, 22%, and 18% of our net sales for those years, respectively, and service and support sales were 5%, 6%, and 4% respectively.

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**Customers**

We sell our products to many of the world's LED, MEMS, OSAT, HDD, and semiconductor manufacturers, as well as research centers and universities. We rely on certain principal customers for a significant portion of our sales. Sales to OSRAM Opto Semiconductors accounted for more than 10% of our total net sales for both 2017 and 2016; sales to San'an Optoelectronics Co. and KAISTAR Lighting (Xiamen) Co. each accounted for more than 10% of our total net sales in 2015. If any principal customer discontinues its relationship with us or suffers economic difficulties, our business prospects, financial condition, and operating results could be materially and adversely affected.

**Research and Development**

Our research and development functions are focused on the timely creation of new products and enhancements to existing products, both of which are necessary to maintain our competitive position. We collaborate with our customers to align our technology and product roadmaps to customer requirements. Our research and development activities take place at our facilities in San Jose, California; Waltham, Massachusetts; St. Paul, Minnesota; Somerset, New Jersey; Plainview, New York; Horsham, Pennsylvania; and Singapore.

Our research and development expenses were approximately \$82.0 million, \$81.0 million, and \$78.5 million, or approximately 17%, 24%, and 16% of net sales for the years ended December 31, 2017, 2016, and 2015, respectively. These expenses consisted primarily of salaries, project materials, and other product development and enhancement costs.

**Suppliers**

We outsource certain functions to third parties, including the manufacturing of some of our MOCVD and Ultratech systems. While we primarily rely on one supplier for the manufacturing of these systems, we maintain a minimum level of internal manufacturing capability for these systems. Refer to Item 1A, Risk Factors, for a description of risks associated with our reliance on suppliers and outsourcing partners.

**Backlog**

Our backlog consists of orders for which we received a firm purchase order, a customer-confirmed shipment date within twelve months, and a deposit when required. Our backlog increased to \$334.3 million at December 31, 2017 from \$209.2 million at December 31, 2016. During the year ended December 31, 2017, we increased backlog by approximately \$41.6 million relating to backlog acquired from Ultratech, while adjusting for a decrease in backlog of approximately \$2.0 million relating to orders that no longer met our booking criteria.

**Competition**

In each of the markets that we serve, we face substantial competition from established competitors, some of which have greater financial, engineering, and marketing resources than we do, as well as from smaller competitors. In addition, many of our products face competition from alternative technologies, some of which are more established than those used in our products. Significant factors for customer selection of our tools include system performance, accuracy, repeatability, ease of use, reliability, cost of ownership, and technical service and support. None of our competitors compete with us across all of our product lines.

Our principal competitors include: Advanced Micro-Fabrication Equipment (AMEC); Aixtron; Canon Anelva; Grand Plastics Technology Corporation; Leybold Optics; Mattson Technology; Riber; Rudolph Technologies; Scientech; Screen Semiconductor Solutions; and Shanghai Micro Electronics Equipment.

### **Intellectual Property**

Our success depends in part on our proprietary technology, and we have over 800 patents in the United States and other countries and have additional applications pending for new inventions.

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We have patents and exclusive and non-exclusive licenses to patents owned by others covering certain of our products, which we believe provide us with a competitive advantage. We have a policy of seeking patents on inventions concerning new products and improvements as part of our ongoing research, development, and manufacturing activities. We believe that there is no single patent or exclusive or non-exclusive license to patents owned by others that is critical to our operations, as the success of our business depends primarily on the technical expertise, innovation, customer satisfaction, and experience of our employees.

Refer to Item 1A, Risk Factors, for a description of risks associated with intellectual property.

**Employees**

At December 31, 2017 we had 1,014 employees, of which there were 280 in manufacturing and testing, 99 in sales and marketing, 214 in service and product support, 260 in engineering and research and development, and 161 in information technology, general administration, and finance. The success of our future operations depends on our ability to recruit and retain engineers, technicians, and other highly skilled professionals who are in considerable demand. We feel that we have adequate programs in place to attract, motivate, and retain our employees. We monitor industry practices to make sure that our compensation and employee benefits remain competitive. We believe that our employee relations are good. Refer to Item 1A, Risk Factors, for a description of risks associated with employee retention and recruitment.

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**Financial Information about Segments and Geographic Areas**

We operate as a single reportable segment and report our financial results in four geographic regions: the United States; China; Europe, Middle East, and Africa ( EMEA ); and Rest of World ( ROW ). Refer to Note 18, Segment Reporting and Geographic Information, in the Notes to the Consolidated Financial Statements for financial data pertaining to our geographic operations. Refer to Item 1A, Risk Factors, for a description of risks relating to our geographic operations.

**Available Information**

Our corporate website address is [www.veeco.com](http://www.veeco.com). All filings we make with the Securities and Exchange Commission ( SEC ), including our Annual Report on Form 10-K, our Quarterly Reports on Form 10-Q, our Current Reports on Form 8-K, our proxy statements and any amendments thereto filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, are available for free in the Investor Relations section of our website as soon as reasonably practicable after they are filed with or furnished to the SEC. Our SEC filings are available to be read or copied at the SEC's Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549. Information about the operation of the Public Reference Room can be obtained by calling the SEC at 1-800-SEC-0330. Our filings can also be obtained for free on the SEC's website at [www.sec.gov](http://www.sec.gov). The reference to our website address does not constitute inclusion or incorporation by reference of the information contained on our website in this Form 10-K or other filings with the SEC, and the information contained on our website is not part of this document.

**Item 1A. Risk Factors**

**Key Risk Factors That May Impact Future Results**

Stockholders should carefully consider the risk factors described below. Any of these factors, many of which are beyond our control, could materially and adversely affect our business, financial condition, operating results, cash flow, and stock price.

*Unfavorable market conditions may adversely affect our operating results.*

Conditions of the markets in which we operate are volatile and have in the past, and may in the future, deteriorate significantly. We have experienced and may continue to experience customer rescheduling and, to a lesser extent, cancellations of orders for our products. Adverse market conditions relative to our products could result in:

- reduced demand for our products;

- rescheduling and cancellations of orders for our products, resulting in negative backlog adjustments;
- increased price competition leading to lower margin for our products;
- increased competition from sellers of used equipment or lower-priced alternatives to our products;
- increased inventory obsolescence;
- an increase in uncollectable amounts due from our customers resulting in increased reserves for doubtful accounts and write-offs of accounts receivable;
- disruptions in our supply chain as we reduce our purchasing volumes and limit our contract manufacturing operations; and
- higher operating costs as a percentage of revenues.

If the markets in which we participate experience deteriorations or downturns, this could negatively impact our sales and revenue generation, margins, operating expenses, and profitability.

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*We are exposed to the risks of operating a global business.*

Most of our sales are to customers located outside of the United States, and we expect sales from non-U.S. markets to continue to represent a significant portion of our sales in the future. Our non-U.S. sales and operations are subject to risks inherent in conducting business outside the United States, many of which are outside our control including:

- political and social attitudes, laws, rules, regulations, and policies within countries that favor local companies over U.S. companies, including government-supported efforts to promote the development and growth of local competitors;
- differing legal systems and standards of trade which may not honor our intellectual property rights and which may place us at a competitive disadvantage;
- pressures from foreign customers and foreign governments for us to increase our operations and sourcing in the foreign country;
- multiple conflicting and changing governmental laws and regulations, including varying labor laws, tax regulations, import/export controls, changes to trade treaties, possible trade wars, and other trade barriers and uncertainties;
- reliance on various information systems and information technology to conduct our business, which may be vulnerable to cyberattacks by third parties or breached due to employee error, misuse, or other causes that could result in business disruptions, loss of or damage to intellectual property, transaction errors, processing inefficiencies, or other adverse consequences should our security practices and procedures prove ineffective;
- regional economic downturns, varying foreign government support, and unstable political environments;
- difficulties in managing a global enterprise, including staffing, managing distributors and representatives, and repatriating cash;

- longer sales cycles and difficulties in collecting accounts receivable; and
- different customs and ways of doing business.

These challenges, many of which are associated with sales into the Asia-Pacific region, have had and may continue to have a material adverse effect on our business.

***We may be unable to effectively enforce and protect our intellectual property rights.***

Our success depends in part upon the protection of our intellectual property rights. We rely primarily on patent, copyright, trademark, and trade secret laws, as well as nondisclosure and confidentiality agreements and other methods, to protect our proprietary information, technologies, processes, and brand identity. We own various U.S. and international patents and have additional pending patent applications relating to certain of our products and technologies. The process of seeking patent protection is lengthy and expensive, and we cannot be certain that pending or future applications will actually result in issued patents or that issued patents will be of sufficient scope or strength to provide meaningful protection or commercial advantage. In addition, our intellectual property rights may be circumvented, invalidated, or rendered obsolete by the rapid pace of technological change, or through efforts by others to reverse engineer our products or design around patents that we own. Policing unauthorized use of our products and technologies is difficult and time consuming and the laws of other countries may not protect our proprietary rights as fully or as readily as U.S. laws. Given these limitations, our success will depend in part upon our ability to innovate ahead of our competitors.

In addition, our outsourcing strategy requires that we share certain portions of our technology with our outsourcing partners, which poses additional risks of infringement and trade secret misappropriation. Infringement of our rights by a third party, possibly for purposes of developing and selling competing products, could result in uncompensated lost market and revenue opportunities. Similar exposure could result in the event that former employees seek to compete with us through their unauthorized use of our intellectual property and proprietary information. We cannot be certain that the protective steps and measures we have taken will prevent the misappropriation or unauthorized use of our proprietary information and technologies, nor can we be certain that applicable intellectual property laws, regulations, and policies will not be changed in a manner detrimental to the sale or use of our products.



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Litigation may be required to enforce our intellectual property rights, protect our trade secrets, and to determine the validity and scope of proprietary rights of others. As a result of any such litigation, we could lose our ability to enforce one or more patents, incur substantial costs, and jeopardize relationships with current or prospective customers or suppliers. Any action we take to enforce or defend our intellectual property rights could absorb significant management time and attention, and could otherwise negatively impact our operating results.

***We may be subject to claims of intellectual property infringement by others.***

We receive communications from time to time from other parties asserting the existence of patent or other rights which they believe cover certain of our products. We also periodically receive notice from customers who believe that we are required to indemnify them for damages they may incur related to infringement claims made against these customers by third parties. Our customary practice is to evaluate such assertions and to consider the available alternatives, including whether to seek a license, if appropriate. However, we cannot ensure that licenses can be obtained or, if obtained, will be on acceptable terms or that costly litigation or other administrative proceedings will not occur. If we are not able to resolve a claim, negotiate a settlement of the matter, obtain necessary licenses on commercially reasonable terms, or successfully prosecute and defend our position, our business, financial condition and results of operations could be materially and adversely affected.

***We may be unable to successfully integrate the Ultratech business and may not realize the anticipated benefits of the acquisition.***

On May 26, 2017, we completed the acquisition of Ultratech, Inc., merging two companies that formerly operated as independent public companies. Significant management attention and resources have been devoted, and will need to be devoted, to integrating our respective business operations and practices. The success of our acquisition of Ultratech will depend in part on our ability to realize the anticipated benefits and revenue and cost synergies associated with this business combination, which is subject to the following risks, among others:

- whether the combined businesses will perform as expected;
  
- the possibility that we paid more for the acquisition of Ultratech than the value we will derive from the acquisition;
  
- complexities associated with managing the combined businesses, including difficulties addressing possible differences in corporate cultures and management philosophies and the challenge of integrating complex systems, technology, networks, and other assets of each of the companies in a seamless manner that minimizes any adverse impact on customers, suppliers, employees, and other business partners;
  
- the potential loss of customers and strategic partners who may not wish to continue their relationships with the combined company; and

- potential unknown liabilities and unforeseen or unanticipated costs.

In connection with the accounting for the Ultratech acquisition, we recorded goodwill and other intangible assets of approximately \$539 million. Under U.S. generally accepted accounting principles, we must assess, at least annually and potentially more frequently, whether the value of the goodwill and other indefinite-lived intangible assets have been impaired. Finite-lived intangible assets will be assessed for impairment in the event of an impairment indicator. Any reduction or impairment in the value of goodwill and other intangible assets will result in a charge against earnings, which could materially and adversely affect our results of operations and financial performance.

*The price of our common shares is volatile and could further decline.*

The stock market in general and the market for technology stocks in particular has experienced significant volatility. The trading price of our common shares has declined, and could continue to decline, independent of the overall market, and shareholders could lose all or a substantial part of their investment. The market price of our common shares could fluctuate significantly in response to several factors, including among others:

- difficult macroeconomic conditions, unfavorable geopolitical events, and general stock market uncertainties, such as those occasioned by a global liquidity crisis and a failure of large financial institutions;

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- the emergence of competitors and competing technologies;
- receipt of large orders or cancellations of orders for our products;
- issues associated with the performance and reliability of our products;
- actual or anticipated variations in our results of operations;
- announcements of financial developments or technological innovations;
- our failure to meet the performance estimates of investment research analysts;
- changes in recommendations and financial estimates by investment research analysts;
- strategic transactions, such as acquisitions, divestitures, and spin-offs;
- the commencement of, and rulings on, litigation and legal proceedings;
- the dilutive impact of our Convertible Senior Notes; and
- the occurrence of major catastrophic events.

As with many technology companies, the price of our common shares has fluctuated significantly in the past and is likely to be volatile in the future. Securities class action litigation is often brought against a company following periods of volatility in the market price of its securities. If similar litigation were to be pursued against us, it could result in substantial costs and a diversion of management's attention and resources, which could materially and adversely affect our financial condition, results of operations, and liquidity.

***We face significant competition.***

We face significant competition throughout the world, which may increase as certain markets in which we operate continue to evolve. Some of our competitors have greater financial, engineering, manufacturing, and marketing resources than us. Other competitors are located in regions with lower labor costs and other reduced costs of operation. In addition, our ability to compete in foreign countries against local manufacturers may be hampered by nationalism, social attitudes, laws, regulations, and policies within such countries that favor local companies over U.S. companies or that are otherwise designed to promote the development and growth of local competitors. Furthermore, we face competition from smaller emerging equipment companies whose strategy is to provide a portion of the products and services we offer, with a focused approach on innovative technology for specialized markets. New product introductions or enhancements by us or our competitors could cause a decline in sales or loss of market acceptance of our existing or prior generation products. Increased competitive pressure could also lead to intensified price competition resulting in lower margins.

To remain competitive, we may enter into strategic alliances with customers, suppliers, and other third parties to explore new market opportunities and possible technological advancements. These alliances may require significant investments of capital and other resources and often involve the exchange of sensitive confidential information. The success of these alliances may depend on factors over which we have limited control and will likely require ongoing cooperation and good faith efforts from our strategic partners. Strategic alliances are inherently subject to significant risks, and the inability to effectively manage these risks could materially and adversely affect our business and operating results.

***We operate in industries characterized by rapid technological change.***

Each of the industries in which we operate is subject to rapid technological change. Our ability to remain competitive depends on our ability to enhance existing products and develop and manufacture new products in a timely and cost effective manner and to accurately predict technology transitions. New product development commitments must be made well in advance of sales, and we must anticipate the future demand for products when selecting which development programs to fund and pursue. Our financial results depend on the successful introduction of new products, many of which require the achievement of increasingly stringent technical specifications. We may not be successful in selecting, developing, manufacturing, and marketing new products and new technologies or in enhancing our existing products. Our performance may be adversely affected if we are unable to accurately predict evolving market trends and related customer needs and to effectively allocate our resources among new and existing products and technologies.

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We are also exposed to potential risks associated with unexpected product performance issues. Our product designs and manufacturing processes are complex and could contain unexpected product defects, especially when products are first introduced. Unexpected product performance issues could result in significant costs and damages, including increased service and warranty expenses, the need to provide product replacements or modifications, reimbursement for damages caused by our products, product recalls, related litigation, product write-offs, and disposal costs. These costs could be substantial and our reputation could be harmed, resulting in a reduced demand for our products and a negative effect on our business, financial condition, and results of operations.

*Our sales to manufacturers are highly dependent on sales of consumer electronics applications, which can experience significant volatility due to seasonal and other factors.*

The demand for LEDs, HDDs, semiconductors, and other devices is highly dependent on sales of consumer electronics, such as televisions, computers, tablets, digital video recorders, smartphones, cell phones, and other mobile devices. Manufacturers of LEDs are among our largest customers and account for a substantial portion of our revenue. Factors that could influence the levels of spending on consumer electronic products include consumer confidence, access to credit, volatility in fuel and other energy costs, conditions in the residential real estate and mortgage markets, labor and healthcare costs, and other macroeconomic factors affecting consumer spending behavior. These and other economic factors have had and could continue to have a material adverse effect on the demand for our customers' products and, in turn, on our customers' demand for our products and services. Furthermore, manufacturers of LEDs have in the past overestimated their potential for market share growth. If this growth is overestimated, we may experience cancellations of orders in backlog, rescheduling of customer deliveries, obsolete inventory, and liabilities to our suppliers for products no longer needed.

In addition, the demand for our customers' products can be even more volatile and unpredictable due to the possibility of competing technologies, such as flash memory as an alternative to HDDs. Unpredictable fluctuations in demand for our customers' products or rapid shifts in demand from our customers' products to alternative technologies could materially and adversely impact our future results of operations.

*We have a concentrated customer base, located primarily in a limited number of regions, which operate in highly concentrated industries.*

Our customer base continues to be highly concentrated. Orders from a relatively limited number of customers have accounted for, and likely will continue to account for, a substantial portion of our net sales, which may lead customers to demand pricing and other terms less favorable to us. Customer consolidation activity involving some of our largest customers could result in an even greater concentration of our sales in the future. Management changes at key customer accounts could result in a loss of future sales due to vendor preferences or other reasons and may introduce new challenges in managing customer relationships.

If a principal customer discontinues its relationship with us or suffers economic setbacks, our business, financial condition, and operating results could be materially and adversely affected. Our ability to increase sales in the future will depend in part upon our ability to obtain orders from new customers and we cannot be certain that we will be successful in these efforts. In addition, because a relatively small number of large manufacturers, many of whom are our customers, dominate the industries in which they operate, it may be especially difficult for us to replace these customers if we lose their business. A significant portion of orders in our backlog are orders from our principal customers.



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In addition, a substantial investment is required by customers to install and integrate capital equipment into a production line. As a result, once a manufacturer has selected a particular vendor to supply capital equipment, the manufacturer will often attempt to consolidate its other capital equipment requirements with the same vendor. Accordingly, if a customer selects a competitor's product over ours, we could experience difficulty selling to that customer for a significant period of time.

Furthermore, we do not have long-term contracts with our customers. As a result, our agreements with our customers do not provide assurance of future sales, and we are exposed to competitive price pressures on new orders we attempt to obtain.

Our customer base is also highly concentrated in terms of geography, and the majority of our sales are to customers located in a limited number of countries. Dependence upon sales emanating from a limited number of regions increases our risk of exposure to local difficulties and challenges, such as those associated with regional economic downturns, political instability, fluctuating currency exchange rates, natural disasters, social unrest, pandemics, terrorism, and acts of war. Our reliance upon customer demand arising primarily from a limited number of countries could materially and adversely impact our future results of operations.

***A further reduction or elimination of foreign government subsidies and economic incentives may adversely affect the future order rate for our MOCVD equipment.***

We generate a significant portion of our revenue in China. In recent years, the Chinese government has provided various incentives to encourage the development of the LED industry, including subsidizing a portion of the purchase cost of MOCVD equipment. These subsidies have enabled and encouraged certain customers in this region to purchase more of our MOCVD equipment than these customers might have purchased without these subsidies. The availability and amount of these subsidies has been reduced over time and may end at some point in the future. A further reduction or elimination of these incentives may result in a reduction in future orders for our MOCVD equipment in this region, which could materially and adversely affect our business, financial condition, and results of operations. In addition, in an effort to promote Chinese competition, the Chinese government could impose restrictions on the receipt of these subsidies, including requirements that the purchased equipment be sourced locally.

A related risk pertains to the fact that many customers use or had planned to use Chinese government subsidies, in addition to other incentives from the Chinese government, to build new manufacturing facilities or to expand existing manufacturing facilities. Delays in the start-up of these facilities or the cancellation of construction plans altogether, together with other related issues pertaining to customer readiness, could adversely impact the timing of our revenue recognition, could result in order cancellations, a reduction in our order backlog, and could have other negative effects on our business, financial condition, and results of operations.

***The cyclicity of the industries we serve directly affects our business.***

Our business depends in large part upon the capital expenditures of manufacturers in the LED, mobile communication, data storage, and other device markets. We are subject to the business cycles of these industries, the timing, length, and volatility of which are difficult to predict. These industries have historically been highly cyclical and have experienced significant economic downturns in the last decade. As a capital equipment provider, our revenue depends in large part on the spending patterns of these customers, who often delay expenditures or cancel or reschedule orders in reaction to variations in their businesses or general economic conditions. In downturns, we must be able to quickly and effectively

align our costs with prevailing market conditions, as well as motivate and retain key employees. However, because a portion of our costs are fixed, our ability to reduce expenses quickly in response to revenue shortfalls may be limited. Downturns in one or more of these industries have had and will likely have a material adverse effect on our business, financial condition, and operating results. Alternatively, during periods of rapid growth, we must be able to acquire and develop sufficient manufacturing capacity to meet customer demand and attract, hire, assimilate, and retain a sufficient number of qualified people. Our net sales and operating results may be negatively affected if our customers experience economic downturns or slowdowns in their businesses.



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***The timing of our orders, shipments, and revenue recognition may cause our quarterly operating results to fluctuate significantly.***

We derive a substantial portion of our net sales in any fiscal period from the sale of a relatively small number of high-priced systems. As a result, the timing of recognition of revenue for a single transaction could have a material effect on our sales and operating results for a particular fiscal period. As is typical in our industry, orders, shipments, and customer acceptances often occur during the last few weeks of a quarter. As a result, a delay of only a week or two can impact which period revenue is reported and can cause volatility in our revenue for a given reporting period. Our quarterly results have fluctuated significantly in the past and we expect this trend to continue. If our orders, shipments, net sales, or operating results in a particular quarter do not meet expectations, our stock price may be adversely affected as well.

***Our sales cycle is long and unpredictable.***

Historically, we have experienced long and unpredictable sales cycles (the period between our initial contact with a potential customer and the time that we recognize revenue for resulting sales to that customer). Our sales cycle can exceed twelve months. The timing of an order often depends on our customer's capital expenditure budget, over which we have no control. In addition, the time it takes us to build a product to customer specifications typically ranges from three to six months. When coupled with the fluctuating amount of time required for shipment, installation, and final acceptance, our sales cycles often vary widely, and these variations can cause fluctuations in our operating results. As a result of our lengthy sales cycles, we may incur significant research, development, selling, general, and administrative expenses before we generate revenue for these products. We may never generate the anticipated revenue if a customer cancels or otherwise changes its purchase plans, which could have an adverse effect on our business.

***Our backlog is subject to customer cancellation or modification which could result in decreased sales, increased inventory obsolescence, and liabilities to our suppliers for products no longer needed.***

Customer purchase orders may be cancelled or rescheduled by the customer, sometimes with limited or no penalties, which may result in increased or unrecoverable costs for the Company. We adjust our backlog for such cancellations, contract modifications, and delivery delays that result in a delivery period in excess of one year, among other items. A downturn in one or more of our businesses could result in an increase in order cancellations and postponements.

We write-off excess and obsolete inventory based on historical trends, future usage forecasts, and other factors including the amount of backlog we have on hand. If our backlog is canceled or modified, our estimates of future product demand may prove to be inaccurate, in which case we may have understated the write-off required for excess and obsolete inventory. In the future, if we determine that our inventory is overvalued, we will be required to recognize associated costs in our financial statements at the time of such determination. In addition, we place orders with our suppliers based on our customers' orders. If our customers cancel their orders with us, we may not be able to cancel our orders with our suppliers. Any such charges could be materially adverse to our results of operations and financial condition.

***Our failure to estimate customer demand accurately could result in inventory obsolescence, liabilities to our suppliers for products no longer needed, and manufacturing interruptions or delays which could affect our ability to meet customer demand.***

## Edgar Filing: VEECO INSTRUMENTS INC - Form 10-K

The success of our business depends in part on our ability to accurately forecast and supply equipment and services that meet the rapidly changing technical and volume requirements of our customers. To meet these demands, we depend on the timely delivery of parts, components, and subassemblies from our suppliers. Uncertain worldwide economic conditions and market instabilities make it difficult for us (and our customers) to accurately forecast future product demand. If actual demand for our products is different than expected, we may purchase more or fewer parts than necessary or incur costs for canceling, postponing, or expediting delivery of parts. If we overestimate the demand for our products, excess inventory could result which could be subject to heavy price discounting, which could become obsolete, and which could subject us to liabilities to our suppliers for products no longer needed. Similarly, we may be harmed in the event that our competitors overestimate the demand for their products and engage in heavy price discounting practices as a result. In addition, the volatility of demand for capital equipment increases capital and other risks for companies in our supply chain.

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Furthermore, certain key parts may be subject to long lead-times or may be obtainable only from a single supplier or limited group of suppliers, and some sourcing and assembly is provided by suppliers located in countries other than the United States. We may experience significant interruptions in our manufacturing operations, delays in our ability to timely deliver products or services, increased costs, or customer order cancellations as a result of:

- the failure or inability of our suppliers to timely deliver quality parts;
- volatility in the availability and cost of materials;
- difficulties or delays in obtaining required import or export approvals;
- information technology or infrastructure failures;
- natural disasters such as earthquakes, tsunamis, floods, or storms; or
- other causes such as regional economic downturns, pandemics, political instability, terrorism, or acts of war, that could result in delayed deliveries, manufacturing inefficiencies, increased costs, or order cancellations.

In addition, in the event of an unanticipated increase in demand for our products, our need to rapidly increase our business and manufacturing capacity may be limited by working capital constraints of our suppliers, which may cause or exacerbate interruptions in our manufacturing and supply chain operations. Any or all of these factors could materially and adversely affect our business, financial condition, and results of operations.

***Our failure to successfully manage our outsourcing activities or failure of our outsourcing partners to perform as anticipated could adversely affect our results of operations.***

To better align our costs with market conditions, increase the percentage of variable costs relative to total costs, and to increase productivity and operational efficiency, we have outsourced certain functions to third parties, including the manufacture of several of our systems. While we maintain some level of internal manufacturing capability for these systems, we rely heavily on our outsourcing partners to perform their contracted functions to allow us flexibility to adapt to changing market conditions, including periods of significantly diminished order volumes. If our outsourcing partners do not perform as required, or if our outsourcing model does not allow us to realize the intended cost savings and flexibility, our results of operations (and those of our third party providers) may be adversely affected. Disputes and possibly litigation involving third party providers could result and we could suffer damage to our reputation. Dependence on contract manufacturing and outsourcing may

also adversely affect our ability to bring new products to market. Although we attempt to select reputable providers, it is possible that one or more of these providers could fail to perform as we expect. If we do not effectively manage our outsourcing strategy or if third party providers do not perform as anticipated, we may not realize the benefits of productivity improvements and we may experience operational difficulties, increased costs, manufacturing and installation interruptions or delays, inefficiencies in the structure and operation of our supply chain, loss of intellectual property rights, quality issues, increased product time-to-market, and an inefficient allocation of our human resources, any or all of which could materially and adversely affect our business, financial condition, and results of operations.

*We rely on a limited number of suppliers, some of whom are our sole source for particular components.*

Certain of the parts, components, and sub-assemblies included in our products are obtained from a single source or a limited group of suppliers. Our inability to develop alternative sources, as necessary, could result in a prolonged interruption in our ability to supply related products, a failure on our part to meet the demands our customers, and a significant increase in the price of related products, which could adversely affect our business, financial condition, and results of operations.

*Our inability to attract, retain, and motivate employees could have a material adverse effect on our business.*

Our success depends in part upon our ability to attract, retain, and motivate employees, including those in executive, managerial, finance, engineering, and marketing positions, as well as highly skilled and qualified technical personnel. Attracting, retaining, and motivating such qualified personnel may be difficult due to challenging industry conditions, competition for such personnel by other technology companies, consolidations and relocations of operations, and workforce reductions, and there can be no assurance that we will be successful in recruiting or retaining key personnel. We have entered

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into employment agreements with certain key personnel but our inability to attract, retain, and motivate key personnel could have a material adverse effect on our business, financial condition, and results of operations.

*We are exposed to risks associated with business combinations, acquisitions, and strategic investments.*

We have completed several significant acquisitions and investments in the past and we will consider new opportunities in the future. Acquisitions and investments involve numerous risks, many of which are unpredictable and beyond our control, including the following:

- difficulties and increased costs in integrating the personnel, operations, technologies, and products of acquired companies;
- diversion of management's attention and disruption of ongoing businesses;
- the inability to complete proposed transactions as anticipated, resulting in obligations to pay professional and other expenses, including any applicable termination fees;
- potential loss of key employees of acquired companies, especially if a relocation or change in responsibilities is involved;
- difficulties in managing geographically dispersed operations in a cost effective manner;
- the failure to realize expected synergies;
- unknown, underestimated, and undisclosed commitments or liabilities;
- increased amortization expenses relating to intangible assets; and

- other adverse effects on our business, including the potential impairment and write-down of amounts capitalized as intangible assets and goodwill as part of the acquisition, as a result of such matters as technological advancements or worse-than-expected performance by the acquired company.

As discussed above with respect to our recent acquisition of Ultratech, our inability to effectively manage these risks could materially and adversely affect our business, financial condition, and results of operations. In addition, if we issue equity securities to pay for an acquisition or investment, the ownership percentage of our then-current shareholders would be reduced and the value of the shares held by these shareholders could be diluted, which could adversely affect the price of our stock. If we use cash to pay for an acquisition or investment, the payment could significantly reduce the cash that would be available to fund our operations or other purposes, which could have a negative effect on our business.

*We may be unable to obtain required export licenses for the sale of our products.*

Products which are either manufactured in the United States or based on U.S. technology are subject to the U.S. Export Administration Regulations ( EAR ) when exported to and re-exported from international jurisdictions, in addition to the local jurisdiction s export regulations applicable to individual shipments. Currently, our MOCVD, MBE, and certain other systems and products are controlled for export under the EAR. Licenses or proper license exceptions may be required for the shipment of our products to certain customers or countries. Obtaining an export license or determining whether an export license exception exists often requires considerable effort by us and cooperation from the customer, which can add time to the order fulfillment process. We may be unable to obtain required export licenses or unable to qualify for export license exceptions and, as a result, we may be unable to export products to our customers. The administrative processing, potential delay and risk of ultimately not obtaining required export approvals pose a particular disadvantage to us relative to our non-U.S. competitors who are not required to comply with U.S. export controls. Non-compliance with the EAR or other applicable export regulations could result in a wide range of penalties including the denial of export privileges, fines, criminal penalties, and the seizure of commodities. In the event that an export regulatory body determines that any of our shipments violate applicable export regulations, we could be fined significant sums and our export capabilities could be restricted, which could have a material adverse impact on our business.

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***Our operating results may be adversely affected by tightening credit markets.***

As a global company with worldwide operations, we are subject to volatility and adverse consequences associated with economic downturns in different parts of the world. In the event of a downturn, many of our customers may delay or further reduce their purchases of our products and services. If negative conditions in the credit markets prevent our customers from obtaining credit or necessary financing, product orders in these channels may decrease, which could result in lower revenue. In addition, we may experience cancellations of orders in backlog, rescheduling of customer deliveries, and attendant pricing pressures. If our suppliers face challenges in obtaining credit, in selling their products, or otherwise in operating their businesses, their ability to continue to supply materials to us may be negatively affected.

In addition, we finance some of our sales through trade credit. In addition to ongoing credit evaluations of our customers' financial condition, we seek to mitigate our credit risk by obtaining deposits and letters of credit on certain of our sales arrangements. We could suffer significant losses if a customer whose accounts receivable we have not secured fails or is otherwise unable to pay us, or if financial institutions providing letters of credit become insolvent. A loss in collections on our accounts receivable would have a negative impact on our financial condition and results of operations.

***We may be exposed to liabilities under the Foreign Corrupt Practices Act and other similar laws.***

We are subject to the Foreign Corrupt Practices Act of 1977 (FCPA) and other laws that prohibit improper payments or offers of payments to foreign government officials, as defined by the statute, for the purpose of obtaining or retaining business. In addition, many of our customers have policies limiting or prohibiting us from providing certain types or amounts of entertainment, meals, or gifts to their employees. It is our policy to implement safeguards to discourage these practices by our employees and representatives. However, our safeguards may prove to be ineffective and our employees, consultants, sales agents, or distributors may engage in conduct for which we may be held responsible. In addition, we may acquire a company that has engaged in unlawful conduct in the past, and be held responsible for this conduct through successor liability principles. Violations of the FCPA or similar laws or similar customer policies may result in severe criminal or civil sanctions or the loss of supplier privileges to a customer and we may be subject to other liabilities, which could negatively affect our business, financial condition, and results of operations.

***We are subject to internal control evaluations and attestation requirements of Section 404 of the Sarbanes-Oxley Act and any delays or difficulties in satisfying these requirements or negative reports concerning our internal controls could adversely affect our future results of operations and our stock price.***

Pursuant to Section 404 of the Sarbanes-Oxley Act of 2002, we must include in our Annual Report on Form 10-K a report by management on the effectiveness of our internal control over financial reporting. Ongoing compliance with this requirement is complex, costly, time-consuming, and is subject to significant judgment. If our internal controls are ineffective or if our management does not timely assess the adequacy of such internal controls, our ability to file timely and accurate periodic reports may be impeded. Any delays in filing may cause us to face the following risks and concerns, among others:

- concern on the part of our customers, partners, investors, and employees about our financial condition and filing delay status, including the potential loss of business opportunities;

- significant time and expense required to complete delayed filings and the distraction of our senior management team and board of directors as we work to complete delayed filings;
- investigations by the SEC and other regulatory authorities of the Company and our management;
- limitations on our ability to raise capital;
- suspension or termination of our stock listing on The NASDAQ Stock Market and the removal of our stock as a component of certain stock market indices; and
- general reputational harm.

Any or all of the foregoing could result in the commencement of stockholder lawsuits against the Company. Any such litigation, as well as any proceedings that could arise as a result of a filing delay and the circumstances which gave rise to it, may be time consuming and expensive, may divert management attention from the conduct of our business, could have a



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material adverse effect on our business, financial condition, and results of operations, and may expose us to costly indemnification obligations to current or former officers, directors, or other personnel, regardless of the outcome of such matters, which may not be adequately covered by insurance.

***Changes in accounting pronouncements or taxation rules or practices may adversely affect our financial results.***

Changes in accounting pronouncements or taxation rules or practices can have a significant effect on our reported results. New accounting pronouncements and taxation rules can have a material impact on effective tax rates, results of operations, and our financial condition. On December 22, 2017, President Trump signed into law the statute commonly referred to as the Tax Cuts and Jobs Act ( 2017 Tax Act ), which makes broad and complex changes to the U.S. tax code. As we collect and prepare necessary data, and interpret the 2017 Tax Act and any additional guidance issued by the IRS or other standard-setting bodies, we may make adjustments to the provisional amounts in accordance with Staff Accounting Bulletin No. 118 ( SAB 118 ), which provides SEC staff guidance for the application of ASC 740 in the reporting period in which the 2017 Tax Act was signed into law. This change could materially affect our financial position and tax attributes carryforward. In addition, varying interpretations of accounting pronouncements or taxation practices, and the questioning of our current or past practices (such as those associated with our transfer pricing), may adversely affect our reported financial results.

***Our income taxes may change.***

We are subject to income tax on a jurisdictional or legal entity basis and significant judgment is required in certain instances to allocate our taxable income to a jurisdiction and to determine the related income tax expense and benefits. Losses in one jurisdiction generally may not be used to offset profits in other jurisdictions. As a result, changes in the mix of our earnings (or losses) between jurisdictions, among other factors, could alter our overall effective income tax rate, possibly resulting in significant tax rate increases.

We are regularly audited by various tax authorities. Income tax audit assessments or changes in tax laws, regulations, or other interpretations may result in increased tax provisions which could materially affect our operating results in the period or periods in which such determinations are made or changes occur.

In addition, our effective tax rate could increase if we determine that it is no longer more likely than not that we are able to realize our remaining net deferred tax assets, if we are unable to generate sufficient future taxable income in certain jurisdictions, or if we are otherwise required to increase our valuation allowances against our deferred tax assets.

***We may be required to take additional impairment charges on assets.***

We are required to assess goodwill and indefinite-lived intangible assets annually for impairment, or on an interim basis whenever certain events occur or circumstances change, such as an adverse change in business climate or a decline in the overall industry, that would more likely than not reduce the fair value below its carrying amount. We are also required to test our long-lived assets, including acquired intangible assets and property, plant, and equipment, for recoverability and impairment whenever there are indicators of impairment such as an adverse change in

business climate.

As part of our long term strategy, we may pursue future acquisitions of other companies or assets which could potentially increase our assets. Adverse changes in business conditions could materially impact our estimates of future operations and result in impairment charges to these assets. A significant decline in the market price of our common stock could indicate a decline in the fair value of our reporting unit such that goodwill becomes impaired. If our assets are impaired, our financial condition and results of operations could be materially and adversely affected.

*We have indebtedness in the form of convertible senior notes which could adversely affect our financial position, prevent us from implementing our strategy, and dilute the ownership interest of our existing shareholders.*

In January of 2017, we issued \$345 million of 2.70% Convertible Senior Notes due 2023 ( Convertible Senior Notes ). The Convertible Senior Notes are convertible into Company common stock at an initial conversion rate of 24.98 shares of Company common stock per \$1,000 principal amount of the Convertible Senior Notes. The Company is obligated to repurchase the Convertible Senior Notes upon the occurrence of certain events described in the indenture relating to the Convertible Senior Notes. The degree to which we are leveraged could have negative consequences, including but not limited to the following:

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- we may be more vulnerable to economic downturns, less able to withstand competitive pressures, and less flexible in responding to changing business and economic conditions;
- our ability to obtain additional financing in the future for working capital, capital expenditures, acquisitions, general corporate, and other purposes may be limited;
- a substantial portion of our cash flows from operations in the future may be required for the payment of the principal amount of our existing indebtedness when it becomes due; and
- we may elect to make cash payments upon any conversion of the Convertible Senior Notes, which would reduce our cash on hand.

Our ability to meet our payment obligations under the Convertible Senior Notes depends on our ability to generate significant cash flow in the future. This, to some extent, is subject to general economic, financial, competitive, legislative, regulatory, and other factors that are beyond our control. There can be no assurance that our business will generate cash flow from operations, or that additional capital will be available to us, in an amount sufficient for us to meet our debt payment obligations and to fund other liquidity needs. If we are unable to generate sufficient cash flow to service our debt obligations, we may need to refinance or restructure our debt, sell assets, reduce or delay capital investments, or seek to raise additional capital. If we were unable to implement one or more of these alternatives, we may be unable to meet our debt payment obligations, which could have a material adverse effect on our business, results of operations, and financial condition.

Furthermore, if the Convertible Senior Notes are converted into shares of Company common stock, the issuance of additional shares of Company common stock would dilute the ownership interest of our existing shareholders and could have a dilutive effect on our net income per share to the extent that the price of our common stock exceeds the conversion price of the Convertible Senior Notes. In addition, any sales in the public market of our common stock issuable upon conversion of the Convertible Senior Notes could adversely affect prevailing market prices of our common stock.

***The accounting method for convertible debt securities that may be settled in cash, such as the Convertible Senior Notes, could have a material effect on our reported financial results.***

Under Accounting Standards Codification 470-20, Debt with Conversion and Other Options ( ASC 470-20 ), an entity must separately account for the liability and equity components of certain convertible debt instruments (such as the Convertible Senior Notes) that may be settled entirely or partially in cash upon conversion in a manner that reflects the issuer's economic interest cost. The effect of ASC 470-20 on the accounting for the Convertible Senior Notes is that the equity component is required to be included in the additional paid-in capital section of stockholders' equity on our consolidated balance sheet, and the value of the equity component would be treated as original issue discount for purposes of accounting for the debt component of the Convertible Senior Notes. As a result, we will be required to record a greater amount of non-cash interest expense in current periods presented as a result of the amortization of the discounted carrying value of the Convertible Senior Notes to their face amount over the term of the Convertible Senior Notes. We will report lower net income in our financial results because ASC 470-20 will require interest to include both the current period's amortization of the debt discount and the instrument's coupon interest, which could adversely affect our

financial results, the trading price of our common stock, and the trading price of the Convertible Senior Notes.

In addition, under certain circumstances convertible debt instruments (such as the Convertible Senior Notes) that may be settled entirely or partly in cash can be accounted for utilizing the treasury stock method, the effect of which is that the shares issuable upon conversion of the Convertible Senior Notes are not included in the calculation of diluted earnings per share except to the extent that the conversion value of the Convertible Senior Notes exceeds their principal amount. Under the treasury stock method, for diluted earnings per share purposes, the transaction is accounted for as if the number of shares of common stock that would be necessary to settle such excess, if we elected to settle such excess in shares, are issued. We cannot be sure that the accounting standards in the future will continue to permit the use of the treasury stock method or that we will continue to expect to settle the principal balance in cash. If we are unable to use the treasury stock method in accounting for the shares issuable upon conversion of the Convertible Senior Notes, our diluted earnings per share could be adversely affected.

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***We are subject to foreign currency exchange risks.***

We are exposed to foreign currency exchange rate risks that are inherent in our anticipated sales, sales and purchase commitments, and assets and liabilities that are denominated in currencies other than the U.S. dollar. Although we attempt to mitigate our exposure to fluctuations in currency exchange rates, hedging activities may not always be available or adequate to mitigate the impact of our exchange rate exposure. Failure to sufficiently hedge or otherwise manage foreign currency risks properly could materially and adversely affect our financial condition, results of operations, and liquidity.

***Our previously announced share repurchase program could affect the price of our common stock and increase volatility and may be suspended or terminated at any time, which may result in a decrease in the trading price of our common stock.***

Repurchases pursuant to our share repurchase program could affect our stock price and increase its volatility. The existence of a share repurchase program could also cause our stock price to be higher than it would be in the absence of such a program and could potentially reduce the market liquidity for our stock. There can be no assurance that any share repurchases will enhance stockholder value because the market price of our common stock may decline below the levels at which we repurchased shares of common stock. Although our share repurchase program is intended to enhance long term stockholder value, short term stock price fluctuations could reduce the program's effectiveness. Furthermore, the program does not obligate the Company to repurchase any dollar amount or number of shares of common stock, and may be suspended or discontinued at any time and any suspension or discontinuation could cause the market price of our stock to decline.

***If we are subject to cyber-attacks we could incur substantial costs and, if such attacks are successful, we could incur significant liabilities, reputational harm, and disruption to our operations.***

We manage, store, and transmit proprietary information and sensitive data relating to our operations. We may be subject to breaches of the information technology systems we use for these purposes. Experienced computer programmers and hackers may be able to penetrate our network security and misappropriate and compromise our confidential information (and third party confidential information), create system disruptions, or cause shutdowns. Computer programmers and hackers also may be able to develop and deploy viruses, worms, and other malicious software programs that attack our systems or our products, or that otherwise exploit security vulnerabilities.

The costs to address the foregoing security problems and security vulnerabilities before or after a cyber-incident could be significant. Our remediation efforts may not be successful and could result in interruptions, delays, a cessation of service, and a loss of existing or potential customers, impeding our sales, manufacturing, distribution, and other critical functions. In addition, breaches of our security measures and the unapproved dissemination of proprietary information or sensitive data about us, our customers or other third parties, could expose us, our customers and others to a risk of loss or misuse of this information, result in litigation and potential liability for us, damage our reputation, and otherwise harm our business.

***We have adopted certain measures that may have anti-takeover effects which may make an acquisition of our Company by another company more difficult.***

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We have adopted, and may in the future adopt, certain measures that may have the effect of delaying, deferring, or preventing a takeover or other change in control of our Company, which a holder of our common stock might not consider to be in the holder's best interest. These measures include:

- blank check preferred stock;
- a classified board of directors; and
- certain other certificate of incorporation and bylaws provisions.

Our board of directors has the authority to issue up to 500,000 shares of preferred stock and to fix the rights (including voting rights), preferences and privileges of these shares (blank check preferred). Such preferred stock may have rights, including economic rights, senior to our common stock. As a result, the issuance of the preferred stock could have a material adverse

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effect on the price of our common stock and could make it more difficult for a third party to acquire a majority of our outstanding common stock.

Our board of directors is divided into three classes with each class serving a staggered three-year term. The existence of a classified board makes it more difficult for our shareholders to change the composition of our board of directors, and therefore the Company's policies, in a relatively short period of time.

We have adopted certain certificate of incorporation and bylaws provisions which have anti-takeover effects. These include: (a) requiring certain actions to be taken at a meeting of shareholders rather than by written consent, (b) requiring a super-majority of shareholders to approve certain amendments to our bylaws, (c) limiting the maximum number of directors, and (d) providing that directors may be removed only for cause. These measures and those described above may have the effect of delaying, deferring, or preventing a takeover or other change in control of our Company that a holder of our common stock might consider to be in the holder's best interest.

In addition, we are subject to the provisions of Section 203 of the General Corporation Law of the State of Delaware, which prohibits a Delaware corporation from engaging in any business combination, including mergers and asset sales, with an interested stockholder (generally, a 15% or greater stockholder) for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in a prescribed manner. The operation of Section 203 may have anti-takeover effects, which could delay, defer, or prevent a takeover attempt that a holder of our common stock might consider to be in the holder's best interest.

Despite the above measures, an activist shareholder could undertake action to implement governance, strategic, or other changes to the Company which a holder of our common stock might not consider to be in the holder's best interest. Such activities could interfere with our ability to execute our strategic plans, be costly and time consuming, disrupt our operations, and divert the attention of management and our employees.

***We are subject to risks of non-compliance with environmental, health, and safety regulations.***

We are subject to environmental, health, and safety regulations in connection with our business operations, including but not limited to regulations related to the development, manufacture and use of our products, recycling and disposal of related materials, and the operation and use of our facilities and real property. Failure or inability to comply with existing or future environmental and safety regulations, which vary from jurisdiction to jurisdiction, could result in significant remediation liabilities, the imposition of fines, and the suspension or termination of research, development, or use of certain of our products, each of which could have a material adverse effect on our business, financial condition, and results of operations. In addition, some of our operations involve the storage, handling, and use of hazardous materials that may pose a risk of fire, explosion, or environmental release. Such events could result from acts of terrorism, natural disasters, or operational failures and may result in injury or loss of life to our employees and others, local environmental contamination, and property damage. These events might cause a temporary shutdown of an affected facility, or portion thereof, and we could be subject to penalties or claims as a result. Each of these events could have a material adverse effect on our business, financial condition, and results of operations.

***Regulations related to conflict minerals will force us to incur additional expenses, may make our supply chain more complex, and may harm our relationships with customers.***

Under the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (the Dodd-Frank Act ), the SEC adopted requirements for companies that manufacture products that contain certain minerals and metals, known as conflict minerals. These rules require public companies to perform diligence and to report annually to the SEC whether such minerals originate from the Democratic Republic of Congo and adjoining countries. The implementation of these requirements could adversely affect the sourcing, availability, and pricing of minerals we use in the manufacture of our products. In addition, we have incurred and will continue to incur additional costs to comply with the disclosure requirements, including costs related to determining the source of any of the relevant minerals used in our products. Given the complexity of our supply chain, we may not be able to ascertain the origins of these minerals used in our products through the due diligence procedures that we implement, which may harm our reputation. We may also face difficulties in satisfying customers who require that our products be certified as conflict mineral free, which could harm our relationships with these customers and lead to a loss of revenue. These requirements could limit the pool of suppliers that can provide conflict-free minerals, and we may be unable



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to obtain conflict-free minerals at competitive prices, which could increase our costs and adversely affect our manufacturing operations and our profitability.

*We have significant operations in locations which could be materially and adversely impacted in the event of a natural disaster, an act of terrorism, or other significant disruption.*

Our operations in the United States, in the Asia-Pacific region, and in other areas could be subject to natural disasters or other significant disruptions, including earthquakes, tsunamis, fires, hurricanes, floods, water shortages, other extreme weather conditions, medical epidemics, power shortages and blackouts, telecommunications failures, and other natural and manmade disasters or disruptions. In the event of such a natural disaster or other disruption, we could experience disruptions or interruptions to our operations and to the operations of our suppliers, distributors, resellers and customers, destruction of facilities and loss of life, all of which could materially increase our costs and expenses and materially and adversely affect our business, financial condition, and results of operations. In addition, various regions of the world in which we do business are subject to the threat of terrorism and acts of war. Any act of terrorism or war that affects the economy or the industries in which we operate could result in significant harm to us, including the loss of life and property, manufacturing and transportation delays, disruptions in our supply chain, the need to comply with enhanced security measures, and other increased costs.

**Item 1B. Unresolved Staff Comments**

None.

**Item 2. Properties**

Our corporate headquarters and principal research and development, manufacturing, and sales and service facilities are:

<b>Owned Facilities Location</b>	<b>Approximate Size (sq. ft.)</b>	<b>Use</b>
Plainview, NY	80,000	Corporate Headquarters; R&D; Sales & Service; Administration
Somerset, NJ	80,000	R&D; Manufacturing; Sales & Service; Administration
St. Paul, MN	43,000	R&D; Manufacturing; Sales & Service; Administration
Somerset, NJ	38,000	R&D; Sales & Service; Administration

<b>Leased Facilities Location</b>	<b>Approximate Size (sq. ft.)</b>	<b>Use</b>	<b>Lease Expires</b>
San Jose, CA	100,000	R&D; Manufacturing; Sales & Service; Administration	2021
Somerset, NJ	57,000	Warehouse	2020
Kingston, NY (1)	52,000	Manufacturing	2018
Horsham, PA	49,000	R&D; Manufacturing; Sales & Service; Administration	2024
Singapore	23,000	R&D; Manufacturing; Sales & Service; Administration	2023

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Waltham, MA	19,000	R&D; Sales & Service; Administration	2023
Hsinchu City, Taiwan	13,000	Sales & Service; Administration	2020
Shanghai, China	10,000	Sales & Service; Administration	2020

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(1) Manufacturing site has been consolidated into Somerset, we expect to vacate this location during 2018.

In addition to the above, we lease a small office in Edina, Minnesota and Malta, New York for sales and service and our foreign sales and service subsidiaries lease office space in Germany, Japan, Malaysia, Philippines, South Korea, Thailand, and United Kingdom. We believe our facilities are adequate to meet our current needs.

### Item 3. Legal Proceedings

On September 21, 2017, Blueblade Capital Opportunities LLC et al., on behalf of purported beneficial owners of 440,100 shares of Ultratech common stock, filed an action against Ultratech in Delaware Court of Chancery requesting an appraisal of the value of their Ultratech stock pursuant to 8 Del. C. §262. We believe that the merger price, which was the product of

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arms-length negotiations, was fair and reasonable, and intend to contest the appraisal claim. Discovery in the matter has commenced and a trial on the action is scheduled to begin in December 2018.

On April 12, 2017, we filed a patent infringement complaint in the U.S. District Court for the Eastern District of New York against SGL Carbon, LLC and SGL Carbon SE (collectively, "SGL"), alleging infringement of patents relating to wafer carrier technology used in MOCVD equipment. The complaint alleges that SGL infringes Veeco's patents by making and selling certain wafer carriers to Veeco's competitor, Advanced Micro-Fabrication Equipment, Inc. ("AMEC"). On November 2, 2017, the U.S. District Court granted our motion for a preliminary injunction prohibiting SGL from shipping wafer carriers using our patented technology without our express authorization.

On July 13, 2017, AMEC filed a patent infringement complaint against Veeco Instruments Shanghai Co., Ltd. ("Veeco Shanghai") with the Fujian High Court in China, alleging that our MOCVD products infringed a Chinese utility model patent relating to the synchronous movement engagement mechanism in a chemical vapor deposition reactor and seeking injunctive relief and monetary damages against Veeco Shanghai. On December 7, 2017, without providing notice to us and without hearing our position on alleged infringement, the Fujian High Court issued a preliminary injunction, applicable in China, that requires Veeco Shanghai to stop importing, making, selling, and offering to sell Veeco EPIK 700 model MOCVD systems and to stop importing, selling, and offering to sell wafer carriers used as supplies for the EPIK 700 MOCVD system.

On February 8, 2018, Veeco, AMEC, and SGL announced that they had mutually agreed to settle the pending litigation among the parties and to amicably resolve all pending disputes, including AMEC's lawsuit against Veeco before the Fujian High Court in China and Veeco's lawsuit against SGL before the U.S. District Court for the Eastern District of New York. As part of the settlement, all legal actions worldwide (in court, patent offices, and otherwise), between Veeco, AMEC, and SGL, and their affiliates, will be dismissed and/or otherwise withdrawn. As a result, all business processes, including sales, service, and importation, will be continued.

We are involved in various other legal proceedings arising in the normal course of business. We do not believe that the ultimate resolution of these matters will have a material adverse effect on its consolidated financial position, results of operations, or cash flows.

**Item 4. Mine Safety Disclosures**

Not Applicable.

Table of Contents**PART II****Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities**

Our common stock is quoted on The NASDAQ Stock Market under the symbol VECO. The 2017 and 2016 high and low closing bid prices by quarter are as follows:

	2017		2016	
	High	Low	High	Low
First Quarter	\$ 30.05	\$ 24.85	\$ 20.64	\$ 16.89
Second Quarter	34.20	27.40	19.72	15.79
Third Quarter	32.95	18.60	20.98	15.91
Fourth Quarter	22.25	11.90	29.95	19.75

On February 14, 2018, the closing price for our common stock on The NASDAQ Stock Market was \$18.70, and we had 124 shareholders of record.

We have not paid dividends on our common stock. The Board of Directors will determine future dividend policy based on our consolidated results of operations, financial condition, capital requirements, and other circumstances.

**Issuer Purchases of Equity Securities**

Share repurchase activity during the three months ended December 31, 2017 is as follows:

Period	Total Number of Shares Purchased	Average Price Paid Per Share (in thousands, except average price paid per share)	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Approximate Dollar Value of Shares That May Yet Be Purchased Under the Plans or Programs
October 2, 2017		\$		\$
October 30, 2017				
December 4, 2017	203	14.83	203	96,982

During fiscal year 2017, 2016, and 2015, we repurchased 0.2 million shares, 0.7 million shares, and 0.5 million shares of our common stock for \$3.0 million, \$13.1 million, and \$9.2 million, respectively, through our share repurchase programs. On December 11, 2017, our Board of Directors authorized a program to repurchase up to \$100 million of the Company's outstanding common stock to be completed through

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December 11, 2019, after completion of the previous program on October 28, 2017. Repurchases may be made from time to time on the open market or in privately negotiated transactions in accordance with applicable federal securities laws. The timing and amount of future repurchases, if any, will depend upon market conditions, SEC regulations, and other factors. The repurchases would be funded using available cash balances and cash generated from operations. The program does not obligate us to acquire any particular amount of common stock and may be modified or suspended at any time at our discretion.

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**Stock Performance Graph**

**ASSUMES \$100 INVESTED ON DEC. 31, 2012**

**ASSUMES DIVIDENDS REINVESTED**

**FISCAL YEAR ENDING DEC. 31**

**2012      2013      2014      2015      2016      2017**

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Veeco Instruments Inc.	100.00	111.60	118.28	69.72	98.85	50.36
S&P Smallcap 600	100.00	141.31	149.45	146.50	185.40	209.94
RDG MidCap Technology	100.00	161.83	159.04	138.67	123.87	132.83

Table of Contents**Item 6. Selected Financial Data**

The information set forth below should be read in conjunction with the Results of Operations section included in Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations.

	2017 (1)	2016	Year ended December 31, 2015		2014 (2)	2013
			(in thousands, except per share data)			
<b>Statement of Operations Data:</b>						
Net sales	\$ 484,756	\$ 332,451	\$ 477,038	\$ 392,873	\$ 331,749	
Operating income (loss)	(63,778)	(120,402)	(23,232)	(79,209)	(71,812)	
Income (loss) from continuing operations, net of tax	(44,793)	(122,210)	(31,978)	(66,940)	(42,263)	
Basic income (loss) per common share from continuing operations	(1.01)	(3.11)	(0.80)	(1.70)	(1.09)	
Diluted income (loss) per common share from continuing operations	(1.01)	(3.11)	(0.80)	(1.70)	(1.09)	

(1) During the second quarter of 2017, the Company acquired Ultratech. The results of operations of Ultratech have been included in the consolidated financial statements since that date.

(2) During the fourth quarter of 2014, the Company acquired PSP. The results of operations of PSP have been included in the consolidated financial statements since that date.

	2017	2016	December 31, 2015		2014	2013
			(in thousands)			
<b>Balance Sheet Data:</b>						
Cash and cash equivalents	\$ 279,736	\$ 277,444	\$ 269,232	\$ 270,811	\$ 210,799	
Short-term investments	47,780	66,787	116,050	120,572	281,538	
Working capital	373,536	357,999	379,904	387,254	485,452	
Total assets	1,387,287	758,532	890,789	929,455	947,969	
Long-term debt (less current installments)	275,630	826	1,193	1,533	1,847	
Total equity	840,713	594,595	714,615	738,932	780,230	



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

**Executive Summary**

On May 26, 2017, we completed the acquisition of Ultratech. Ultratech develops, manufactures, sells, and supports lithography, laser annealing, and inspection equipment for manufacturers of semiconductor devices, including front-end semiconductor manufacturing and advanced packaging. Ultratech also develops, manufactures, sells, and supports ALD equipment for scientific and industrial applications. Ultratech's customers are primarily located throughout the United States, Europe, China, Japan, Taiwan, Singapore, and Korea. With the addition of Ultratech, we establish ourselves as a leading equipment supplier in the advanced packaging market, forming a strong technology portfolio to address critical advanced packaging applications, as well as greatly increasing our critical mass in the front-end semiconductor market. The results of Ultratech's operations have been included in the consolidated financial statements since the date of acquisition.

We categorize our revenue by the key market segments into which we sell. Our four key markets are: Advanced Packaging, MEMS & RF Filters; LED Lighting, Display & Compound Semiconductor; Front-End Semiconductor; and Scientific & Industrial.

We are a technology company that develops, manufactures, sells, and supports semiconductor process equipment aligned to meet the demands of key global trends such as enhanced mobility, increased connectivity, and energy efficiency. Our primary technologies include metal organic chemical vapor deposition, advanced packaging lithography, wet etch and clean, laser annealing, ion beam, molecular beam epitaxy, wafer inspection, and atomic layer deposition systems. These technologies play an integral role in producing LEDs for solid-state lighting and displays, and in the fabrication and packaging of advanced semiconductor devices. With equipment designed to optimize performance, yield, and cost of ownership, we hold technology leadership positions in all of these served markets.

Sales in the Advanced Packaging, MEMS & RF Filter markets were driven by Lithography and PSP systems, as the market continues to be influenced by the mobility trend and increasing functionality in mobile devices. Advanced Packaging opportunities slowed in 2017 as customers temporarily delayed adoption of fan-out wafer level packaging ( FOWLP ) in favor of cheaper flip chip solutions. Our versatile PSP product architecture has allowed us to continue to generate solid business in the MEMS and RF Filter portion of this category. We remain well positioned for future growth in these markets, supported by trends such as mobile connectivity, automotive electronics, big data processing and 5G infrastructure deployment, as well as the longer term growth of FOWLP and other Advanced Packaging applications.

Sales in the LED Lighting, Display & Compound Semiconductor market were driven by the continued shipment of MOCVD and PSP systems to customers in China, Malaysia, and Europe. The largest applications for LEDs are solid state lighting, followed by TV displays. Over the past several quarters, demand has increased for larger LCD TV displays, which require relatively more LEDs to backlight than smaller display sizes. More recently, we have seen an increase in demand in non general-lighting applications such as 3D sensors, VCSELs, laser diodes, and RF devices. Our broad portfolio of MOCVD and PSP technologies have been developed to support these significant industry trends, driving an increase in demand for our MOCVD and PSP equipment. Our product mix in the LED market is expected to shift, and we expect to see a decline in gross margins in the first half of 2018. We expect margins in the second half of 2018 to be higher than the first half.

Sales in the Front-End Semiconductor market were primarily driven by Laser Annealing systems, an IBD Photomask system for EUV applications, and IBE systems sold into STT-MRAM applications. We see strong interest from customers for our laser melt anneal systems

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which are being qualified in 7nm and 5nm applications, as well as our 3D inspection systems which are being evaluated at several high volume manufacturing fabs.

Sales in the Scientific & Industrial markets were supported by shipments of Ion Beam systems for optical coatings and data storage applications, as well as shipments of MBE systems to universities and laboratories. While equipment demand from each individual market may fluctuate quarter to quarter, the diverse customer base has historically provided a relatively stable revenue stream for the Company.

Table of Contents**Results of Operations****Years Ended December 31, 2017 and 2016**

The following table presents revenue and expense line items reported in our Consolidated Statements of Operations for 2017 and 2016 and the period-over-period dollar and percentage changes for those line items. Our results of operations are reported as one business segment, represented by our single operating segment, including the Ultratech business acquired.

(dollars in thousands)							
Net sales	\$	484,756	100%	\$	332,451	100%	\$ 152,305 46%
Cost of sales		300,438	62%		199,593	60%	100,845 51%
Gross profit		184,318	38%		132,858	40%	51,460 39%
Operating expenses, net:							
Research and development		81,987	17%		81,016	24%	971 1%
Selling, general, and administrative		100,250	21%		77,642	23%	22,608 29%
Amortization of intangible assets		35,475	7%		19,219	6%	16,256 85%
Restructuring		11,851	2%		5,640	2%	6,211 110%
Acquisition costs		17,786	4%		0	0%	17,786 *
Asset impairment		1,139	0%		69,520	21%	(68,381) (98)%
Other, net		(392)	(0)%		223	0%	(615) *
Total operating expenses, net		248,096	51%		253,260	76%	(5,164) (2)%
Operating income (loss)		(63,778)	(13)%		(120,402)	(36)%	56,624 *
Interest income (expense), net		(17,122)	(4)%		958	0%	(18,080) *
Income (loss) before income taxes		(80,900)	(17)%		(119,444)	(36)%	38,544 *
Income tax expense (benefit)		(36,107)	(7)%		2,766	1%	(38,873) *
Net income (loss)	\$	(44,793)	(9)%	\$	(122,210)	(37)%	\$ 77,417 *

\* Not meaningful

*Net Sales*

The following is an analysis of sales by market and by region:

(dollars in thousands)							
<b>Sales by market</b>	\$	253,785	52%	\$	144,675	44%	\$ 109,110 75%

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LED Lighting, Display & Compound

Semiconductor

Advanced Packaging, MEMS & RF Filters	69,353	14%	68,304	21%	1,049	2%
Scientific & Industrial	120,788	25%	111,198	33%	9,590	9%
Front-End Semiconductor	40,830	9%	8,274	2%	32,556	393%
<b>Total</b>	\$ 484,756	100%	\$ 332,451	100%	\$ 152,305	46%

**Sales by geographic region**

United States	\$ 94,936	20%	\$ 85,637	26%	\$ 9,299	11%
China	107,844	22%	85,834	26%	22,010	26%
EMEA	76,636	16%	83,410	25%	(6,774)	(8)%
Rest of World	205,340	42%	77,570	23%	127,770	165%
<b>Total</b>	\$ 484,756	100%	\$ 332,451	100%	\$ 152,305	46%

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Total sales increased across all market categories for the year ended December 31, 2017 against the comparable prior year period, driven by ongoing improvements in LED industry conditions, as well as additional sales of approximately \$65.5 million from the Ultratech business acquired in May 2017, primarily in the Front-End Semiconductor and Advanced Packaging, MEMS, and RF Filters markets. Pricing was not a significant driver of the change in total sales. By geography, sales increased in the United States, China, and Rest of World regions, offset by a slight decrease in the EMEA region. The most significant increase occurred in the Rest of World region, which was attributable to the increased sales in the LED Lighting, Display & Compound Semiconductor market in Malaysia, as well as additional sales from the Ultratech business acquired. Sales into Malaysia for the year ended December 31, 2017 was approximately \$78.2 million, compared to \$6.6 million for the year ended December 31, 2016. Sales in China increased principally due to increased sales in the LED Lighting, Display, and Compound Semiconductor market. We expect there will continue to be year-to-year variations in our future sales distribution across markets and geographies.

Orders increased to \$570.7 million in 2017, an increase of \$196.5 million, or 53% compared with 2016. The LED Lighting, Display, and Compound Semiconductor and Scientific & Industrial markets increased 51% and 56%, respectively, driven by overall improvements in industry conditions. The Advanced Packaging, MEMS, and RF Filters and Front-End Semiconductor markets increased 52% and 49%, respectively, driven by the additional bookings from the Ultratech acquisition.

One of the performance measures we use as a leading indicator of the business is the book-to-bill ratio. The ratio is defined as orders recorded in a given period divided by revenue recognized in the same period. A ratio greater than one indicates we are adding orders faster than we are recognizing revenue. In 2017, the ratio was 1.2, a rise compared to the 2016 ratio of 1.1. Our backlog at December 31, 2017 was \$334.3 million, which was higher than the ending backlog at December 31, 2016 of \$209.2 million. During the year ended December 31, 2017, we increased backlog by approximately \$41.6 million relating to backlog acquired from Ultratech, while adjusting for a decrease in backlog of approximately \$2.0 million relating to orders that no longer met our bookings criteria. For certain sales arrangements, we require a deposit for a portion of the sales price prior to manufacturing a system for a customer. At December 31, 2017 and 2016, we had customer deposits of \$41.5 million and \$22.2 million, respectively.

*Gross Profit*

In 2017, gross profit increased compared to 2016 due to an increase in sales volume, including the acquisition of Ultratech, partially offset by decreased gross margins. Gross margins decreased principally due to an inventory fair value step-up that was recorded in connection with the purchase accounting relating to the Ultratech acquisition. Our product mix in the LED market is expected to shift, and we expect to see a decline in gross margins in the first half of 2018. We expect margins in the second half of 2018 to be higher than the first half.

*Research and development*

The markets we serve are characterized by continuous technological development and product innovation, and we invest in various research and development initiatives to maintain our competitive advantage and achieve our growth objectives. Research and development expenses remained relatively flat in 2017 compared to 2016, as the addition of the acquired Ultratech related research and development projects was offset by our decision to reduce investments in certain technology, as well as decreases in other personnel-related expenses and professional fees, as a result of our initiative to streamline operations, enhance efficiency, and reduce costs.

*Selling, general, and administrative*

Selling, general, and administrative expenses increased primarily due to the addition of the acquired Ultratech related selling, general, and administrative costs, as well as increased professional and legal fees.

*Amortization expense*

The increase in amortization expense is a result of the additional intangibles acquired as part of the acquisition of Ultratech, offset by the lower amortization resulting from the impairment of the certain technology assets in the prior year

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as well as certain other intangible assets becoming fully amortized during 2016.

*Restructuring expense*

During 2016, we undertook restructuring activities as part of our initiative to streamline operations, enhance efficiencies, and reduce costs, as well as reducing future investments in certain technology development, which together impacted approximately 75 employees. These activities were substantially completed in 2017. In addition, during 2017, we began the acquisition integration process to enhance efficiencies, resulting in additional employee terminations and other facility closing costs. Restructuring expense for the year ended December 31, 2017 included non-cash charges of \$1.9 million related to accelerated share-based compensation for employee terminations.

*Acquisition costs*

Acquisition costs are non-recurring charges incurred in connection with the acquisition of the Ultratech business, which included \$4.2 million of non-cash charges related to accelerated share-based compensation for employee terminations for the year ended December 31, 2017.

*Asset impairment*

During 2016, we recorded non-cash impairment charges of \$57.6 million relating to our decision to reduce investments in certain technologies, \$5.7 million relating to our assessments of the fair market value of assets held for sale, and \$6.2 million relating to the disposal of certain lab equipment. Impairment charges for the year ended December 31, 2017, primarily relate to further reductions to the fair market value of assets held for sale upon disposal.

*Interest Income (Expense)*

For the year ended December 31, 2017, we recorded net interest expense of \$17.1 million, including non-cash interest expense of \$10.4 million, compared with net interest income of \$1.0 million in the prior year period. The change primarily relates to the Convertible Senior Notes issued in January 2017.

*Income Taxes*

On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act ( 2017 Tax Act ), which makes broad and complex changes to the U.S. tax code. Certain income tax effects of the 2017 Tax Act are reflected in our

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financial results in accordance with SAB 118. SAB 118 provides SEC staff guidance regarding the application of Accounting Standards Codification Topic 740 ( ASC 740 ) *Income Taxes*, and the required disclosures due to the enactment of the 2017 Tax Act. The income tax effects of the 2017 Tax Act include a provisional \$11.3 million income tax benefit related to the re-measurement of our deferred tax assets and liabilities at the reduced rate of 21 percent and a reduction in our U.S. valuation allowance attributable to indefinite lived intangibles becoming a source of future taxable income for certain deferred tax assets that are expected to have an indefinite life due to the 2017 Tax Act. Refer to Note 17, *Income Taxes*, in the Notes to the Consolidated Financial Statements for further information on the financial statement impact of the 2017 Tax Act.

The 2017 income tax benefit of \$36.1 million is comprised of: (i) a \$24.2 million income tax benefit related to domestic losses incurred during the year ended December 31, 2017, as the deferred tax liability created by the issuance of the Convertible Senior Notes and recorded as a component of APIC is treated as a source of income in fiscal 2017, (ii) a \$11.3 million income tax benefit recorded in connection with the 2017 Tax Act, primarily due to the re-measurement of our deferred tax assets and liabilities at the new federal statutory rate of 21 percent, as well as a reduction in our valuation allowance attributable to deferred tax liabilities associated with indefinite-lived intangible assets that became available as a source of income to offset existing deferred tax assets, and (iii) \$0.6 million income tax benefit from non-U.S. operations primarily attributable to a reduction in uncertain tax positions and the recognition of a deferred tax asset for certain non-U.S. net operating losses generated in prior years that have become realizable on a more-likely-than-not basis, offset by tax expense attributed to the profitable non-U.S. operations, as well as withholding taxes recorded as we now expect to repatriate certain foreign earnings as a result of changes in tax laws under the 2017 Tax Act.



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The 2016 income tax expense of \$2.8 million is comprised of three components: (i) a \$1.9 million tax expense related primarily to U.S. tax amortization of our indefinite-lived intangible assets that is not available to offset existing deferred tax assets and related valuation allowance, as well as state and local income taxes, (ii) a \$0.4 million tax benefit associated with the termination of a pension plan, and (iii) \$1.3 million in net tax expense related primarily to our profitable foreign operations. The current period non-U.S. tax expense is attributable to the profitable non-U.S. operations.

**Years Ended December 31, 2016 and 2015**

The following table presents revenue and expense line items reported in our Consolidated Statements of Operations for 2016 and 2015 and the period-over-period dollar and percentage changes for those line items. Our results of operations are reported as one business segment, represented by our single operating segment.

Net sales	\$	332,451	100%	\$	477,038	100%	\$	(144,587)	(30)%
Cost of sales		199,593	60%		299,797	63%		(100,204)	(33)%
Gross profit		132,858	40%		177,241	37%		(44,383)	(25)%
Operating expenses, net:									
Research and development		81,016	24%		78,543	16%		2,473	3%
Selling, general, and administrative		77,642	23%		90,188	19%		(12,546)	(14)%
Amortization of intangible assets		19,219	6%		27,634	6%		(8,415)	(30)%
Restructuring		5,640	2%		4,679	1%		961	21%
Asset impairment		69,520	21%		126	0%		69,394	*
Other, net		223	0%		(697)	(0)%		920	*
Total operating expenses, net		253,260	76%		200,473	42%		52,787	26%
Operating income (loss)		(120,402)	(36)%		(23,232)	(5)%		(97,170)	*
Interest income (expense), net		958	0%		586	0%		372	63%
Income (loss) before income taxes		(119,444)	(36)%		(22,646)	(5)%		(96,798)	*
Income tax expense (benefit)		2,766	1%		9,332	2%		(6,566)	(70)%
Net income (loss)	\$	(122,210)	(37)%	\$	(31,978)	(7)%	\$	(90,232)	*

\* Not Meaningful

*Net Sales*

The following is an analysis of sales by market and by region:



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(dollars in thousands)							
<b>Sales by market</b>							
LED Lighting, Display & Compound Semiconductor	\$ 144,675	44%	\$ 291,133	61%	\$ (146,458)	(50)%	
Advanced Packaging, MEMS & RF Filters	68,304	21%	61,935	13%	6,369	10%	
Scientific & Industrial	111,198	33%	118,132	25%	(6,934)	(6)%	
Front-End Semiconductor	8,274	2%	5,838	1%	2,436	42%	
<b>Total</b>	<b>\$ 332,451</b>	<b>100%</b>	<b>\$ 477,038</b>	<b>100%</b>	<b>\$ (144,587)</b>	<b>(30)%</b>	
<b>Sales by geographic region</b>							
United States	\$ 85,637	26%	\$ 86,627	18%	\$ (990)	(1)%	
China	85,834	26%	242,442	51%	(156,608)	(65)%	
EMEA	83,410	25%	64,019	13%	19,391	30%	
Rest of World	77,570	23%	83,950	18%	(6,380)	(8)%	
<b>Total</b>	<b>\$ 332,451</b>	<b>100%</b>	<b>\$ 477,038</b>	<b>100%</b>	<b>\$ (144,587)</b>	<b>(30)%</b>	

Total sales decreased in 2016 from 2015 primarily due to reduced sales in LED Lighting, Display & Compound Semiconductor driven by an oversupply of LED units in the market. Pricing was not a significant driver of the change in total sales. By geography, sales decreased in all regions, except EMEA. The largest sales decline was in China, which was attributable to the decline in LED Lighting, Display & Compound Semiconductor.

Between 2016 and 2015, orders decreased \$10.2 million, or 3%, to \$374.2 million. The decrease in orders was primarily attributable to a 43% decrease in orders in Advanced Packaging, MEMS & RF Filters as well as a 16% decrease in Scientific & Industrial. These decreases were offset by increases in LED Lighting, Display & Compound Semiconductor and Front-End Semiconductor. In the second half of 2016, we saw some improvements in LED industry conditions.

One of the performance measures we use as a leading indicator of the business is the book-to-bill ratio. The ratio is defined as orders recorded in a given period divided by revenue recognized in the same period. A ratio greater than one indicates we are adding orders faster than we are recognizing revenue. In 2016, the ratio was 1.1, a rise compared to 2015, when it was 0.8. Our backlog at December 31, 2016 was \$209.2 million, which was higher than the ending backlog at December 31, 2015 of \$186.0 million. During the year ended December 31, 2016, we recorded backlog adjustments of approximately \$17.9 million primarily relating to a partial cancellation of a prior period customer order. For certain sales arrangements, we require a deposit for a portion of the sales price prior to manufacturing a system for a customer. At December 31, 2016 and 2015, we had customer deposits of \$22.2 million and \$28.2 million, respectively.

*Gross Profit*

Gross profit decreased compared to 2015 due to sharp decline in sales volume, partially offset by improved gross margins. Gross margins increased despite the decline in overall sales volume principally due to favorable product and region mix of sales in the period and from the benefits associated with ongoing cost reduction activities.

*Research and development*

R&D expenses increased in 2016 compared to 2015 as a result of a reduction in external funding used to offset the cost of R&D activities, as well as the additional use of third party contractors to accelerate the development of products for the LED Lighting, Display & Compound Semiconductor market. We also incurred increased depreciation of research and development-related property, plant, and equipment. These increases were partially offset by decreased personnel-related incentive compensation.

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*Selling, general, and administrative*

Selling, general, and administrative expenses decreased primarily due to reductions in sales commissions and incentive compensation as a result of the decline in our financial performance, as well as a decrease in personnel-related expenses as a result of our initiative to streamline operations, enhance efficiency, and reduce costs in response to market conditions.

*Amortization expense*

The decrease in amortization expense is a result of the impairment of certain technology assets as well as certain other intangible assets becoming fully amortized during 2016.

*Restructuring expense*

During 2016, additional accruals were recognized and payments made related to previous years' restructuring initiatives. In addition, during 2016, we undertook additional restructuring activities as part of our initiative to streamline operations, enhance efficiencies, and reduce costs, as well as reducing future investments in certain technology development, which together impacted approximately 75 employees.

*Asset impairment*

During 2016, we recorded non-cash impairment charges of \$57.6 million relating to our decision to reduce investments in certain technologies, \$5.7 million relating to our assessments of the fair market value of assets held for sale, and \$6.2 million relating to the disposal of certain lab equipment.

*Income Taxes*

The 2016 income tax expense is comprised of three components: (i) \$1.9 million related primarily to U.S. tax amortization of our indefinite-lived intangible assets that is not available to offset existing deferred tax assets and related valuation allowance as well as state and local income taxes, (ii) a \$0.4 million tax benefit associated with the termination of the pension plan, and (iii) \$1.3 million in net tax expense related primarily to our profitable foreign operations. The 2015 income tax expense is comprised of two components: (i) \$1.8 million related primarily to U.S. tax amortization of our indefinite-lived intangible assets that is not available to offset existing deferred tax assets and related valuation allowance and state and local income taxes and (ii) \$7.5 million in tax expense relating to our profitable foreign operations. Our 2016 and 2015 effective tax rate is different than the statutory rate primarily due to our inability to recognize our U.S. deferred tax assets on a more-likely-than-not basis with respect to the pre-tax U.S. operating losses in those years.

**Liquidity and Capital Resources**

Our cash and cash equivalents, restricted cash, and short-term investments are as follows:

	2017	December 31, (in thousands)	2016
Cash and cash equivalents	\$	279,736	\$ 277,444
Restricted cash		847	
Short-term investments		47,780	66,787
<b>Total</b>	<b>\$</b>	<b>328,363</b>	<b>\$ 344,231</b>

A portion of our cash and cash equivalents is held by our subsidiaries throughout the world, frequently in each subsidiary's respective functional currency, which is typically the U.S. dollar. At December 31, 2017 and 2016, cash and cash equivalents of \$214.3 million and \$149.2 million, respectively, were held outside the United States. As of December 31, 2017, we had \$155.8 million of accumulated undistributed earnings generated by our non-U.S. subsidiaries, of which approximately \$140.2 million was subject to the one-time transition tax on foreign earnings required by the 2017 Tax Act. We do not expect to incur a current U.S. tax liability for the one-time transition tax due to the utilization of foreign tax

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credits and research and development credits. We expect to repatriate accumulated undistributed earnings from certain non-U.S. subsidiaries and have recognized applicable withholding taxes of \$6.2 million. We believe that our projected cash flow from operations, combined with our cash and short term investments, will be sufficient to meet our projected working capital requirements, contractual obligations, and other cash flow needs for the next twelve months, including scheduled interest payments on our Convertible Senior Notes issued in January 2017.

A summary of the cash flow activity for the year ended December 31, 2017 and 2016 is as follows:

*Cash Flows from Operating Activities*

	<b>For the year ended December 31,</b>	
	<b>2017</b>	<b>2016</b>
	<b>(in thousands)</b>	
Net income (loss)	\$ (44,793)	\$ (122,210)
Non-cash items:		
Depreciation and amortization	50,095	32,650
Non-cash interest expense	10,446	
Deferred income taxes	(33,875)	940
Share-based compensation expense	24,396	15,741
Asset impairment	1,139	69,520
Other	99	(259)
Changes in operating assets and liabilities	26,639	(20,226)
<b>Net cash provided by (used in) operating activities</b>	<b>\$ 34,146</b>	<b>\$ (23,844)</b>

Net cash provided by operating activities was \$34.1 million for the year ended December 31, 2017 and was due to the net loss of \$44.8 million offset by adjustments for non-cash items of \$52.3 million and an increase in cash flow from operating activities due to changes in operating assets and liabilities of \$26.6 million. The changes in operating assets and liabilities were largely attributable to increases in accounts payable and accrued expenses and customer deposits and deferred revenue, decreases in accounts receivable and inventory and deferred cost of sales, partially offset by increases in prepaid expenses and other current and non-current assets, and decreases in income tax payables.

Net cash used in operating activities was \$23.8 million in 2016 and was due to the net loss of \$122.2 million plus a decline in cash flow from operating activities due to changes in operating assets and liabilities of \$20.2 million, partially offset by adjustments for non-cash items of \$118.6 million. The changes in operating assets and liabilities was largely attributable to a decrease in accounts payable and accrued expenses, an increase in accounts receivable, and an increase in inventories and deferred cost of sales, partially offset by a decrease in prepaid expenses and other current assets and an increase in customer deposits and deferred revenue.

*Cash Flows from Investing Activities*

	<b>For the year ended December 31,</b>	
	<b>2017</b>	<b>2016</b>
	<b>(in thousands)</b>	
Acquisitions of businesses, net of cash acquired	\$ (401,828)	\$

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Capital expenditures	(24,272)	(11,479)
Changes in investments, net	65,980	48,907
Other	2,284	9,282
<b>Net cash provided by (used in) investing activities</b>	<b>\$ (357,836)</b>	<b>\$ 46,710</b>

The net cash used in investing activities during the year ended December 31, 2017 was primarily attributable to the net cash used in the acquisition of Ultratech as well as capital expenditures, offset by the net changes in investments. In 2017, as part of our efforts to streamline operations, enhance efficiency, and reduce costs, we made certain investments in our facilities to support the consolidation activities. These activities were substantially completed in 2017. The cash provided by investing activities in 2016 was primarily attributable to net changes in investments and sales of property, plant, and equipment, partially offset by capital expenditures.



Table of Contents*Cash Flows from Financing Activities*

	<b>For the year ended December 31,</b>	
	<b>2017</b>	<b>2016</b>
	<b>(in thousands)</b>	
Settlement of equity awards, net of withholding taxes	\$ (5,749)	\$ (945)
Purchases of common stock	(2,869)	(13,349)
Proceeds from long-term debt borrowings	335,752	
Repayments of long-term debt	(1,194)	(340)
<b>Net cash provided by (used in) financing activities</b>	<b>\$ 325,940</b>	<b>\$ (14,634)</b>

The cash provided by financing activities for the year ended December 31, 2017 was primarily related to the net cash proceeds received from the issuance of the Convertible Senior Notes in January 2017. The cash used in financing activities for 2016 was primarily related to the share repurchase program, which commenced in November 2015.

*Convertible Senior Notes*

On January 10, 2017, we issued \$345.0 million of 2.70% Convertible Senior Notes. We received net proceeds, after deducting underwriting discounts and fees and expenses payable by the Company, of approximately \$335.8 million. The Convertible Senior Notes bear interest at a rate of 2.70% per year, payable semiannually in arrears on January 15 and July 15 of each year, commencing on July 15, 2017. The Convertible Senior Notes mature on January 15, 2023, unless earlier purchased by the Company, redeemed, or converted. We believe that we have sufficient capital resources and cash flows from operations to support scheduled interest payments on this debt.

*Business Combination*

As discussed above, on May 26, 2017, the Company acquired 100% of Ultratech, Inc., a leading supplier of lithography, laser-processing, and inspection systems used to manufacture semiconductor devices and LEDs. The results of Ultratech's operations have been included in the consolidated financial statements since the date of acquisition.

*Contractual Obligations and Commitments*

We have commitments under certain contractual arrangements to make future payments for goods and services. These contractual arrangements secure the rights to various assets and services to be used in the future in the normal course of business. We expect to fund these contractual arrangements with cash generated from operations in the normal course of business.

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The following table summarizes our contractual arrangements at December 31, 2017, and the timing and effect that those commitments are expected to have on our liquidity and cash flow in future periods. The effect of unrecognized tax benefits, which total \$0.6 million at December 31, 2017, have been excluded from the table since we are unable to reasonably estimate the period of potential cash settlement, if any, with the respective tax authorities.

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	Total	Payments due by period			
		Less than 1 year	1 3 years (in thousands)	3 5 years	More than 5 years
Principal payments on long-term debt	\$ 345,000	\$	\$	\$	\$ 345,000
Cash interest on debt	46,963	9,315	18,630	18,630	388
Operating leases	24,251	5,655	11,061	4,616	2,919
Bank guarantees	6,498	6,498			
Purchase commitments(1)	181,032	181,032			
Total	\$ 603,744	\$ 202,500	\$ 29,691	\$ 23,246	\$ 348,307

(1) Purchase commitments are primarily for inventory used in manufacturing our products. We generally do not enter into purchase commitments extending beyond one year. We have \$7.6 million of offsetting supplier deposits against these purchase commitments as of December 31, 2017.

In December 2017, we entered into a Receivable Purchase Agreement with a financial institution to sell certain of our trade receivables from customers without recourse, up to \$23.0 million at any point in time for a term of one year. Under the terms of the agreement, we may offer to sell certain eligible accounts receivable (the "Receivables") to the financial institution (the "Purchaser"), which may accept such offer, and purchase the offered Receivables. The Purchaser will assume credit risk of the Receivables purchased; provided, however, that we will service the Receivables, and as such servicer, collect and otherwise enforce the Receivables on behalf of the Purchaser. Pursuant to this agreement, we sold \$15.0 million of Receivables during the year ended December 31, 2017 and maintained \$8.0 million available under the agreement for additional sales of Receivables as of December 31, 2017. The net sale of accounts receivable, under the agreement is reflected as a reduction of accounts receivable in our Consolidated Balance Sheet at the time of sale and any fees for the sale of trade receivables were not material for the periods presented.

*Off-Balance Sheet Arrangements*

We do not have any off-balance sheet arrangements that have, or are reasonably likely to have, a current or future material effect on our financial condition, changes in financial condition, expenses, results of operations, liquidity, capital expenditures, or capital resources other than operating leases, bank guarantees, and purchase commitments disclosed in the preceding "Contractual Obligations and Commitments" table.

**Application of Critical Accounting Policies**

Our discussion and analysis of our financial condition and results of operations are based upon our Consolidated Financial Statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements require a high degree of judgment, either in the application and interpretation of existing accounting literature or in the development of estimates that affect the reported amounts of assets, liabilities, revenues, and expenses. On an ongoing basis, we evaluate our estimates and judgments based on historical experience as well as other factors that we believe to be reasonable under the circumstances. The results of our evaluation form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. These estimates may change in the future if underlying assumptions or factors change, and actual results may differ from these estimates.

We consider the following significant accounting policies to be critical because of their complexity and the high degree of judgment involved in implementing them.

*Revenue Recognition*

We recognize revenue when persuasive evidence of an arrangement exists, delivery has occurred or services have been rendered, the selling price is fixed or determinable, collectability is reasonably assured, and, for system sales, we have received customer acceptance or we have otherwise objectively demonstrated that the delivered system meets all of the agreed-to customer specifications. Each sales arrangement may contain commercial terms that differ from other arrangements. In addition, we frequently enter into contracts that contain multiple deliverables. Judgment is required to properly identify the accounting units of the multiple deliverable transactions and to determine the manner in which

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revenue should be allocated among the accounting units. Moreover, judgment is used in interpreting the commercial terms and determining when all criteria have been met in order to recognize revenue in the appropriate accounting period. The maximum revenue we recognize on a delivered element is limited to the amount that is not contingent upon the delivery of additional items. While changes in the allocation of the estimated sales price between the units of accounting will not affect the amount of total revenue recognized for a particular sales arrangement, any material changes in these allocations could impact the timing of revenue recognition, which could have a material effect on our financial condition and results of operations. We generally recognize revenue related to sales of components and spare parts upon shipment. We generally recognize revenue related to maintenance and service contracts ratably over the applicable contract term. See Note 1, Significant Accounting Policies, in the Notes to the Consolidated Financial Statements for a description of our revenue recognition policy.

*Inventory Valuation*

Inventories are stated at the lower of cost or net realizable value, with cost determined on a first-in, first-out basis. Each quarter we assess the valuation and recoverability of all inventories: materials (raw materials, spare parts, and service inventory); work-in-process; and finished goods. Obsolete inventory or inventory in excess of our estimated usage requirements is written down to its estimated net realizable value if less than cost. We evaluate usage requirements by analyzing historical and anticipated demand, and anticipated demand is estimated based upon current economic conditions, utilization requirements related to current backlog, current sales trends, and other qualitative factors. **Unanticipated changes in demand for our products may require a write down of inventory that could materially affect our operating results.**

*Goodwill and Intangible Assets*

Goodwill is tested for impairment at least annually in the fourth quarter of our fiscal year. We may first perform a qualitative assessment of whether it is more likely than not that the reporting unit's fair value is less than its carrying amount, and, if so, we then quantitatively compare the fair value of our reporting unit to its carrying amount. If the fair value of the reporting unit exceeds its carrying amount, goodwill is not impaired. If the carrying amount of the reporting unit exceeds its fair value, we then record an impairment loss equal to the difference, up to the carrying value of goodwill.

We determine the fair value of our reporting unit based on a reconciliation of the aggregate fair value of our reporting unit to our adjusted market capitalization. The adjusted market capitalization is calculated by multiplying the average share price of our common stock for the last ten trading days prior to the measurement date by the number of outstanding common shares and adding a control premium.

The carrying values of identifiable intangible assets are reviewed for recoverability on a quarterly basis. The facts and circumstances considered include the recoverability of the cost of other intangible assets from future undiscounted cash flows to be derived from the use of the asset or asset group. It is not possible for us to predict the likelihood of any possible future impairments or, if such an impairment were to occur, the magnitude of any impairment.

Intangible assets with finite useful lives, including purchased technology, customer-related intangible assets, patents, trademarks, covenants not-to-compete, backlog, and software licenses, are subject to amortization over the expected

period of economic benefit to us. We evaluate whether events or circumstances have occurred that warrant a revision to the remaining useful lives of intangible assets. In cases where a revision is deemed appropriate, the remaining carrying amounts of the intangible assets are amortized over the revised remaining useful life. Intangible assets related to IPR&D projects are considered to be indefinite-lived until the completion or abandonment of the associated R&D efforts. If and when development is complete, the associated assets would be deemed long-lived and would then be amortized based on their respective estimated useful lives at that point in time.

*Accounting for Business Combinations*

The allocation of the purchase price for acquisitions requires extensive use of accounting estimates and judgments to allocate the purchase price to the identifiable tangible and intangible assets acquired, including in-process research and development and liabilities assumed based on their respective fair values. The estimates we make include expected cash flows, expected cost savings, and the appropriate weighted average cost of capital. We complete these assessments as

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soon as practical after the acquisition closing dates. Any excess of the purchase price over the estimated fair values of the identifiable net assets acquired is recorded as goodwill.

*Income Taxes*

We estimate our income taxes in each of the jurisdictions in which we operate. Deferred income taxes reflect the net tax effect of temporary differences between the asset and liability balances recognized for financial reporting purposes and the balances used for income tax purposes, as well as the tax effect of carry forwards. We record a valuation allowance to reduce our deferred tax assets to the amount that is more likely than not to be realized. Realization of our net deferred tax assets is dependent on future taxable income.

We recognize the effect of income tax positions for only those positions which are estimated to more likely than not be sustained if challenged. We reflect changes in recognition or measurement in the period in which our change in judgment occurs. We record interest and penalties related to uncertain tax positions in income tax expense.

Because of the complexity of the new global intangible low-taxed income ( GILTI ) rules, we are continuing to evaluate this provision of the 2017 Tax Act and the application of ASC 740. Under U.S. GAAP, we are allowed to make an accounting policy choice of either (1) treating taxes due on future U.S. inclusions in taxable income related to GILTI as a current-period expense when incurred (the period cost method ) or (2) factoring such amounts into our measurement of our deferred taxes (the deferred method ). Our selection of an accounting policy with respect to the new GILTI tax rules will depend, in part, on analyzing our global income to determine whether we expect to have future U.S. inclusions in taxable income related to GILTI, and if so, what the impact will be. This assessment depends not only on our current structure and estimated future results of global operations, but also on our intent and ability to modify our structure and/or our business. We are not yet able to reasonably estimate the effect of this provision of the 2017 Tax Act, and therefore we have not made any adjustments related to potential GILTI tax in our consolidated financial statements and have not made a policy decision regarding whether to record deferred taxes on GILTI.

**Recent Accounting Pronouncements**

The FASB issued ASU 2014-09, as amended: *Revenue from Contracts with Customers*, which has been codified as Accounting Standards Codification 606 ( ASC 606 ). ASC 606 requires our revenue recognition to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which we expect to be entitled in exchange for those goods or services. ASC 606 outlines a five-step model to make the revenue recognition determination and requires new financial statement disclosures. Publicly-traded companies are required to adopt ASC 606 for reporting periods beginning after December 15, 2017. The most significant financial statement impacts of adopting ASC 606 will be the elimination of the constraint on revenue associated with the billing retention related to the receipt of customer final acceptance as well as the identification of installation services as a performance obligation. The elimination of the constraint on revenue related to customer final acceptance, which is usually about 10 percent of a system sale, will generally be recognized at the time we transfer control of the system to the customer, which is earlier than under our current revenue recognition model. The new performance obligation related to installation services under the new standard will generally be recognized as the installation services are performed, which is later than under our current revenue recognition model. Taken together, we do not believe these changes will have a material impact on the consolidated financial statements. We plan to adopt using the full retrospective method.

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In January 2016, the FASB issued ASU 2016-01: *Financial Instruments - Overall*, which requires certain equity investments to be measured at fair value, with changes in fair value recognized in net income. For equity investments without readily observable market prices, entities have the option to either measure these investments at fair value every quarter, or measure at cost adjusted for changes in observable prices minus impairment. Changes in measurement under either alternative must be recognized in net income. Publicly-traded companies are required to adopt the update for reporting periods beginning after December 15, 2017; early adoption is permitted. We do not expect this ASU will have a material impact on the consolidated financial statements upon adoption, and will monitor our cost method investments each reporting period for changes in observable market prices, if any, which may be material in future periods.

In February 2016, the FASB issued ASU 2016-02: *Leases*, which generally requires our operating lessee rights and obligations to be recognized as assets and liabilities on the balance sheet. In addition, interest on lease liabilities is to be



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recognized separately from the amortization of right-of-use assets in the Statement of Operations. Further, payments of the principal portion of lease liabilities are to be classified as financing activities while payments of interest on lease liabilities and variable lease payments are to be classified as operating activities in the Statement of Cash Flows. When the standard is adopted, we will be required to recognize and measure leases at the beginning of the earliest period presented using a modified retrospective approach. ASU 2016-02 is effective for fiscal years beginning after December 15, 2018, with early application permitted. We are evaluating the anticipated impact of adopting the ASU on the consolidated financial statements.

In August 2016, the FASB issued ASU 2016-15, *Statement of Cash Flows: Classification of Certain Cash Receipts and Cash Payments*, which provides guidance on eight specific cash flow issues, including debt prepayments or debt extinguishment costs. Publicly-traded companies are required to adopt the update for reporting periods beginning after December 15, 2017. We do not expect this ASU will have a material impact on the consolidated financial statements.

In October 2016, the FASB issued ASU 2016-16, *Income Taxes: Intra-Entity Transfers of Assets Other Than Inventory*, which requires that entities recognize the income tax consequences of an intra-entity transfer of an asset, other than inventory, when the transfer occurs. Publicly-traded companies are required to adopt the update for reporting periods beginning after December 15, 2017. We do not expect this ASU will have a material impact on the consolidated financial statements.

We are also evaluating other pronouncements recently issued but not yet adopted. The adoption of these pronouncements is not expected to have a material impact on our consolidated financial statements.

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**Item 7A. Quantitative and Qualitative Disclosures about Market Risk**

*Interest Rate Risk*

Our exposure to market rate risk for changes in interest rates primarily relates to our investment portfolio. We centrally manage our investment portfolios considering investment opportunities and risks, tax consequences, and overall financing strategies. Our investment portfolio includes fixed-income securities with a fair value of approximately \$47.8 million at December 31, 2017. These securities are subject to interest rate risk and, based on our investment portfolio at December 31, 2017, a 100 basis point increase in interest rates would result in a decrease in the fair value of the portfolio of \$0.1 million. While an increase in interest rates may reduce the fair value of the investment portfolio, we will not realize the losses in the Consolidated Statements of Operations unless the individual fixed-income securities are sold prior to recovery or the loss is determined to be other-than-temporary.

*Currency Exchange Risk*

We conduct business on a worldwide basis and, as such, a portion of our revenues, earnings, and net investments in foreign affiliates is exposed to changes in currency exchange rates. The economic impact of currency exchange rate movements is complex because such changes are often linked to variability in real growth, inflation, interest rates, governmental actions, and other factors. These changes, if material, could cause us to adjust our financing and operating strategies. Consequently, isolating the effect of changes in currency does not incorporate these other important economic factors.

From time to time, we manage our risks and exposures to currency exchange rates through the use of derivative financial instruments (e.g., forward contracts). We mainly use derivative financial instruments in the context of hedging and generally do not use them for speculative purposes. During fiscal 2017, we had an immaterial amount of foreign exchange derivatives designated as hedges. During fiscal 2016, we did not designate foreign exchange derivatives as hedges. Accordingly, most foreign exchange derivatives are recorded in our Consolidated Balance Sheets at fair value and changes in fair value from these contracts are recorded in *Other, net* in our Consolidated Statements of Operations.

Our net sales to customers located outside of the United States represented approximately 80%, 74%, and 82% of our total net sales in 2017, 2016, and 2015, respectively. We expect that net sales to customers outside the United States will continue to represent a large percentage of our total net sales. Our net sales denominated in currencies other than the U.S. dollar represented approximately 1%, 4%, and 2% of total net sales in 2017, 2016, and 2015, respectively.

A 10% change in foreign exchange rates would have an immaterial impact on the consolidated results of operations since most of our sales outside the United States are denominated in U.S. dollars.

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

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Our Consolidated Financial Statements are listed in the Index to Consolidated Financial Statements and Financial Statement Schedule filed as part of this Form 10-K.

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

None.

### **Item 9A. Controls and Procedures**

#### **Management's Report on Internal Control over Financial Reporting**

Our principal executive and financial officers have evaluated and concluded that our disclosure controls and procedures are effective as of December 31, 2017. The disclosure controls and procedures are designed to ensure that the information required to be disclosed in this report filed under the Securities Exchange Act of 1934 is recorded, processed, summarized, and reported within the time periods specified in the Securities and Exchange Commission's rules and forms and is

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accumulated and communicated to our principal executive and financial officers as appropriate to allow timely decisions regarding required disclosure.

Our principal executive and financial officers are responsible for establishing and maintaining adequate internal control over financial reporting, which is a process designed and put into effect 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. Using the criteria established in the Internal Control – Integrated Framework (2013) published by the Committee of Sponsoring Organizations of the Treadway Commission ( COSO ), Management has evaluated, assessed, and concluded that internal control over financial reporting is effective as of December 31, 2017.

We acquired Ultratech, Inc. ( Ultratech ) on May 26, 2017, and the results of Ultratech from the acquisition date through December 31, 2017 are included in our 2017 consolidated financial statements. The results of Ultratech constituted 50 percent of total assets and 14 percent of net sales as of and for the year ended December 31, 2017. We have excluded Ultratech from our annual assessment of the effectiveness of our internal control over financial reporting.

KPMG LLP, an independent registered public accounting firm, has audited the consolidated financial statements included in this Annual Report on Form 10-K and, as part of their audit, has issued their report, included herein, on the effectiveness of our internal control over financial reporting.

**Changes in Internal Control over Financial Reporting**

During the quarter ended December 31, 2017, there were no changes in internal control that have materially affected or are reasonably likely to materially affect internal control over financial reporting.

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**Report of Independent Registered Public Accounting Firm**

The Board of Directors and Stockholders of

Veeco Instruments Inc.:

*Opinion on Internal Control Over Financial Reporting*

We have audited Veeco Instrument Inc. s and subsidiaries (the Company ) internal control over financial reporting as of December 31, 2017, based on criteria established in Internal Control Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2017, based on criteria established in Internal Control Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ( PCAOB ), the consolidated balance sheets of the Company as of December 31, 2017 and 2016, the related consolidated statements of operations, comprehensive income (loss), stockholders equity, and cash flows for each of the years in the three-year period ended December 31, 2017, and the related notes and financial statement Schedule II Valuation and Qualifying Accounts (collectively, the consolidated financial statements), and our report dated February 21, 2018 expressed an unqualified opinion on those consolidated financial statements.

The Company acquired Ultratech, Inc. ( Ultratech ) on May 26, 2017, and the results of Ultratech from the acquisition date through December 31, 2017 are included in the 2017 consolidated financial statements. The results of Ultratech constituted 50% of total assets and 14% of net sales as of and for the year ended December 31, 2017. Management has excluded Ultratech from its annual assessment of the effectiveness of the Company s internal control over financial reporting. Our audit of internal control over financial reporting of the Company also excluded an evaluation of the internal control over financial reporting of Ultratech.

*Basis for Opinion*

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

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit 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 audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

*Definition and Limitations of Internal Control Over Financial Reporting*

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

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unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

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

/s/ KPMG LLP

Melville, New York  
February 21, 2018

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**Item 9B. Other Information**

None.

**PART III**

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

Information required by this Item that will appear under the headings **Governance**, **Executive Officers**, and **Section 16(a) Beneficial Ownership Reporting Compliance** in the definitive proxy statement to be filed with the SEC relating to our 2018 Annual Meeting of Stockholders is incorporated herein by reference.

We have adopted a Code of Ethics for Senior Officers (the **Code**) which applies to our chief executive officer, principal financial officer, principal accounting officer, and persons performing similar functions. A copy of the Code can be found on our website ([www.veeco.com](http://www.veeco.com)). We intend to disclose on our website the nature of any future amendments to and waivers of the Code that apply to the chief executive officer, principal financial officer, principal accounting officer, or persons performing similar functions. We have also adopted a Code of Business Conduct which applies to all of our employees, including those listed above, as well as to our directors. A copy of the Code of Business Conduct can be found on our website ([www.veeco.com](http://www.veeco.com)). The website address above is intended to be an inactive, textual reference only. None of the material on this website is part of this report.

**Item 11. Executive Compensation**

Information required by this Item that will appear under the heading **Compensation** in the definitive proxy statement to be filed with the SEC relating to our 2018 Annual Meeting of Stockholders is incorporated herein by reference.

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

Information required by this Item that will appear under the headings **Security Ownership of Certain Beneficial Owners and Management** and **Equity Compensation Plan Information** in the definitive proxy statement to be filed with the SEC relating to our 2018 Annual Meeting of Stockholders is incorporated herein by reference.



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

Information required by this Item that will appear under the headings **Certain Relationships and Related Transactions** and **Independence of Board** in the definitive proxy statement to be filed with the SEC relating to our 2018 Annual Meeting of Stockholders is incorporated herein by reference.

**Item 14. Principal Accounting Fees and Services**

Information required by this Item that will appear under the heading **Proposal 4 Ratification of Appointment of KPMG** in the definitive proxy statement to be filed with the SEC relating to our 2018 Annual Meeting of Stockholders is incorporated herein by reference.

Table of Contents**PART IV****Item 15. Exhibits, Financial Statement Schedules**

- (a) (1) The Registrant's financial statements together with a separate table of contents are annexed hereto
- (2) Financial Statement Schedules are listed in the separate table of contents annexed hereto.
- (3) Exhibits

Unless otherwise indicated, each of the following exhibits has been previously filed with the Securities and Exchange Commission by the Company under File No. 0-16244.

Exhibit Number	Exhibit Description	Form	Incorporated by Reference		Filed or Furnished Herewith
			Exhibit	Filing Date	
2.1	<u>Agreement and Plan of Merger dated as of February 2, 2017 among Ultratech, Inc., Veeco Instruments Inc. and Ulysses Acquisition Subsidiary Corp.</u>	8-K	2.1	2/3/2017	
2.2	<u>Securities Purchase Agreement, dated December 4, 2014, by and among Solid State Equipment Holdings LLC, certain securityholders thereof, Veeco Instruments Inc. and certain other parties thereto.</u>	10-K	2.1	2/24/2015	
2.3	<u>Agreement and Plan of Merger, dated September 18, 2013, by and among Veeco, Veeco Wyoming Inc., Synos Technology, Inc., certain stockholders of Synos Technology, Inc., and Shareholder Representative Services LLC.</u>	10-K	2.1	2/28/2014	
3.1	<u>Amended and Restated Certificate of Incorporation of Veeco dated December 1, 1994, as amended June 2, 1997 and July 25, 1997.</u>	10-Q	3.1	8/14/1997	
3.2	<u>Amendment to Certificate of Incorporation of Veeco dated May 29, 1998.</u>	10-K	3.2	3/14/2001	
3.3	<u>Amendment to Certificate of Incorporation of Veeco dated May 5, 2000.</u>	10-Q	3.1	8/14/2000	
3.4	<u>Amendment to Certificate of Incorporation of Veeco dated May 16, 2002.</u>	10-Q	3.1	10/26/2009	
3.5	<u>Amendment to Certificate of Incorporation of Veeco dated May 18, 2010.</u>	10-K	3.8	2/24/2011	
3.6	<u>Fifth Amended and Restated Bylaws of Veeco effective February 5, 2016.</u>	8-K	3.1	2/10/2016	
3.7	<u>Certificate of Designation, Preferences, and Rights of Series A Junior Participating Preferred Stock of Veeco.</u>	10-Q	3.1	5/9/2001	
4.1	<u>Indenture, dated as of January 18, 2017, by and between Veeco Instruments Inc. and U.S. Bank National Association, as Trustee (relating to the 2.70% Convertible Notes due 2023).</u>	8-K	4.1	1/18/2017	

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4.2	<u>First Supplemental Indenture, dated as of January 18, 2017, by and between Veeco Instruments Inc. and U.S. Bank National Association, as Trustee (relating to the 2.70% Convertible Notes due 2023).</u>	8-K	4.2	1/18/2017
10.1	<u>Loan Agreement dated as of December 15, 1999 between Applied Epi, Inc. and Jackson National Life Insurance Company.</u>	10-Q	10.2	11/14/2001
10.2	<u>Promissory Note dated as of December 15, 1999 issued by Applied Epi, Inc. to Jackson National Life Insurance Company.</u>	10-Q	10.3	11/14/2001

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Exhibit Number	Exhibit Description	Form	Incorporated by Reference		Filed or Furnished Herewith
			Exhibit	Filing Date	
10.3	<u>Amendment to Loan Documents effective as of September 17, 2001 between Applied Epi, Inc. and Jackson National Life Insurance Company (executed in June 2002).</u>	10-Q	10.2	8/14/2002	
10.4*	<u>Veeco Amended and Restated 2000 Stock Incentive Plan, effective July 20, 2006.</u>	10-Q	10.4	8/4/2006	
10.5*	<u>Amendment No. 1 effective April 18, 2007 (ratified by the Board August 7, 2007) to Veeco Amended and Restated 2000 Stock Incentive Plan.</u>	10-Q	10.1	8/7/2007	
10.6*	<u>Amendment No. 2 dated January 22, 2009 to Veeco Amended and Restated 2000 Stock Incentive Plan.</u>	10-K	10.41	3/2/2009	
10.7*	<u>Veeco Amended and Restated 2010 Stock Incentive Plan, effective May 14, 2010.</u>	Def 14A	Appendix A	11/4/2013	
10.8*	<u>Veeco Amended and Restated 2010 Stock Incentive Plan, effective May 5, 2016.</u>	S-8	10.1	6/2/2016	
10.9	<u>Veeco Amended and Restated 2010 Stock Incentive Plan, effective March 3, 2017.</u>	10-Q	10.1	11/3/2017	
10.10	<u>Ultratech, Inc. 1993 Stock Option/Stock Issuance Plan (as Amended and Restated as of May 31, 2011).</u>	S-8	10.1	5/26/2017	
10.11*	<u>Form of Notice of Performance Share Award and related terms and conditions pursuant to the Veeco 2010 Stock Incentive Plan, effective June 2015.</u>	10-Q	10.1	8/3/2015	
10.12*	<u>Form of Notice of Performance Share Award and related terms and conditions pursuant to the Veeco 2010 Stock Incentive Plan, effective June 2016.</u>	10-Q	10.1	11/1/2016	
10.13*	<u>Form of Notice of Critical Priorities Performance Share Award and related terms and conditions pursuant to the Veeco 2010 Stock Incentive Plan, effective June 2016.</u>	10-Q	10.2	11/1/2016	
10.14*	<u>Veeco 2013 Inducement Stock Incentive Plan, effective September 26, 2013.</u>	10-Q	10.1	11/4/2013	
10.15*	<u>Veeco Instruments Inc. 2016 Employee Stock Purchase Plan.</u>	S-8	10.9	6/2/2016	
10.16*	<u>Form of Support Agreement (issued in connection with the Agreement and Plan of Merger with Ultratech, Inc. dated February 2, 2017).</u>	8-K	10.1	2/3/2017	
10.17	<u>Form of Amended and Restated Indemnification Agreement entered into between Veeco and each of its directors and executive officers (August 2017).</u>	10-Q	10.2	8/3/2017	
10.18*	<u>Veeco Amended and Restated Senior Executive Change in Control Policy, effective as of January 1, 2014.</u>	10-K	10.22	2/28/2014	
10.19*	<u>Employment Agreement effective as of July 1, 2007 between Veeco and John R. Peeler.</u>	10-Q	10.3	8/7/2007	
10.20*	<u>Amendment effective December 31, 2008 to Employment Agreement between Veeco and John R. Peeler.</u>	10-K	10.38	3/2/2009	
10.21*	<u>Second Amendment effective June 11, 2010 to Employment Agreement between Veeco and John R. Peeler.</u>	10-Q	10.1	7/29/2010	
10.22*	<u>Third Amendment effective April 25, 2012 to Employment Agreement between Veeco and John R. Peeler.</u>	10-Q	10.2	5/9/2012	
10.23*	<u>Amendment dated June 12, 2014 to Employment Agreement between Veeco and John R. Peeler.</u>	10-Q	10.3	7/31/2014	
10.24	<u>Amendment dated June 12, 2017 to Employment Agreement between Veeco and John R. Peeler.</u>	10-Q	10.1	8/3/2017	
10.25*	<u>Letter Agreement dated April 8, 2014 between Veeco and Shubham Maheshwari.</u>	10-Q	10.1	7/31/2014	
10.26*	<u>Letter Agreement dated January 30, 2012 between Veeco and Dr. William J. Miller.</u>	10-K	10.30	2/22/2012	



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Exhibit Number	Exhibit Description	Form	Incorporated by Reference		Filed or Furnished Herewith
			Exhibit	Filing Date	
10.27*	<u>Letter dated December 22, 2015 from Veeco to Dr. William J. Miller.</u>	10-K	10.21	2/25/2016	
10.28*	<u>Letter Agreement dated January 21, 2004 between Veeco and John P. Kiernan.</u>	10-K	10.38	3/12/2004	
10.29*	<u>Amendment effective June 9, 2006 to Letter Agreement between Veeco and John P. Kiernan.</u>	10-Q	10.3	8/4/2006	
10.30*	<u>Amendment effective December 31, 2008 to Letter Agreement between Veeco and John P. Kiernan.</u>	10-K	10.40	3/2/2009	
10.31*	<u>Letter Agreement effective as of June 19, 2009 between Veeco and John P. Kiernan.</u>	10-Q	10.2	7/30/2009	
21.1	<u>Subsidiaries of the Registrant.</u>				X
23.1	<u>Consent of KPMG LLP.</u>				X
31.1	<u>Certification of Chief Executive Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities and Exchange Act of 1934.</u>				X
31.2	<u>Certification of Chief Financial Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities and Exchange Act of 1934.</u>				X
32.1	<u>Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes - Oxley Act of 2002.</u>				X
32.2	<u>Certification of Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes - Oxley Act of 2002.</u>				X
101.INS	XBRL Instance.				**
101.XSD	XBRL Schema.				**
101.PRE	XBRL Presentation.				**
101.CAL	XBRL Calculation.				**
101.DEF	XBRL Definition.				**
101.LAB	XBRL Label.				**

\* Indicates a management contract or compensatory plan or arrangement, as required by Item 15(a) (3) of Form 10-K.

\*\* Filed herewith electronically

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**SIGNATURES**

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, as amended, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized, on February 21, 2018.

Veeco Instruments Inc.

By:

/S/ JOHN R. PEELER  
John R. Peeler  
*Chairman and Chief Executive Officer*

Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, this report has been signed below by the following persons on behalf of the Registrant and in the capacities indicated, on February 21, 2018.

<b>Signature</b>	<b>Title</b>
/s/ JOHN R. PEELER John R. Peeler	Chairman and Chief Executive Officer (principal executive officer)
/s/ SHUBHAM MAHESHWARI Shubham Maheshwari	Executive Vice President and Chief Financial Officer (principal financial officer)
/s/ JOHN P. KIERNAN John P. Kiernan	Senior Vice President, Finance, Chief Accounting Officer, and Treasurer (principal accounting officer)
/s/ KATHLEEN A. BAYLESS Kathleen A. Bayless	Director
/s/ RICHARD A. D. AMORE Richard A. D. Amore	Director
/s/ GORDON HUNTER Gordon Hunter	Director
/s/ KEITH D. JACKSON Keith D. Jackson	Director
/s/ PETER J. SIMONE Peter J. Simone	Director
/s/ THOMAS ST. DENNIS Thomas St. Dennis	Director

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**Veeco Instruments Inc. and Subsidiaries**

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**REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

The Board of Directors and Stockholders of

Veeco Instruments Inc.:

*Opinion on the Consolidated Financial Statements*

We have audited the accompanying consolidated balance sheets of Veeco Instruments Inc. and subsidiaries (the Company) as of December 31, 2017 and 2016, the related consolidated statements of operations, comprehensive income (loss), stockholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2017, and the related notes and financial statement Schedule II Valuation and Qualifying Accounts (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2017, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2017, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated February 21, 2018 expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting.

*Basis for Opinion*

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

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

/s/ KPMG LLP

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

Melville, New York  
February 21, 2018

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## Veeco Instruments Inc. and Subsidiaries

## Consolidated Balance Sheets

(in thousands, except share amounts)

	December 31, 2017	December 31, 2016
<b>Assets</b>		
Current assets:		
Cash and cash equivalents	\$ 279,736	\$ 277,444
Restricted cash	847	
Short-term investments	47,780	66,787
Accounts receivable, net	98,866	58,020
Inventories	120,266	77,063
Deferred cost of sales	16,060	6,160
Prepaid expenses and other current assets	33,437	16,034
Total current assets	596,992	501,508
Property, plant, and equipment, net	85,058	60,646
Intangible assets, net	369,843	58,378
Goodwill	307,131	114,908
Deferred income taxes	2,953	2,045
Other assets	25,310	21,047
<b>Total assets</b>	<b>\$ 1,387,287</b>	<b>\$ 758,532</b>
<b>Liabilities and stockholders equity</b>		
Current liabilities:		
Accounts payable	\$ 50,318	\$ 22,607
Accrued expenses and other current liabilities	60,339	33,201
Customer deposits and deferred revenue	108,953	85,022
Income taxes payable	3,846	2,311
Current portion of long-term debt		368
Total current liabilities	223,456	143,509
Deferred income taxes	36,845	13,199
Long-term debt	275,630	826
Other liabilities	10,643	6,403
<b>Total liabilities</b>	<b>546,574</b>	<b>163,937</b>
Stockholders equity:		
Preferred stock, \$0.01 par value; 500,000 shares authorized; no shares issued and outstanding.		
Common stock, \$0.01 par value; 120,000,000 shares authorized; 48,229,251 and 40,714,790 shares issued at December 31, 2017 and December 31, 2016, respectively; 48,144,416 and 40,588,194 shares outstanding at December 31, 2017 and December 31, 2016, respectively.	482	407
Additional paid-in capital	1,053,079	763,303
Accumulated deficit	(213,376)	(168,583)
Accumulated other comprehensive income	1,812	1,777
Treasury stock, at cost, 84,835 and 126,596 shares at December 31, 2017 and 2016, respectively.	(1,284)	(2,309)
<b>Total stockholders equity</b>	<b>840,713</b>	<b>594,595</b>
<b>Total liabilities and stockholders equity</b>	<b>\$ 1,387,287</b>	<b>\$ 758,532</b>

See accompanying Notes to the Consolidated Financial Statements.



Table of Contents**Veeco Instruments Inc. and Subsidiaries****Consolidated Statements of Operations****(in thousands, except per share amounts)**

	<b>For the year ended December 31,</b>		
	<b>2017</b>	<b>2016</b>	<b>2015</b>
Net sales	\$ 484,756	\$ 332,451	\$ 477,038
Cost of sales	300,438	199,593	299,797
Gross profit	184,318	132,858	177,241
Operating expenses, net:			
Research and development	81,987	81,016	78,543
Selling, general, and administrative	100,250	77,642	90,188
Amortization of intangible assets	35,475	19,219	27,634
Restructuring	11,851	5,640	4,679
Acquisition costs	17,786		
Asset impairment	1,139	69,520	126
Other, net	(392)	223	(697)
Total operating expenses, net	248,096	253,260	200,473
Operating income (loss)	(63,778)	(120,402)	(23,232)
Interest income	2,335	1,180	1,050
Interest expense	(19,457)	(222)	(464)
Income (loss) before income taxes	(80,900)	(119,444)	(22,646)
Income tax expense (benefit)	(36,107)	2,766	9,332
Net income (loss)	\$ (44,793)	\$ (122,210)	\$ (31,978)
Income (loss) per common share:			
Basic	\$ (1.01)	\$ (3.11)	\$ (0.80)
Diluted	\$ (1.01)	\$ (3.11)	\$ (0.80)
Weighted average number of shares:			
Basic	44,174	39,340	39,742
Diluted	44,174	39,340	39,742

See accompanying Notes to the Consolidated Financial Statements.

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## Veeco Instruments Inc. and Subsidiaries

## Consolidated Statements of Comprehensive Income (Loss)

(in thousands)

	For the year ended December 31,		
	2017	2016	2015
Net income (loss)	\$ (44,793)	\$ (122,210)	\$ (31,978)
Other comprehensive income (loss), net of tax:			
Available-for-sale securities:			
Change in net unrealized gains or losses	(7)	(6)	(49)
Reclassification adjustments for net (gains) losses included in net loss		18	
Net unrealized gain (loss) on available-for-sale securities	(7)	12	(49)
Minimum pension liability:			
Change in minimum pension liability			15
Reclassification adjustments for net (gains) losses included in net loss		866	
Net changes related to minimum pension liability		866	15
Currency translation adjustments:			
Change in currency translation adjustments	42	(19)	(87)
Reclassification adjustments for net (gains) losses included in net loss		(430)	
Net changes related to currency translation adjustments	42	(449)	(87)
Other comprehensive income (loss), net of tax	35	429	(121)
Total comprehensive income (loss)	\$ (44,758)	\$ (121,781)	\$ (32,099)

See accompanying Notes to the Consolidated Financial Statements.

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## Veeco Instruments Inc. and Subsidiaries

## Consolidated Statements of Stockholders' Equity

(in thousands)

	Common Stock		Treasury Stock		Additional Paid-in Capital	Retained Earnings (Accumulated Deficit)	Accumulated Other Comprehensive Income	Total
	Shares	Amount	Shares	Amount				
<b>Balance at December 31, 2014</b>	40,360	\$ 404		\$	\$ 750,139	\$ (13,080)	\$ 1,469	\$ 738,932
Net loss						(31,978)		(31,978)
Other comprehensive loss, net of tax							(121)	(121)
Share-based compensation expense					17,986			17,986
Net issuance under employee stock plans	636	6			(988)			(982)
Purchases of common stock			469	(9,222)				(9,222)
<b>Balance at December 31, 2015</b>	40,996	410	469	(9,222)	767,137	(45,058)	1,348	714,615
Cumulative effect of change in accounting principle - adoption of ASU 2016-09					1,315	(1,315)		
Net loss						(122,210)		(122,210)
Other comprehensive income, net of tax							429	429
Share-based compensation expense					15,741			15,741
Net issuance under employee stock plans	(281)	(3)	(1,072)	19,948	(20,890)			(945)
Purchases of common stock			730	(13,035)				(13,035)
<b>Balance at December 31, 2016</b>	40,715	407	127	(2,309)	763,303	(168,583)	1,777	594,595
Net loss						(44,793)		(44,793)
Other comprehensive income, net of tax							35	35
Share-based compensation expense					24,396			24,396
Net issuance under employee stock plans	313	3	(245)	4,043	(9,795)			(5,749)
Stock issuance for business acquisition	7,201	72			228,800			228,872
Convertible Senior Notes, equity component					46,375			46,375
Purchases of common stock			203	(3,018)				(3,018)
<b>Balance at December 31, 2017</b>	48,229	\$ 482	85	\$ (1,284)	\$ 1,053,079	\$ (213,376)	\$ 1,812	\$ 840,713

See accompanying Notes to the Consolidated Financial Statements.

Table of Contents**Veeco Instruments Inc. and Subsidiaries****Consolidated Statements of Cash Flows**

(in thousands)

	For the year ended December 31,		
	2017	2016	2015
<b>Cash Flows from Operating Activities</b>			
Net income (loss)	\$ (44,793)	\$ (122,210)	\$ (31,978)
Adjustments to reconcile net income (loss) to net cash provided by (used in) operating activities:			
Depreciation and amortization	50,095	32,650	39,850
Non-cash interest expense	10,446		
Deferred income taxes	(33,875)	940	2,648
Share-based compensation expense	24,396	15,741	17,986
Asset impairment	1,139	69,520	126
Provision for bad debts	99	171	43
Gain on sale of lab tools			(1,261)
Gain on cumulative translation adjustment		(430)	
Changes in operating assets and liabilities:			
Accounts receivable	4,520	(8,667)	10,715
Inventories and deferred cost of sales	6,336	(5,389)	(12,312)
Prepaid expenses and other current assets	(10,204)	6,726	(39)
Accounts payable and accrued expenses	12,197	(24,202)	9,470
Customer deposits and deferred revenue	19,096	8,807	(20,738)
Income taxes receivable and payable, net	775	547	759
Long-term income tax liability	(4,877)		
Other, net	(1,204)	1,952	520
Net cash provided by (used in) operating activities	34,146	(23,844)	15,789
<b>Cash Flows from Investing Activities</b>			
Acquisitions of businesses, net of cash acquired	(401,828)		(68)
Capital expenditures	(24,272)	(11,479)	(13,887)
Proceeds from the sale of investments	348,927	152,301	88,647
Payments for purchases of investments	(282,947)	(103,394)	(85,838)
Proceeds from held for sale assets	2,284	9,512	3,068
Other		(230)	1,000
Net cash provided by (used in) investing activities	(357,836)	46,710	(7,078)
<b>Cash Flows from Financing Activities</b>			
Proceeds (net of tax withholdings) from option exercises and employee stock purchase plan	2,992	1,656	2,233
Restricted stock tax withholdings	(8,741)	(2,601)	(3,215)
Purchases of common stock	(2,869)	(13,349)	(8,907)
Proceeds from long-term debt borrowings	335,752		
Principal payments on long-term debt	(1,194)	(340)	(314)
Net cash provided by (used in) financing activities	325,940	(14,634)	(10,203)
Effect of exchange rate changes on cash and cash equivalents	42	(20)	(87)
Net increase (decrease) in cash and cash equivalents	2,292	8,212	(1,579)
Cash and cash equivalents - beginning of period	277,444	269,232	270,811
Cash and cash equivalents - end of period	\$ 279,736	\$ 277,444	\$ 269,232



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**Supplemental Disclosure of Cash Flow Information**

Interest paid	\$	4,675	\$	225	\$	485
Income taxes paid		1,939		1,669		7,091
<b>Non-cash operating and financing activities</b>						
Net transfer of inventory to property, plant and equipment		(97)		1,827		

See accompanying Notes to the Consolidated Financial Statements.

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**Veeco Instruments Inc. and Subsidiaries**

**Notes to Consolidated Financial Statements**

**Note 1 Significant Accounting Policies**

*(a) Description of Business*

Veeco Instruments Inc. (together with its consolidated subsidiaries, Veeco, or the Company) operates in a single segment: the development, manufacture, sales, and support of semiconductor process equipment primarily sold to make electronic devices.

*(b) Basis of Presentation*

The accompanying audited Consolidated Financial Statements of the Company have been prepared in accordance with United States generally accepted accounting principles (GAAP). The Company reports interim quarters on a 13-week basis ending on the last Sunday of each period, which is determined at the start of each year. The Company's fourth quarter always ends on the last day of the calendar year, December 31. During 2017 the interim quarters ended on April 2, July 2, and October 1, and during 2016 the interim quarters ended on April 3, July 3, and October 2. The Company reports these interim quarters as March 31, June 30, and September 30 in its interim consolidated financial statements.

*(c) Use of Estimates*

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. Although these estimates are based on management's knowledge of current events and actions it may undertake in the future, these estimates may ultimately differ from actual results. Significant items subject to such estimates and assumptions include: (i) the best estimate of selling price for the Company's products and services; (ii) allowances for doubtful accounts; (iii) inventory obsolescence; (iv) the useful lives and expected future cash flows of property, plant, and equipment and identifiable intangible assets; (v) the fair value of the Company's reporting unit and related goodwill; (vi) the fair value, less cost to sell, of assets held for sale; (vii) investment valuations and the valuation of derivatives, deferred tax assets, and assets acquired in business combinations; (viii) the recoverability of long-lived assets; (ix) liabilities for product warranty and legal contingencies; (x) share-based compensation; and (xi) income tax uncertainties. Actual results could differ from those estimates.

*(d) Principles of Consolidation*

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The Consolidated Financial Statements include the accounts of the Company and its subsidiaries. Intercompany balances and transactions have been eliminated in consolidation. Companies acquired during each reporting period are reflected in the results of the Company effective from their respective dates of acquisition through the end of the reporting period.

### *(e) Foreign Currencies*

Assets and liabilities of the Company's foreign subsidiaries that operate using local functional currencies are translated using the exchange rates in effect at the balance sheet date. Results of operations are translated using monthly average exchange rates. Adjustments arising from the translation of the foreign currency financial statements of the Company's subsidiaries into U.S. dollars, including intercompany transactions of a long-term nature, are reported as currency translation adjustments in Accumulated other comprehensive income in the Consolidated Balance Sheets. Foreign currency transaction gains or losses are included in Other, net in the Consolidated Statements of Operations.

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**Veeco Instruments Inc. and Subsidiaries**

**Notes to Consolidated Financial Statements (Continued)**

*(f) Revenue Recognition*

The Company recognizes revenue when all of the following criteria have been met: persuasive evidence of an arrangement exists with a customer; delivery of the specified products has occurred or services have been rendered; prices are contractually fixed or determinable; and collectability is reasonably assured. Revenue is recorded including shipping and handling costs and excluding applicable taxes related to sales.

Contracts with customers frequently contain multiple deliverables, such as systems, upgrades, components, spare parts, maintenance, and service plans. Judgment is required to properly identify the accounting units of the multiple-element arrangements and to determine how the revenue should be allocated among the accounting units. The Company also evaluates whether multiple transactions with the same customer or related parties should be considered part of a single, multiple-element arrangement based on an assessment of whether the contracts or agreements are negotiated or executed within a short time frame of each other or if there are indicators that the contracts are negotiated in contemplation of one another. Moreover, judgment is used in interpreting the commercial terms and determining when all criteria have been met in order to recognize revenue in the appropriate accounting period.

When there are separate units of accounting, the Company allocates revenue to each element based on the following selling price hierarchy: vendor-specific objective evidence ( VSOE ) if available; third party evidence ( TPE ) if VSOE is not available; or the best estimate of selling price ( BESP ) if neither VSOE nor TPE is available. The Company uses BESP for the elements in its arrangements. The maximum revenue recognized on a delivered element is limited to the amount that is not contingent upon the delivery of additional items.

The Company considers many facts when evaluating each of its sales arrangements to determine the timing of revenue recognition including its contractual obligations, the customer's creditworthiness, and the nature of the customer's post-delivery acceptance provisions. The Company's system sales arrangements, including certain upgrades, generally include field acceptance provisions that may include functional or mechanical test procedures. For the majority of the arrangements, a customer source inspection of the system is performed in the Company's facility or test data is sent to the customer documenting that the system is functioning to the agreed upon specifications prior to delivery. Historically, such source inspection or test data replicates the field acceptance provisions that are performed at the customer's site prior to final acceptance of the system. When the Company objectively demonstrates that the criteria specified in the contractual acceptance provisions are achieved prior to delivery, revenue is recognized upon system delivery since there is no substantive contingency remaining related to the acceptance provisions at that date, subject to the retention amount constraint described below for certain contracts. For new products, new applications of existing products, or for products with substantive customer acceptance provisions where the Company cannot objectively demonstrate that the criteria specified in the contractual acceptance provisions have been achieved prior to delivery, revenue and the associated costs are deferred and fully recognized upon the receipt of final customer acceptance, assuming all other revenue recognition criteria have been met.

The Company's system sales arrangements, including certain upgrades, generally do not contain provisions for the right of return, forfeiture, refund, or other purchase price concession. In the rare instances where such provisions are included, all revenue is deferred until such rights expire. The sales arrangements generally include installation. The installation process is not deemed essential to the functionality of the equipment since it is not complex; it does not require significant changes to the features or capabilities of the equipment or involve constructing elaborate interfaces or connections subsequent to factory acceptance. The Company has a demonstrated history of consistently completing installations in a timely manner and can reliably estimate the costs of such activities. Most customers engage the Company to perform the

installation services, although there are other third-party providers with sufficient knowledge who could complete these services. Based on these factors, installation is deemed to be inconsequential or perfunctory relative to the system sale as a whole, and as a result, installation service is not considered a separate element of the arrangement. As such, the Company records the cost of the installation at the earlier of the time of revenue recognition for the system or when installation services are performed.

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**Veeco Instruments Inc. and Subsidiaries**

**Notes to Consolidated Financial Statements (Continued)**

In certain cases the Company's products are sold with a billing retention, typically 10% of the sales price, which is billed by the Company and payable by the customer when field acceptance provisions are completed. The amount of revenue recognized upon delivery of a system or upgrade, if any, is limited to the lower of i) the amount billed that is not contingent upon acceptance provisions or ii) the value of the arrangement consideration allocated to the delivered elements, if such sale is part of a multiple-element arrangement.

The Company recognizes revenue related to maintenance and service contracts ratably over the applicable contract term. The Company recognizes revenue from the sales of components, spare parts, and specified service engagements at the time of delivery in accordance with the terms of the applicable sales arrangement.

Incremental direct costs incurred related to the acquisition of a customer contract, such as sales commissions, are expensed as incurred, even if the related revenue is deferred in accordance with the above policy.

*(g) Warranty Costs*

The Company typically provides standard warranty coverage on its systems for one year from the date of final acceptance by providing labor and parts necessary to repair the systems during the warranty period. The Company accounts for the estimated warranty cost when revenue is recognized on the related system. Warranty cost is included in "Cost of sales" in the Consolidated Statements of Operations. The estimated warranty cost is based on the Company's historical experience with its systems and regional labor costs. The Company calculates the average service hours by region and parts expense per system utilizing actual service records to determine the estimated warranty charge. The Company updates its warranty estimates on a semiannual basis when the actual product performance or field expense differs from original estimates.

*(h) Shipping and Handling Costs*

Shipping and handling costs are expenses incurred to move, package, and prepare the Company's products for shipment and to move the products to a customer's designated location. These costs are generally comprised of payments to third-party shippers. Shipping and handling costs are included in "Cost of sales" in the Consolidated Statements of Operations.

*(i) Research and Development Costs*

Research and development costs are expensed as incurred and include charges for the development of new technology and the transition of existing technology into new products or services.

*(j) Advertising Expense*

The cost of advertising is expensed as incurred and totaled \$0.9 million, \$0.8 million, and \$0.9 million for the years ended December 31, 2017, 2016, and 2015, respectively.

*(k) Accounting for Share-Based Compensation*

Share-based awards exchanged for employee services are accounted for under the fair value method. Accordingly, share-based compensation cost is measured at the grant date based on the fair value of the award. The expense for awards is recognized over the employee's requisite service period (generally the vesting period of the award). The Company has elected to treat awards with only service conditions and with graded vesting as one award. Consequently, the total compensation expense is recognized straight-line over the entire vesting period, so long as the compensation cost recognized at any date at least equals the portion of the grant date fair value of the award that is vested at that date.

The Company uses the Black-Scholes option-pricing model to compute the estimated fair value of option awards, as well as purchase rights under the Employee Stock Purchase Plan. The Black-Scholes model includes assumptions regarding dividend yields, expected volatility, expected option term, and risk-free interest rates. See Note 15, *Stock Plans*, for additional information.

In addition to stock options, restricted share awards (RSAs) and restricted stock units (RSUs) with time-based vesting, the Company issues performance share units and awards (PSUs and PSAs). Compensation cost for PSUs and PSAs is recognized over the requisite service period based on the timing and expected level of achievement of the performance targets. A change in the assessment of the probability of a performance condition being met is recognized in the period of the change in estimate. At the conclusion of the performance period, the number of shares granted may vary based on the level of achievement of the performance targets.

See Note 1(u), *Recently Adopted Accounting Standards*, for additional information concerning the Company's early adoption of Accounting Standards Update (ASU) 2016-09: *Stock Compensation: Improvements to Employee Share-Based Payment Accounting*.

*(l) Income Taxes*

Income taxes are accounted for under the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases and operating loss and tax credit carryforwards. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities from a change in tax rate is recognized in income in the period that includes the enactment date.

On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act (the 2017 Tax Act), which makes broad and complex changes to the U.S. tax code. Certain income tax effects of the 2017 Tax Act are reflected in the Company's financial results in accordance with Staff Accounting Bulletin No. 118 (SAB 118), which provides SEC staff guidance regarding the application of Accounting Standards Codification Topic 740 *Income Taxes* (ASC 740). See Note 17, *Income Taxes*, for further information on the financial statement impact of the 2017 Tax Act.

Because of the complexity of the new global intangible low-taxed income ( GILTI ) rule, the Company is continuing to evaluate this provision of the 2017 Tax Act and the application of ASC 740. Under U.S. GAAP, the Company is allowed to make an accounting policy choice of either (1) treating taxes due on future U.S. inclusions in taxable income related to GILTI as a current-period expense when incurred (the period cost method ) or (2) factoring such amounts into the Company s measurement of its deferred taxes (the deferred method ). The Company s selection of an accounting policy with respect to the new GILTI tax rules will depend, in part, on analyzing its global income to determine whether it



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**Veeco Instruments Inc. and Subsidiaries**

**Notes to Consolidated Financial Statements (Continued)**

expects to have future U.S. inclusions in taxable income related to GILTI, and if so, what the impact will be. This assessment depends not only on the Company's current structure and estimated future results of global operations, but also on its intent and ability to modify its structure and/or business. The Company is not yet able to reasonably estimate the effect of this provision of the 2017 Tax Act; therefore, the Company has not made any adjustments related to potential GILTI tax in its consolidated financial statements and has not made a policy election decision regarding whether to record deferred taxes on GILTI.

*(m) Concentration of Credit Risk*

Financial instruments that potentially subject the Company to concentrations of credit risk consist primarily of cash and cash equivalents, investments, derivative financial instruments used in hedging activities, and accounts receivable. The Company invests in a variety of financial instruments and, by policy, limits the amount of credit exposure with any one financial institution or commercial issuer. The Company has not experienced any material credit losses on its investments.

The Company maintains an allowance reserve for potentially uncollectible accounts for estimated losses resulting from the inability of its customers to make required payments. The Company evaluates its allowance for doubtful accounts based on a combination of factors. In circumstances where specific invoices are deemed to be uncollectible, the Company provides a specific allowance for bad debt against the amount due to reduce the net recognized receivable to the amount reasonably expected to be collected. The Company also provides allowances based on its write-off history. The allowance for doubtful accounts totaled \$0.3 million at December 31, 2017 and 2016.

To further mitigate the Company's exposure to uncollectable accounts, the Company may request certain customers provide a negotiable irrevocable letter of credit drawn on a reputable financial institution. These irrevocable letters of credit are typically issued to mature between zero and 90 days from the date the documentation requirements are met, typically when a system ships or upon receipt of final acceptance from the customer. The Company, at its discretion, may monetize these letters of credit on a non-recourse basis after they become negotiable, but before maturity. The fees associated with the monetization are included in Selling, general, and administrative in the Consolidated Statements of Operations and were insignificant for the years ended December 31, 2017, 2016, and 2015.

*(n) Fair Value of Financial Instruments*

The carrying amounts of financial instruments, including cash and cash equivalents, accounts receivable, accounts payable, and accrued expenses reflected in the consolidated financial statements approximate fair value due to their short-term maturities. The fair value of debt for footnote disclosure purposes, including current maturities, if any, is estimated using recently quoted market prices of the instrument, or if not available, a discounted cash flow analysis based on the estimated current incremental borrowing rates for similar types of instruments.

*(o) Cash, Cash Equivalents, and Short-Term Investments*

All financial instruments purchased with an original maturity of three months or less at the time of purchase are considered cash equivalents. Such items may include liquid money market accounts, U.S. treasuries, government agency securities, and corporate debt. Investments that are classified as cash equivalents are carried at cost, which approximates fair value. The Company's cash and cash equivalents includes \$12.5 million and \$1.5 million of cash equivalents at December 31, 2017 and 2016, respectively.

A portion of the Company's cash and cash equivalents is held by its subsidiaries throughout the world, frequently in each subsidiary's respective functional currency, which is typically the U.S. dollar. Approximately 77% and 54% of cash and cash equivalents were maintained outside the United States at December 31, 2017 and 2016, respectively.

Marketable securities are generally classified as available-for-sale for use in current operations, if required, and are reported at fair value, with unrealized gains and losses, net of tax, presented as a separate component of stockholders' equity under the caption Accumulated other comprehensive income. These securities can include U.S. treasuries, government agency securities, corporate debt, and commercial paper, all with maturities of greater than three months when purchased. All realized gains and losses and unrealized losses resulting from declines in fair value that are other than temporary are included in Other, net in the Consolidated Statements of Operations. The specific identification method is used to determine the realized gains and losses on investments.

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**Veeco Instruments Inc. and Subsidiaries**

**Notes to Consolidated Financial Statements (Continued)**

*(p) Inventories*

Inventories are stated at the lower of cost or net realizable value, with cost determined on a first-in, first-out basis. The Company assesses the valuation of all inventories, including manufacturing raw materials, work-in-process, and finished goods, each quarter. Obsolete inventory or inventory in excess of management's estimated usage requirement is written down to its estimated net realizable value if less than cost. Estimates of net realizable value include, but are not limited to, management's forecasts related to the Company's future manufacturing schedules, customer demand, technological and/or market obsolescence, general market conditions, possible alternative uses, and ultimate realization of excess inventory. If future customer demand or market conditions are less favorable than the Company's projections, additional inventory write-downs may be required and would be reflected in cost of sales in the period the revision is made. Inventory acquired as part of a business combination is recorded at fair value on the date of acquisition. See Note 5, Business Combinations, for additional information.

*(q) Business Combinations*

The Company allocates the fair value of the purchase consideration of the Company's acquisitions to the tangible assets, intangible assets, including in-process research and development (IPR&D), if any, and liabilities assumed, based on estimated fair values. The excess of the fair value of purchase consideration over the fair values of these identifiable assets and liabilities is recorded as goodwill. Acquisition-related expenses are recognized separately from the business combination and are expensed as incurred. See Note 5, Business Combinations, for additional information.

*(r) Goodwill and Indefinite-Lived Intangibles*

Goodwill is an asset representing the future economic benefits arising from assets acquired in a business combination that are not individually identified and separately recognized. Goodwill is measured as the excess of the consideration transferred over the net fair value of identifiable assets acquired and liabilities assumed. Intangible assets with indefinite useful lives are measured at their respective fair values on the acquisition date. Intangible assets related to IPR&D projects are considered to be indefinite-lived until the completion or abandonment of the associated R&D efforts. If and when development is complete, the associated assets would be deemed long-lived and would then be amortized based on their respective estimated useful lives at that point in time. Goodwill and indefinite-lived intangibles are not amortized into results of operations but instead are evaluated for impairment. The Company performs the evaluation in the fourth quarter of each year or more frequently if impairment indicators arise.

The Company may first perform a qualitative assessment of whether it is more likely than not that the reporting unit's fair value is less than its carrying amount, and, if so, the Company then quantitatively compares the fair value of the reporting unit to its carrying amount. If the fair value exceeds the carrying amount, goodwill is not impaired. If the carrying amount exceeds fair value, the Company then records an impairment loss equal to the difference, up to the carrying value of goodwill.

The Company determines the fair value of its reporting unit based on a reconciliation of the fair value of the reporting unit to the Company's adjusted market capitalization. The adjusted market capitalization is calculated by multiplying the average share price of the Company's common stock for the last ten trading days prior to the measurement date by the number of outstanding common shares and adding a control premium.

*(s) Long-Lived Assets and Cost Method Investment*

Long-lived intangible assets consist of purchased technology, customer relationships, patents, trademarks and tradenames, covenants not-to-compete, and backlog and are initially recorded at fair value. Long-lived intangibles are amortized over their estimated useful lives in a method reflecting the pattern in which the economic benefits are consumed or straight-lined if such pattern cannot be reliably determined.

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**Veeco Instruments Inc. and Subsidiaries**

**Notes to Consolidated Financial Statements (Continued)**

Property, plant, and equipment are recorded at cost. Depreciation expense is calculated based on the estimated useful lives of the assets by using the straight-line method. Amortization of leasehold improvements is recognized using the straight-line method over the shorter of the remaining lease term or the estimated useful lives of the improvements.

Long-lived assets and cost method investments are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. If circumstances require a long-lived asset or asset group be tested for possible impairment, a recoverability test is performed utilizing undiscounted cash flows expected to be generated by that asset or asset group compared to its carrying amount. If the carrying amount of the long-lived asset or asset group is not recoverable on an undiscounted cash flow basis, impairment is recognized to the extent the carrying amount exceeds its fair value. Fair value is determined through various valuation techniques including discounted cash flow models or, when available, quoted market values, and third-party appraisals.

*(t) Recent Accounting Pronouncements*

The FASB issued ASU 2014-09, as amended: *Revenue from Contracts with Customers*, which has been codified as Accounting Standards Codification 606 ( ASC 606 ). ASC 606 requires the Company's revenue recognition to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which it expects to be entitled in exchange for those goods or services. ASC 606 outlines a five-step model to make the revenue recognition determination and requires new financial statement disclosures. Publicly-traded companies are required to adopt ASC 606 for reporting periods beginning after December 15, 2017. The most significant financial statement impacts of adopting ASC 606 will be the elimination of the constraint on revenue associated with the billing retention related to the receipt of customer final acceptance as well as the identification of installation services as a performance obligation. The elimination of the constraint on revenue related to customer final acceptance, which is usually about 10 percent of a system sale, will generally be recognized at the time the Company transfers control of the system to the customer, which is earlier than under the Company's current revenue recognition model for certain contracts that are subject to the billing retention constraint described above. The new performance obligation related to installation services under the new standard will generally be recognized as the installation services are performed, which is later than under the Company's current revenue recognition model. Taken together, the Company does not believe these changes will have a material impact on the consolidated financial statements. The Company plans to adopt using the full retrospective method.

In January 2016, the FASB issued ASU 2016-01: *Financial Instruments - Overall*, which requires certain equity investments to be measured at fair value, with changes in fair value recognized in net income. For equity investments without readily observable market prices, entities have the option to either measure these investments at fair value every quarter, or measure at cost adjusted for changes in observable prices minus impairment. Changes in measurement under either alternative must be recognized in net income. Publicly-traded companies are required to adopt the update for reporting periods beginning after December 15, 2017; early adoption is permitted. The Company does not expect this ASU will have a material impact on the consolidated financial statements upon adoption, and will monitor its cost method investments each reporting period for changes in observable market prices, if any, which may be material in future periods.

In February 2016, the FASB issued ASU 2016-02: *Leases*, which generally requires operating lessee rights and obligations to be recognized as assets and liabilities on the balance sheet. In addition, interest on lease liabilities is to be recognized separately from the amortization of right-of-use assets in the Statement of Operations. Further, payments of the principal portion of lease liabilities are to be classified as financing

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activities while payments of interest on lease liabilities and variable lease payments are to be classified as operating activities in the Statement of Cash Flows. When the standard is adopted, the Company will be required to recognize and measure leases at the beginning of the earliest period presented using a modified retrospective approach. ASU 2016-02 is effective for fiscal years beginning after December 15, 2018, with early application permitted. The Company is evaluating the anticipated impact of adopting the ASU on the consolidated financial statements.

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**Veeco Instruments Inc. and Subsidiaries**

**Notes to Consolidated Financial Statements (Continued)**

In August 2016, the FASB issued ASU 2016-15, *Statement of Cash Flows: Classification of Certain Cash Receipts and Cash Payments*, which provides guidance on eight specific cash flow issues, including debt prepayments or debt extinguishment costs. Publicly-traded companies are required to adopt the update for reporting periods beginning after December 15, 2017. This ASU will not have a material impact on the consolidated financial statements.

In October 2016, the FASB issued ASU 2016-16, *Income Taxes: Intra-Entity Transfers of Assets Other Than Inventory*, which requires that entities recognize the income tax consequences of an intra-entity transfer of an asset, other than inventory, when the transfer occurs. Publicly-traded companies are required to adopt the update for reporting periods beginning after December 15, 2017. This ASU will not have a material impact on the consolidated financial statements.

The Company is also evaluating other pronouncements recently issued but not yet adopted. The adoption of these pronouncements is not expected to have a material impact on our consolidated financial statements.

*(u) Recently Adopted Accounting Standards*

In January 2017, the FASB issued ASU 2017-04: *Simplifying the Test for Goodwill Impairment*, which eliminates the requirement to calculate the implied fair value of goodwill when testing goodwill for impairment. Instead, if the carrying value of an entity's reporting unit(s) exceeds fair value, then an impairment charge should be recorded equal to the difference. The Company has early adopted the ASU effective January 1, 2017, and it did not have a material impact on the consolidated financial statements.

In March 2016, the FASB issued ASU 2016-09: *Stock Compensation: Improvements to Employee Share-Based Payment Accounting*, which simplifies several aspects of the accounting for share-based payments. The Company early adopted the ASU effective January 1, 2016. Beginning in 2016, excess tax benefits and deficiencies are recognized as income tax expense or benefit in the income statement in the reporting period incurred. The Company also made an accounting policy election to account for forfeitures when they occur. The ASU transition guidance requires that this election be applied on a modified retrospective basis through a cumulative-effect adjustment to retained earnings as of the beginning of the period in which the ASU is adopted. Accordingly, the Company recorded a \$1.3 million charge to the opening accumulated deficit balance as of January 1, 2016, with a corresponding adjustment to additional paid-in capital, resulting in no impact to the opening balance of total stockholders' equity. In addition, the Company recorded additional deferred tax assets with an equally offsetting valuation allowance of \$2.4 million.

**Note 2 Income (Loss) Per Share**

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The Company considers unvested share-based awards that have non-forfeitable rights to dividends prior to vesting to be participating shares, which are treated as a separate class of security from the Company's common shares for calculating per share data. Therefore, the Company applies the two-class method when calculating income (loss) per share. The two-class method is an earnings allocation formula that determines earnings per share for each class of common stock and participating security according to dividends declared and participation rights in undistributed earnings. However, since the holders of the participating shares are not obligated to fund losses, participating shares are excluded from the calculation of loss per share.

The dilutive effect of the Convertible Senior Notes on income per share is calculated using the treasury stock method since the Company has both the current intent and ability to settle the principal amount of the Convertible Senior Notes in cash. See Note 12, Debt, for additional information on the Convertible Senior Notes.

Basic income (loss) per share is calculated by dividing net income (loss) by the weighted average number of shares outstanding during the period under the two-class method. Diluted income per share is calculated by dividing net income by the weighted average number of shares used to calculate basic income per share plus the weighted average number of common share equivalents outstanding during the period. The dilutive effect of outstanding options to purchase common stock and non-participating share-based awards is considered in diluted income per share by application of the treasury



Table of Contents**Veeco Instruments Inc. and Subsidiaries****Notes to Consolidated Financial Statements (Continued)**

stock method. The dilutive effect of performance share units is included in diluted income per common share in the periods the performance targets have been achieved. The computations of basic and diluted income (loss) per share for the years ended December 31, 2017, 2016, and 2015 are as follows:

	2017	For the year ended December 31, 2016		2015
	(in thousands, except per share amounts)			
Net income (loss)	\$ (44,793)	\$ (122,210)	\$ (31,978)	
Net income (loss) per common share:				
Basic	\$ (1.01)	\$ (3.11)	\$ (0.80)	
Diluted	\$ (1.01)	\$ (3.11)	\$ (0.80)	
Basic weighted average shares outstanding	44,174	39,340	39,742	
Effect of potentially dilutive share-based awards				
Diluted weighted average shares outstanding	44,174	39,340	39,742	
Unvested participating shares excluded from basic weighted average shares outstanding since the securityholders are not obligated to fund losses	72	312	1,017	
Common share equivalents excluded from the diluted weighted average shares outstanding since Veeco incurred a net loss and their effect would be antidilutive	239	107	146	
Potentially dilutive non-participating shares excluded from the diluted calculation as their effect would be antidilutive	1,744	1,896	2,111	
Maximum potential shares to be issued for settlement of Convertible Senior Notes excluded from the diluted calculation as their effect would be antidilutive	8,618			

**Note 3 Fair Value Measurements**

Fair value is the price that would be received for an asset or the amount paid to transfer a liability in an orderly transaction between market participants. The Company is required to classify certain assets and liabilities based on the following fair value hierarchy:

- Level 1: Quoted prices in active markets that are unadjusted and accessible at the measurement date for identical, unrestricted assets or liabilities;

- Level 2: Quoted prices for identical assets and liabilities in markets that are not active, quoted prices for similar assets and liabilities in active markets or financial instruments for which significant inputs are observable, either directly or indirectly; and
- Level 3: Prices or valuations that require inputs that are both significant to the fair value measurement and unobservable.

A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement. The Company has evaluated the estimated fair value of financial instruments using available market information and valuations as provided by third-party sources. The use of different market assumptions or

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**Veeco Instruments Inc. and Subsidiaries**  
**Notes to Consolidated Financial Statements (Continued)**

estimation methodologies could have a significant effect on the estimated fair value amounts.

The following table presents the Company's assets that were measured at fair value on a recurring basis at December 31, 2017 and 2016:

	Level 1	Level 2	Level 3	Total
	(in thousands)			
<b>December 31, 2017</b>				
<b>Cash equivalents</b>				
Corporate debt	\$ 12,490	\$	\$	\$ 12,490
<b>Total</b>	<b>\$ 12,490</b>	<b>\$</b>	<b>\$</b>	<b>\$ 12,490</b>
<b>Short-term investments</b>				
U.S. treasuries	\$ 33,895	\$	\$	\$ 33,895
Corporate debt		10,886		10,886
Commercial paper		2,999		2,999
<b>Total</b>	<b>\$ 33,895</b>	<b>\$ 13,885</b>	<b>\$</b>	<b>\$ 47,780</b>
<b>December 31, 2016</b>				
<b>Cash equivalents</b>				
Corporate debt	\$	\$ 1,501	\$	\$ 1,501
<b>Total</b>	<b>\$</b>	<b>\$ 1,501</b>	<b>\$</b>	<b>\$ 1,501</b>
<b>Short-term investments</b>				
U.S. treasuries	\$ 40,008	\$	\$	\$ 40,008
Government agency securities		10,012		10,012
Corporate debt		13,773		13,773
Commercial paper		2,994		2,994
<b>Total</b>	<b>\$ 40,008</b>	<b>\$ 26,779</b>	<b>\$</b>	<b>\$ 66,787</b>

The Company's investments classified as Level 1 are based on quoted prices that are available in active markets. The Company's investments classified as Level 2 are valued using observable inputs to quoted market prices, benchmark yields, reported trades, broker/dealer quotes, or alternative pricing sources with reasonable levels of price transparency.

**Note 4 Investments**

At December 31, 2017 and 2016 the amortized cost and fair value of marketable securities were as follows:

**Gross**                      **Gross**

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	Amortized Cost	Unrealized Gains	Unrealized Losses	Estimated Fair Value
	(in thousands)			
<b>December 31, 2017</b>				
U.S. treasuries	\$ 33,914	\$	\$ (19)	\$ 33,895
Corporate debt	10,894		(8)	10,886
Commercial paper	2,999			2,999
<b>Total</b>	<b>\$ 47,807</b>	<b>\$</b>	<b>\$ (27)</b>	<b>\$ 47,780</b>
<b>December 31, 2016</b>				
U.S. treasuries	\$ 40,013	\$	\$ (5)	\$ 40,008
Government agency securities	10,020		(8)	10,012
Corporate debt	13,780		(7)	13,773
Commercial paper	2,994			2,994
<b>Total</b>	<b>\$ 66,807</b>	<b>\$</b>	<b>\$ (20)</b>	<b>\$ 66,787</b>

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Table of Contents**Veeco Instruments Inc. and Subsidiaries****Notes to Consolidated Financial Statements (Continued)**

Available-for-sale securities in a loss position at December 31, 2017 and 2016 were as follows:

	December 31, 2017		December 31, 2016	
	Estimated Fair Value	Gross Unrealized Losses	Estimated Fair Value	Gross Unrealized Losses
	(in thousands)			
U.S. treasuries	\$ 33,895	\$ (19)	\$ 20,002	\$ (5)
Government agency securities			10,012	(8)
Corporate debt	10,886	(8)	13,773	(7)
<b>Total</b>	\$ 44,781	\$ (27)	\$ 43,787	\$ (20)

At December 31, 2017 and 2016, there were no short-term investments that had been in a continuous loss position for more than 12 months.

The maturities of securities classified as available-for-sale at December 31, 2017 were all due in one year or less. Actual maturities may differ from contractual maturities because borrowers may have the right to call or prepay obligations with or without call or prepayment penalties. There were minimal realized gains or losses for the years ended December 31, 2017, 2016, and 2015.

*Cost Method Investment*

The Company has an ownership interest of less than 20% in a non-marketable investment, Kateeva, Inc. ( Kateeva ). The Company does not exert significant influence over Kateeva and therefore the investment is carried at cost. The carrying value of the investment was \$21.0 million at December 31, 2017 and 2016. The investment is included in Other assets on the Consolidated Balance Sheets. The investment is subject to a periodic impairment review; as there are no open-market valuations, the impairment analysis requires judgment. The analysis includes assessments of Kateeva's financial condition, the business outlook for its products and technology, its projected results and cash flow, business valuation indications from recent rounds of financing, the likelihood of obtaining subsequent rounds of financing, and the impact of equity preferences held by Veeco relative to other investors. Fair value of the investment is not estimated unless there are identified events or changes in circumstances that could have a significant adverse effect on the fair value of the investment. No such events or circumstances are present.

**Note 5 Business Combinations***Ultratech*

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On May 26, 2017, the Company completed its acquisition of Ultratech, Inc. ( Ultratech ). Ultratech develops, manufactures, sells, and supports lithography, laser annealing, and inspection equipment for manufacturers of semiconductor devices, including front-end semiconductor manufacturing and advanced packaging. Ultratech also develops, manufactures, sells and supports ALD equipment for scientific and industrial applications. Ultratech's customers are primarily located throughout the United States, Europe, China, Japan, Taiwan, Singapore, and Korea. The results of Ultratech's operations have been included in the consolidated financial statements since the date of acquisition.

Ultratech shareholders received (i) \$21.75 per share in cash and (ii) 0.2675 of a share of Veeco common stock for each Ultratech common share outstanding on the acquisition date. The acquisition date fair value of the consideration totaled \$633.4 million, net of cash acquired, which consisted of the following:

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Table of Contents**Veeco Instruments Inc. and Subsidiaries****Notes to Consolidated Financial Statements (Continued)**

	<b>Acquisition Date (May 26, 2017) (in thousands)</b>
Cash consideration, net of cash acquired of \$229.4 million	\$ 404,489
Equity consideration (7.2 million shares issued)	228,644
Replacement equity awards attributable to pre-acquisition service	228
Acquisition date fair value	\$ 633,361

Approximately \$2.7 million of the cash merger consideration is included in Accrued expenses and other current liabilities on the Consolidated Balance Sheets as of December 31, 2017 related to shareholder appraisal proceedings.

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

	<b>Acquisition Date (May 26, 2017) (in thousands)</b>
Short-term investments	\$ 47,161
Accounts receivable	45,465
Inventories	59,100
Deferred cost of sales	242
Prepaid expense and other current assets	7,217
Property, plant, and equipment	18,152
Intangible assets	346,940
Other assets	6,442
Total identifiable assets acquired	530,719
Accounts payable	24,291
Accrued expenses and other current liabilities	16,356
Customer deposits and deferred revenue	4,834
Deferred income taxes	32,478
Other liabilities	11,622
Total liabilities assumed	89,581
Net identifiable assets acquired	441,138
Goodwill	192,223
Net assets acquired	\$ 633,361

The gross contractual value of the acquired accounts receivable was approximately \$46.0 million. The fair value of the accounts receivables is the amount expected to be collected by the Company. Goodwill generated from the acquisition is primarily attributable to expected synergies from future growth and strategic advantages provided through the expansion of product offerings as well as assembled workforce and is not expected to be deductible for income tax purposes.

The classes of intangible assets acquired and the estimated useful life of each class is presented in the table below:

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Table of Contents**Veeco Instruments Inc. and Subsidiaries****Notes to Consolidated Financial Statements (Continued)**

	Acquisition Date (May 26, 2017)	
	Amount	Useful life
Technology	\$ 158,390	9 years
Customer relationships	116,710	12 years
Backlog	3,080	6 months
In-process research and development	43,340	*
Trademark and tradenames	25,420	7 years
Intangible assets acquired	\$ 346,940	

\*In-process research and development will be amortized (or impaired) upon completion (or abandonment) of the development project.

The Company determined the estimated fair value of the identifiable intangible assets based on various factors including: cost, discounted cash flow, income method, loss-of-revenue/income method, and relief-from-royalty method in determining the purchase price allocation.

In-process research and development ( IPR&D ) represents the estimated fair values of incomplete Ultratech research and development projects that had not reached the commercialization stage and meet the criteria for recognition as IPR&D as of the date of the acquisition. In the future, the fair value of each project at the acquisition date will be either amortized or impaired depending on whether the projects are completed or abandoned. The fair value of IPR&D was determined using an income approach and costs to complete the project and expected commercialization timelines are considered key assumptions. This valuation approach reflects the present value of the projected cash flows that are expected to be generated by the IPR&D less charges representing the contribution of other assets to those cash flows. The value of the IPR&D was determined to be \$43.3 million, approximately half of which is related to Ultratech's lithography technologies and one-third of which is related to Ultratech's laser annealing technologies.

For the year ended December 31, 2017, acquisition related costs were approximately \$17.8 million, including non-cash charges of \$4.2 million related to accelerated share-based compensation for employee terminations.

The amounts of net sales and income (loss) from operations before income taxes of Ultratech included in the Company's Consolidated Statement of Operations for the year ended December 31, 2017 are as follows:

	Year ended December 31, 2017 (in thousands)
Net sales	\$ 65,530
Loss before income taxes	\$ (62,762)

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Loss before income taxes of Ultratech for the year ended December 31, 2017 of \$62.8 million includes acquisition costs of \$17.8 million, release of inventory fair value step-up related to purchase accounting of \$9.6 million, amortization expense on intangible assets of \$23.9 million, and restructuring charges of \$3.3 million.

The following table presents unaudited pro forma financial information as if the acquisition of Ultratech had occurred on January 1, 2016:

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Table of Contents**Veeco Instruments Inc. and Subsidiaries****Notes to Consolidated Financial Statements (Continued)**

	<b>For the year ended December 31,</b>	
	<b>2017</b>	<b>2016</b>
	<b>(in thousands, except per share amounts)</b>	
Net sales	\$ 555,498	\$ 526,501
Loss before income taxes	(81,910)	(218,023)
Diluted earnings per share	\$ (1.24)	\$ (4.67)

The pro-forma results were calculated by combining the audited results of the Company with the stand-alone unaudited results of Ultratech for the pre-acquisition period, and adjusting for the following:

- (i) Additional amortization expense related to identified intangible assets valued as part of the purchase price allocation that would have been incurred starting on January 1, 2016.
- (ii) Additional depreciation expense for the property, plant, and equipment fair value adjustments that would have been incurred starting on January 1, 2016.
- (iii) All acquisition related costs incurred by the Company as well as by Ultratech pre-acquisition have been removed from the year ended December 31, 2017 and included in the year ended December 31, 2016, as such expenses would have been incurred in the first quarter following the acquisition.
- (iv) All amortization of inventory step-up has been removed from the year ended December 31, 2017 and recorded in the year ended December 31, 2016, as such costs would have been incurred as the corresponding inventory was sold.
- (v) Additional interest expense related to the Convertible Senior Notes (see Note 12, Debt ) as if they had been issued on January 1, 2016.
- (vi) Income tax expense (benefit) was adjusted for the impact of the above adjustments for each period.

(vii) All shares issued in connection with the acquisition were considered outstanding as of January 1, 2016 for purposes of calculating diluted earnings per share.

#### Note 6 Goodwill and Intangible Assets

Goodwill represents the future economic benefits arising from assets acquired in a business combination that are not individually identified and separately recognized. The following table presents the changes in goodwill balances during the years indicated:

	Gross carrying amount		Accumulated impairment (in thousands)		Net amount
<b>Balance at December 31, 2015 and 2016</b>	\$ 238,108	\$	123,200	\$	114,908
Acquisition	192,223				192,223
<b>Balance at December 31, 2017</b>	\$ 430,331	\$	123,200	\$	307,131

The Company performs its annual goodwill impairment test at the beginning of the fourth quarter each year. As the Company maintains a single goodwill reporting unit, it determines the fair value of its reporting unit based upon the Company's adjusted market capitalization. The adjusted market capitalization is calculated by multiplying the average share price of the Company's common stock for the last ten trading days prior to the measurement date by the number of outstanding common shares and adding a control premium. The annual test performed at the beginning of the fourth quarter of fiscal 2016 and 2017 did not result in any potential impairment as the fair value of the reporting unit was determined to exceed the carrying amount of the reporting unit.

Table of Contents**Veeco Instruments Inc. and Subsidiaries****Notes to Consolidated Financial Statements (Continued)**

As a result of a significant decline in the Company's stock price during the fourth quarter, the Company determined it was appropriate to perform an interim goodwill impairment test as of the end of the fourth quarter. The Company determined the fair value of its reporting unit using both the adjusted market capitalization approach noted above, and a market approach, which was based on a review of comparable companies market-derived trailing twelve month revenue multiples. Both approaches indicated the fair value exceeded the carrying amount of the reporting unit and no impairment of goodwill existed at December 31, 2017. The valuation of goodwill will continue to be subject to changes in the Company's market capitalization and observable market control premiums.

The components of purchased intangible assets were as follows:

	Weighted Average Remaining Amortization Period (in years)	Gross Carrying Amount	December 31, 2017 Accumulated Amortization and Impairment	Net Amount (in thousands)	Gross Carrying Amount	December 31, 2016 Accumulated Amortization and Impairment	Net Amount
Technology	8.0	\$ 307,588	\$ 133,121	\$ 174,467	\$ 149,198	\$ 113,904	\$ 35,294
Customer relationships	11.4	164,595	39,336	125,259	47,885	28,659	19,226
In-process R&D		43,340		43,340			
Trademarks and tradenames	6.4	30,910	4,321	26,589	2,590	1,948	642
Indefinite-lived trademark					2,900		2,900
Other	2.0	3,686	3,498	188	2,026	1,710	316
<b>Total</b>	<b>9.2</b>	<b>\$ 550,119</b>	<b>\$ 180,276</b>	<b>\$ 369,843</b>	<b>\$ 204,599</b>	<b>\$ 146,221</b>	<b>\$ 58,378</b>

Other intangible assets primarily consist of patents, licenses, and backlog.

During 2016, the Company decided to reduce future investments in certain technologies and, as a result, recorded a non-cash impairment charge of \$54.3 million for the related intangible purchased technology. The impairment charge was based on projected cash flows that required the use of unobservable inputs, and was recorded in Asset impairment in the Consolidated Statements of Operations.

Based on the intangible assets recorded at December 31, 2017, and assuming no subsequent additions to or impairment of the underlying assets, the remaining estimated annual amortization expense, excluding in-process R&D, is expected to be as follows:

	Amortization (in thousands)
2018	\$ 54,128

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2019		57,071
2020		54,382
2021		40,959
2022		26,009
Thereafter		93,954
Total	\$	326,503

**Note 7 Inventories**

Inventories are stated at the lower of cost or net realizable value, with cost determined on a first-in, first-out basis. Inventories consist of the following:

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## Veeco Instruments Inc. and Subsidiaries

## Notes to Consolidated Financial Statements (Continued)

	2017	December 31, (in thousands)	2016
Materials	\$	59,919	\$ 46,457
Work-in-process		37,222	25,250
Finished goods		23,125	5,356
<b>Total</b>	<b>\$</b>	<b>120,266</b>	<b>\$ 77,063</b>

**Note 8 Property, Plant, and Equipment and Assets Held for Sale**

Property and equipment, net, consist of the following:

	2017	December 31, (in thousands)	2016	Average Useful Life
Land	\$	5,669	\$ 5,669	N/A
Building and improvements		54,449	50,814	10 40 years
Machinery and equipment(1)		126,829	99,370	3 10 years
Leasehold improvements		10,073	3,652	3 7 years
Gross property, plant, and equipment		197,020	159,505	
Less: accumulated depreciation and amortization		111,962	98,859	
<b>Net property, plant, and equipment</b>	<b>\$</b>	<b>85,058</b>	<b>\$ 60,646</b>	

(1) Machinery and equipment also includes software, furniture and fixtures

Depreciation expense was \$14.6 million, \$13.4 million, and \$12.2 million for the years ended December 31, 2017, 2016, and 2015, respectively. During 2016, the Company decided to reduce future investments in certain technologies and, as a result, recorded an impairment charge of \$3.3 million of property, plant, and equipment.

As part of the Company's efforts to reduce costs, enhance efficiency, and streamline operations, the Company removed certain lab equipment that is no longer required and recorded a non-cash impairment charge of \$6.2 million for the year ended December 31, 2016. Additionally, as part of that initiative, the Company listed its two facilities in South Korea for sale. When each facility was reclassified as held for sale, the Company determined that the carrying values of the buildings exceeded their fair market values, less cost to sell, and recorded net impairment charges of \$4.5 million for the year ended December 31, 2016. Both facilities were sold before the end of 2016 at prices that approximated the revised carrying values.

Finally, during the year ended December 31, 2016, the Company recorded an impairment charge of approximately \$1.2 million related to an owned property in St. Paul, Minnesota. The property was sold during 2017, resulting in an additional impairment charge of \$0.7 million for the year ended December 31, 2017. There were no assets held for sale as of December 31, 2017 and 2016. All impairment charges were recorded in Asset impairment in the Consolidated Statements of Operations.

**Note 9 Accrued Expenses and Other Liabilities**

The components of accrued expenses and other current liabilities were as follows:

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## Veeco Instruments Inc. and Subsidiaries

## Notes to Consolidated Financial Statements (Continued)

	2017	December 31, (in thousands)	2016
Payroll and related benefits	\$	32,996	\$ 18,780
Warranty		6,532	4,217
Interest		4,430	
Professional fees		3,942	1,827
Merger consideration payable		2,662	
Installation		2,271	1,382
Sales, use, and other taxes		2,144	1,282
Restructuring liability		1,520	1,796
Other		3,842	3,917
<b>Total</b>	<b>\$</b>	<b>60,339</b>	<b>\$ 33,201</b>

*Customer deposits and deferred revenue*

Customer deposits totaled \$41.5 million and \$22.2 million at December 31, 2017 and 2016, respectively, which are included in Customer deposits and deferred revenue in the Consolidated Balance Sheets.

*Other liabilities*

The Company maintains an executive non-qualified deferred compensation plan that was assumed from Ultratech that allows qualifying executives to defer cash compensation. At December 31, 2017, plan assets approximated \$3.4 million representing the cash surrender value of life insurance policies and is included within Other assets in the Consolidated Balance Sheets, while plan liabilities approximated \$4.7 million and is included within Other liabilities in the Consolidated Balance Sheets. Other liabilities also included asset retirement obligations of \$3.3 million, medical and dental benefits of \$2.2 million, and acquisition related accruals of \$0.4 million at December 31, 2017. At December 31, 2016, other liabilities primarily consisted of a non-current income tax payable of \$4.9 million.

**Note 10 Restructuring Charges**

During 2016, the Company undertook restructuring activities as part of its initiative to streamline operations, enhance efficiencies, and reduce costs, as well as reducing future investments in certain technology development, which together impacted approximately 75 employees. These activities were substantially completed in 2017. In addition, during 2017, the Company began the acquisition integration process to enhance efficiencies, resulting in additional employee terminations and other facility closing costs.

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During 2015, charges of \$4.7 million were recognized related to the closing of facilities in Ft. Collins, Colorado, Camarillo, California, and Hyeongok-ri, South Korea, as well as other cost reduction initiatives, which together impacted approximately 50 employees.

The following table shows the amounts incurred and paid for restructuring activities during the years ended December 31, 2017, 2016, and 2015 and the remaining accrued balance of restructuring costs at December 31, 2017, which is included in **Accrued expenses and other current liabilities** in the Consolidated Balance Sheets:

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## Veeco Instruments Inc. and Subsidiaries

## Notes to Consolidated Financial Statements (Continued)

	Personnel Severance and Related Costs	Facility Closing Costs (in thousands)	Total
<b>Balance at December 31, 2014</b>	\$ 1,428	\$	\$ 1,428
Provision	3,513	1,166	4,679
Payments	(4,117)	(1,166)	(5,283)
<b>Balance at December 31, 2015</b>	824		824
Provision	4,544	1,098	5,642
Changes in estimate	(2)		(2)
Payments	(3,570)	(1,098)	(4,668)
<b>Balance at December 31, 2016</b>	1,796		1,796
Provision	4,714	5,257	9,971
Payments	(4,990)	(5,257)	(10,247)
<b>Balance - December 31, 2017</b>	\$ 1,520	\$	\$ 1,520

Included within restructuring expense in the Consolidated Statements of Operations for the year ended December 31, 2017 is approximately \$1.9 million of non-cash charges related to accelerated share-based compensation for employee terminations.

**Note 11 Commitments and Contingencies***Warranty*

Warranties are typically valid for one year from the date of system final acceptance, and the Company estimates the costs that may be incurred under the warranty. Estimated warranty costs are determined by analyzing specific product and historical configuration statistics and regional warranty support costs and is affected by product failure rates, material usage, and labor costs incurred in correcting product failures during the warranty period. Unforeseen component failures or exceptional component performance can also result in changes to warranty costs.

Changes in the Company's product warranty reserves were as follows:

	2017	December 31, 2016 (in thousands)	2015
<b>Balance, beginning of the year</b>	\$ 4,217	\$ 8,159	\$ 5,411
Warranties issued	5,817	3,916	7,873
Addition from Ultratech acquisition	1,889		
Consumption of reserves	(6,330)	(6,433)	(3,551)

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Changes in estimate		939		(1,425)		(1,574)
<b>Balance, end of the year</b>	\$	6,532	\$	4,217	\$	8,159

*Minimum Lease Commitments*

Minimum lease commitments at December 31, 2017 for property and equipment under operating lease agreements (exclusive of renewal options) are payable as follows:

Table of Contents**Veeco Instruments Inc. and Subsidiaries****Notes to Consolidated Financial Statements (Continued)**

	<b>Operating Leases (in thousands)</b>	
<b>Payments due by period:</b>		
2018	\$	5,655
2019		5,533
2020		5,529
2021		2,307
2022		2,308
Thereafter		2,919
Total	\$	24,251

Lease expense was \$5.3 million, \$2.5 million, and \$2.3 million for the years ended December 31, 2017, 2016, and 2015, respectively. In addition, the Company is obligated under such leases for certain other expenses, including real estate taxes and insurance.

*Legal Proceedings*

On September 21, 2017, Blueblade Capital Opportunities LLC et al., on behalf of purported beneficial owners of 440,100 shares of Ultratech common stock, filed an action against Ultratech in Delaware Court of Chancery requesting an appraisal of the value of their Ultratech stock pursuant to 8 Del. C. §262. The Company believes that the merger price, which was the product of arms-length negotiations, was fair and reasonable, and intends to contest the appraisal claim. Discovery in the matter has commenced and a trial on the action is scheduled to begin in December 2018.

On April 12, 2017, the Company filed a patent infringement complaint in the U.S. District Court for the Eastern District of New York against SGL Carbon, LLC and SGL Carbon SE (collectively, "SGL"), alleging infringement of patents relating to wafer carrier technology used in MOCVD equipment. The complaint alleges that SGL infringes Veeco's patents by making and selling certain wafer carriers to Veeco's competitor, Advanced Micro-Fabrication Equipment, Inc. ("AMEC"). On November 2, 2017, the U.S. District Court granted the Company's motion for a preliminary injunction prohibiting SGL from shipping wafer carriers using the Company's patented technology without the Company's express authorization.

On July 13, 2017, AMEC filed a patent infringement complaint against Veeco Instruments Shanghai Co., Ltd. ("Veeco Shanghai") with the Fujian High Court in China, alleging that the Company's MOCVD products infringed a Chinese utility model patent relating to the synchronous movement engagement mechanism in a chemical vapor deposition reactor and seeking injunctive relief and monetary damages against Veeco Shanghai. On December 7, 2017, without providing notice to Veeco and without hearing Veeco's position on alleged infringement, the Fujian High Court issued a preliminary injunction, applicable in China, that requires Veeco Shanghai to stop importing, making, selling, and offering to sell Veeco EPIK 700 model MOCVD systems and to stop importing, selling, and offering to sell wafer carriers used as supplies for the EPIK 700 MOCVD system.

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On February 8, 2018, Veeco, AMEC, and SGL announced that they had mutually agreed to settle the pending litigation among the parties and to amicably resolve all pending disputes, including AMEC's lawsuit against Veeco before the Fujian High Court in China and Veeco's lawsuit against SGL before the U.S. District Court for the Eastern District of New York. As part of the settlement, all legal actions worldwide (in court, patent offices, and otherwise), between Veeco, AMEC, and SGL, and their affiliates, will be dismissed and/or otherwise withdrawn. As a result, all business processes, including sales, service, and importation, will be continued.

The Company is involved in various other legal proceedings arising in the normal course of business. The Company does not believe that the ultimate resolution of these matters will have a material adverse effect on its consolidated financial position, results of operations, or cash flows.

Table of Contents**Veeco Instruments Inc. and Subsidiaries****Notes to Consolidated Financial Statements (Continued)***Concentrations of Credit Risk*

The Company depends on purchases from its ten largest customers, which accounted for 67% and 73% of net accounts receivable at December 31, 2017 and 2016, respectively.

Customers who accounted for more than 10% of net accounts receivable or net sales are as follows:

Customer	Accounts Receivable Year ended December 31,		Net Sales For the Year Ended December 31,		
	2017	2016	2017	2016	2015
Customer A	24%	23%	21%	13%	*
Customer B	*	17%	*	*	*
Customer C	*	*	*	*	20%
Customer D	*	*	*	*	12%

\* Less than 10% of aggregate accounts receivable or net sales

The Company manufactures and sells its products to companies in different geographic locations. Refer to Note 18, Segment Reporting and Geographic Information, for additional information. In certain instances, the Company requires deposits from its customers for a portion of the sales price in advance of shipment and performs periodic credit evaluations on its customers. Where appropriate, the Company requires letters of credit on certain non-U.S. sales arrangements. Receivables generally are due within 30 to 90 days from the date of invoice.

*Receivable Purchase Agreement*

In December 2017, the Company entered into a Receivable Purchase Agreement with a financial institution to sell certain of its trade receivables from customers without recourse, up to \$23.0 million at any point in time for a term of one year. Under the terms of the agreement, the Company may offer to sell certain eligible accounts receivable (the "Receivables") to the financial institution (the "Purchaser"), which may accept such offer, and purchase the offered Receivables. The Purchaser will assume credit risk of the Receivables purchased; provided, however, the Company will service the Receivables, and as such servicer, collect and otherwise enforce the Receivables on behalf of the Purchaser. Pursuant to this agreement, the Company sold \$15.0 million of Receivables during the year ended December 31, 2017 and maintained \$8.0 million available under the agreement for additional sales of Receivables as of December 31, 2017. The sale of accounts receivable under the agreement is reflected as a reduction of accounts receivable in the Company's Consolidated Balance Sheet at the time of sale and any fees for the sale of trade receivables were not material for the periods presented.

*Suppliers*

The Company outsources certain functions to third parties, including the manufacture of some of its MOCVD and Ultratech systems. While the Company primarily relies on one supplier for the manufacturing of these systems, the Company maintains a minimum level of internal manufacturing capability for these systems. The failure of the Company's present suppliers to meet their contractual obligations under their supply arrangements and the Company's inability to make alternative arrangements or resume the manufacture of these systems could have a material adverse effect on the Company's revenues, profitability, cash flows, and relationships with its customers.

In addition, certain of the components and sub-assemblies included in the Company's products are obtained from a single source or a limited group of suppliers. The Company's inability to develop alternative sources, if necessary, could result in a prolonged interruption in supply or a significant increase in the price of one or more components, which could adversely affect the Company's operating results.



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**Veeco Instruments Inc. and Subsidiaries**

**Notes to Consolidated Financial Statements (Continued)**

The Company had deposits with its suppliers of \$7.6 million and \$7.8 million at December 31, 2017 and 2016, respectively, that were included in Prepaid expenses and other current assets on the Consolidated Balance Sheets.

*Purchase Commitments*

The Company had purchase commitments of \$181.0 million at December 31, 2017, substantially all of which will come due within one year. Purchase commitments are primarily for inventory used in manufacturing products, and are partially offset by existing deposits with suppliers.

*Bank Guarantees*

The Company has bank guarantees and letters of credit issued by a financial institution on its behalf as needed. At December 31, 2017, outstanding bank guarantees and letters of credit totaled \$6.5 million, and unused bank guarantees and letters of credit of \$66.5 million were available to be drawn upon.

**Note 12 Debt**

*Mortgage Payable*

At December 31, 2016, the Company had a mortgage note payable associated with its property in St. Paul, Minnesota, which, during the third quarter of 2017 was fully extinguished in connection with the sale of the building. The carrying value of the property exceeded the carrying value of the mortgage note of \$1.2 million at December 31, 2016. The annual interest rate on the note was 7.91%.

*Convertible Senior Notes*

On January 10, 2017, the Company issued \$345.0 million of 2.70% convertible senior unsecured notes (the Convertible Senior Notes). The Company received net proceeds, after deducting underwriting discounts and fees and expenses payable by the Company, of approximately \$335.8 million. The Convertible Senior Notes bear interest at a rate of 2.70% per year, payable semiannually in arrears on January 15 and July 15 of each year, commencing on July 15, 2017. The Convertible Senior Notes mature on January 15, 2023 (the Maturity Date), unless

earlier purchased by the Company, redeemed, or converted.

The Convertible Senior Notes are unsecured obligations of Veeco and rank senior in right of payment to any of Veeco's subordinated indebtedness; equal in right of payment to all of Veeco's unsecured indebtedness that is not subordinated; effectively subordinated in right of payment to any of Veeco's secured indebtedness to the extent of the value of the assets securing such indebtedness; and structurally subordinated to all indebtedness and other liabilities (including trade payables) of Veeco's subsidiaries.

The Convertible Senior Notes are convertible into cash, shares of the Company's common stock, or a combination thereof, at the Company's election, upon the satisfaction of specified conditions and during certain periods as described below. The initial conversion rate is 24.9800 shares of the Company's common stock per \$1,000 principal amount of Convertible Senior Notes, representing an initial effective conversion price of \$40.03 per share of common stock. The conversion rate may be subject to adjustment upon the occurrence of certain specified events as provided in the indenture governing the Convertible Senior Notes, dated January 18, 2017 between the Company and U.S. Bank National Association, as trustee, but will not be adjusted for accrued but unpaid interest.

Holders may convert all or any portion of their notes, in multiples of one thousand dollar principal amount, at their option at any time prior to the close of business on the business day immediately preceding October 15, 2022 only under the following circumstances:

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**Veeco Instruments Inc. and Subsidiaries**

**Notes to Consolidated Financial Statements (Continued)**

- (i) During any calendar quarter (and only during such calendar quarter), if the last reported sale price of the common stock for at least 20 trading days (whether or not consecutive) during a period of 30 consecutive trading days ending on the last trading day of the immediately preceding calendar quarter is greater than or equal to 130% of the conversion price on each applicable trading day;
- (ii) During the five consecutive business day period after any five consecutive trading day period (the measurement period ) in which the trading price per one thousand dollar principal amount of Convertible Senior Notes for each trading day of the measurement period was less than 98% of the product of the last reported sale price of Veeco's common stock and the conversion rate on each such trading day;
- (iii) If the Company calls any or all of the Convertible Senior Notes for redemption at any time prior to the close of business on the scheduled trading day immediately preceding the redemption date; or
- (iv) Upon the occurrence of specified corporate events.

On or after October 15, 2022, until the close of business on the business day immediately preceding the Maturity Date, holders may convert their notes at any time, regardless of the foregoing circumstances.

Upon conversion by the holders, the Company may elect to settle such conversion in shares of its common stock, cash, or a combination thereof. As a result of its cash conversion option, the Company segregated the liability component of the instrument from the equity component. The liability component was measured by estimating the fair value of a non-convertible debt instrument that is similar in its terms to the Convertible Senior Notes. The calculation of the fair value of the debt component required the use of Level 3 inputs, including utilization of convertible investors' credit assumptions and high yield bond indices. Fair value was estimated through discounting future interest and principal payments, an income approach, due under the Convertible Senior Notes at a discount rate of 7.00%, an interest rate equal to the estimated borrowing rate for similar non-convertible debt. The excess of the aggregate face value of the Convertible Senior Notes over the estimated fair value of the liability component of \$72.5 million was recognized as a debt discount and recorded as an increase to additional paid-in capital, and will be amortized over the expected life of the Convertible Senior Notes using the effective interest rate method. Amortization of the debt discount is recognized as non-cash interest expense.

The transaction costs of \$9.2 million incurred in connection with the issuance of the Convertible Senior Notes were allocated to the liability and equity components based on their relative values. Transaction costs allocated to the liability component are being amortized using the effective interest rate method and recognized as non-cash interest expense over the expected term of the Convertible Senior Notes. Transaction costs allocated to the equity component of \$1.9 million reduced the value of the equity component recognized in stockholders' equity.

The carrying value of the Convertible Senior Notes is as follows:

	<b>December 31, 2017 (in thousands)</b>	
Principal amount	\$	345,000
Unamortized debt discount		(63,022)
Unamortized transaction costs		(6,348)
<b>Net carrying value</b>	<b>\$</b>	<b>275,630</b>

Total interest expense related to the Convertible Senior Notes is as follows:

Table of Contents**Veeco Instruments Inc. and Subsidiaries****Notes to Consolidated Financial Statements (Continued)**

	<b>For the year ended December 31, 2017 (in thousands)</b>	
<b>Cash Interest Expense</b>		
Coupon interest expense	\$	8,901
<b>Non-Cash Interest Expense</b>		
Amortization of debt discount		9,490
Amortization of transaction costs		956
<b>Total Interest Expense</b>	<b>\$</b>	<b>19,347</b>

The Company determined the Convertible Senior Notes is a Level 2 liability in the fair value hierarchy and estimated its fair value as \$300.7 million at December 31, 2017.

**Note 13 Derivative Financial Instruments**

The Company is exposed to financial market risks arising from changes in currency exchange rates. Changes in currency exchange rate changes could affect the Company's foreign currency denominated monetary assets and liabilities and forecasted cash flows. The Company entered into monthly forward derivative contracts with the intent of mitigating a portion of this risk. The Company only used derivative financial instruments in the context of hedging and not for speculative purposes and had not designated its foreign exchange derivatives as hedges. Accordingly, changes in fair value from these contracts were recorded as Other, net in the Company's Consolidated Statements of Operations. The Company executed derivative transactions with highly rated financial institutions to mitigate counterparty risk.

A summary of the foreign exchange derivatives outstanding on December 31, 2017 is as follows:

	<b>Fair Value</b>	<b>Maturity Dates (in thousands)</b>	<b>Notional Amount</b>
Foreign currency exchange forwards	\$	January 2018	\$ 622

The Company did not have any outstanding derivative contracts at December 31, 2016.

The following table shows the gains and (losses) from currency exchange derivatives during the years ended December 31, 2017, 2016, and 2015, which are included in Other, net in the Consolidated Statements of Operations:

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	2017	Year ended December 31, 2016		2015
		(in thousands)		
Foreign currency exchange forwards	\$ (6)	\$	219	\$

**Note 14 Stockholders Equity**

*Accumulated Other Comprehensive Income*

The following table presents the changes in the balances of each component of AOCI, net of tax:

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## Veeco Instruments Inc. and Subsidiaries

## Notes to Consolidated Financial Statements (Continued)

	Foreign Currency Translation	Minimum Pension Liability	Unrealized Gains (Losses) on Available for Sale Securities	Total
		(in thousands)		
<b>Balance - December 31, 2014</b>	\$ 2,333	\$ (881)	\$ 17	\$ 1,469
Other comprehensive income (loss)	(87)	15	(49)	(121)
<b>Balance - December 31, 2015</b>	2,246	(866)	(32)	1,348
Other comprehensive income (loss), before reclassifications	(19)		(6)	(25)
Amounts reclassified from AOCI	(430)	866	18	454
Other comprehensive income (loss)	(449)	866	12	429
<b>Balance - December 31, 2016</b>	1,797		(20)	1,777
Other comprehensive income (loss)	42		(7)	35
<b>Balance - December 31, 2017</b>	\$ 1,839	\$	\$ (27)	\$ 1,812

The Company did not allocate additional tax expense (benefit) to other comprehensive income (loss) for all years presented as the Company is in a full valuation allowance position such that a deferred tax asset related to amounts recognized in other comprehensive income is not regarded as realizable on a more-likely-than-not basis.

During 2016, the Company finalized the process to terminate a defined benefit plan. As a result, the Company reclassified the minimum pension liability of \$0.9 million, net of a tax benefit of \$0.4 million, from Accumulated other comprehensive income in the Consolidated Balance Sheets to Other, net in the Consolidated Statements of Operations. Additionally the Company completed its plan to liquidate one of its subsidiaries in Korea. As a result of this liquidation, a cumulative translation gain of \$0.4 million was reclassified from Accumulated other comprehensive income to Other, net in the Consolidated Statements of Operations.

*Preferred Stock*

The Board of Directors has authority under the Company's Certificate of Incorporation to issue shares of preferred stock, par value \$0.01, with voting and economic rights to be determined by the Board of Directors. As of December 31, 2017, no preferred shares have been issued.

*Treasury Stock*

The share repurchase program authorized by our Board of Directors in October 2015 expired on October 28, 2017. On December 11, 2017, our Board of Directors authorized a new program to repurchase up to \$100 million of our common stock to be completed through December 11, 2019. At December 31, 2017, \$3.0 million of the \$100 million had been utilized, of which approximately \$0.1 million is included in Accrued expenses and other current liabilities on the Consolidated Balance Sheets as of December 31, 2017. Repurchases are expected to be made from

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time to time in the open market or in privately negotiated transactions in accordance with applicable federal securities laws.

The Company records treasury stock purchases under the cost method using the first-in, first-out ( FIFO ) method. Upon reissuance of treasury stock, amounts in excess of the acquisition cost are credited to additional paid-in capital. If the Company reissues treasury stock at an amount below its acquisition cost and if additional paid-in capital associated with prior treasury stock transactions is insufficient to cover the difference between the acquisition cost and the reissue price, this difference is charged to accumulated deficit.

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**Veeco Instruments Inc. and Subsidiaries**

**Notes to Consolidated Financial Statements (Continued)**

**Note 15 Stock Plans**

Share-based incentive awards are provided to employees under the terms of the Company's equity incentive compensation plans (the Plans), which are administered by the Compensation Committee of the Board of Directors. The 2010 Plan was approved by the Company's shareholders. The Company's employees, non-employee directors, and consultants are eligible to receive awards under the 2010 Stock Incentive Plan (as amended to date, the 2010 Plan), which can include non-qualified stock options, incentive stock options, restricted share awards (RSAs), restricted share units (RSUs), performance share awards (PSAs), performance share units (PSUs), share appreciation rights, dividend equivalent rights, or any combination thereof. The Company settles awards under the Plans with newly issued shares or with shares held in treasury.

In 2013, the Board of Directors granted equity awards to certain employees under the Company's 2013 Inducement Stock Incentive Plan (the Inducement Plan). The Company issued 124,500 stock option shares and 87,000 RSUs under this plan. Stock options under this plan vest over a three year period and have a 10-year term, and RSUs under this plan vest over a two or four year period. At December 31, 2013, the Inducement Plan was merged into the 2010 Plan and is considered an inactive plan with no further shares available for grant. At December 31, 2017 there are 2,000 option shares and no RSUs outstanding under the Inducement Plan.

The Company is authorized to issue up to 10.6 million shares under the 2010 Plan, including additional shares authorized under plan amendments approved by shareholders in 2016 and 2013. Option awards are granted with an exercise price equal to the closing price of the Company's common stock on the trading day prior to the date of grant; option awards generally vest over a three year period and have a seven or ten year term. RSAs and RSUs generally vest over one to five years. Certain option and share awards provide for accelerated vesting if there is a change in control, as defined in the 2010 Plan. At December 31, 2017, there are 1.4 million option shares and 0.6 million RSUs and PSUs outstanding under the 2010 Plan.

During 2016 the Company's Board of Directors approved the 2016 Employee Stock Purchase Plan (ESPP). The Company is authorized to issue up to 750,000 shares under the ESPP. Under the ESPP, substantially all employees in the U.S. may purchase the Company's common stock through payroll deductions at a price equal to 85 percent of the lower of the fair market value of the Company's common stock at the beginning or end of each six-month Offer Period, as defined in the ESPP, and subject to certain limits. The ESPP was approved by the Company's shareholders.

During 2017, in connection with the acquisition of Ultratech, the Company assumed certain restricted stock units (the Assumed RSUs) available and outstanding under the Ultratech, Inc. 1993 Stock Option/Stock Issuance Plan, as amended (the Ultratech Plan). The Assumed RSUs remain subject to the terms set forth in the award agreement governing the award and the Ultratech Plan, except that the Assumed RSUs relate to shares of Company common stock and the number of restricted stock units was adjusted pursuant to the terms of the acquisition to reflect the difference in the value of a share of Company common stock and a share of Ultratech common stock prior to closing the acquisition. The Assumed RSUs were converted into 338,144 restricted stock units of the Company, and generally vest over 50 months. After the acquisition and notwithstanding any other provisions of the Ultratech Plan, no further grants will be made under the Ultratech Plan, and the Company is solely maintaining the Ultratech Plan with respect to the Assumed RSUs. At December 31, 2017, there are 0.1 million RSUs outstanding under the assumed Ultratech Plan.

*Shares Reserved for Future Issuance*

At December 31, 2017, the Company has 5.7 million shares reserved to cover exercises of outstanding stock options, vesting of RSUs, and additional grants under the 2010 Plan. At December 31, 2017, the Company has 0.5 million shares reserved to cover future issuances under the ESPP Plan.

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Table of Contents**Veeco Instruments Inc. and Subsidiaries****Notes to Consolidated Financial Statements (Continued)***Share-Based Compensation*

The Company recognized share-based compensation in the following line items in the Consolidated Statements of Operations for the periods indicated:

	2017	For the year ended December 31, 2016		2015
		(in thousands)		
Cost of sales	\$ 2,505	\$ 1,956	\$ 2,495	
Research and development	2,957	3,324	4,031	
Selling, general, and administrative	12,851	10,433	11,474	
Restructuring	1,880			
Acquisition costs	4,203			
<b>Total</b>	<b>\$ 24,396</b>	<b>\$ 15,713</b>	<b>\$ 18,000</b>	

The Company did not realize any tax benefits associated with share-based compensation for the years ended December 31, 2017, 2016, and 2015, due to the full valuation allowance on its U.S. deferred tax assets. See Note 17, *Income Taxes* for additional information. The Company capitalized an insignificant amount of share-based compensation into inventory for the years ended December 31, 2017, 2016, and 2015.

Unrecognized share-based compensation costs at December 31, 2017 are summarized below:

	Unrecognized Share-Based Compensation Costs (in thousands)	Weighted Average Period Expected to be Recognized (in years)
Stock option awards	\$ 12	0.3
Restricted stock units	6,157	2.8
Restricted stock awards	21,656	2.6
Performance share units	4,685	2.1
<b>Total unrecognized share-based compensation cost</b>	<b>\$ 32,510</b>	<b>2.7</b>

*Stock Option Awards*

Stock options are awards issued to employees that entitle the holder to purchase shares of the Company's stock at a fixed price. At December 31, 2017, options outstanding that have vested and are expected to vest are as follows:

	Number of Shares (in thousands)	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life (in years)	Aggregate Intrinsic Value (in thousands)
Vested	1,389	\$34.99	3.9	
Expected to vest	5	30.18	4.2	
Total	1,394	\$34.97	3.9	

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## Veeco Instruments Inc. and Subsidiaries

## Notes to Consolidated Financial Statements (Continued)

The aggregate intrinsic value represents the difference between the option exercise price and \$14.85, the closing price of the Company's common stock on December 29, 2017, the last trading day of the Company's fiscal year as reported on the NASDAQ Stock Market.

Additional information with respect to stock option activity:

	Number of Shares (in thousands)	Weighted Average Exercise Price
<b>Balance - December 31, 2014</b>	2,391	\$ 31.65
Granted	17	30.22
Exercised	(192)	12.95
Expired or forfeited	(152)	38.15
<b>Balance - December 31, 2015</b>	2,064	32.91
Granted		
Exercised	(194)	12.18
Expired or forfeited	(294)	34.44
<b>Balance - December 31, 2016</b>	1,576	35.18
Granted		
Exercised	(18)	30.03
Expired or forfeited	(164)	37.47
<b>Balance - December 31, 2017</b>	1,394	\$ 34.97

The following table summarizes stock option information at December 31, 2017:

Range of Exercise Prices	Shares (in thousands)	Options Outstanding			Options Exercisable			
		Aggregate Intrinsic Value (in thousands)	Weighted Average Remaining Contractual Life (in years)	Weighted Average Exercise Price	Aggregate Intrinsic Value (in thousands)	Weighted Average Remaining Contractual Life (in years)	Weighted Average Exercise Price	
\$20.00 - \$30.00	25	\$	5.0	\$ 28.13	23	\$	5.0	\$ 28.03
\$30.01 - \$40.00	1,197		4.0	32.84	1,194		4.0	32.84
\$40.01 - \$50.00	39		1.3	48.05	39		1.3	48.05
\$50.01 - \$60.00	133		3.3	51.70	133		3.3	51.70
	1,394		3.9	\$ 34.97	1,389	\$	3.9	\$ 34.99

The fair value of each option is estimated on the date of grant using the Black-Scholes option pricing model.

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Estimates of fair value are not intended to predict actual future events or the value ultimately realized by employees who receive equity awards. No options were granted in 2017 or 2016. The weighted average estimated values of employee stock option grants as well as the weighted average assumptions that were used in calculating such values during fiscal year 2015 was based on estimates at the date of grant as follows:

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Table of Contents**Veeco Instruments Inc. and Subsidiaries****Notes to Consolidated Financial Statements (Continued)**

	Year ended December 31, 2015	
Weighted average fair value	\$	10.58
Dividend yield		0%
Expected volatility factor(1)		44%
Risk-free interest rate(2)		1.18%
Expected life (in years)(3)		3.9

(1) Expected volatility is measured using historical daily price changes of the Company's stock over the respective expected term of the options and the implied volatility derived from the market prices of the Company's traded options.

(2) The risk-free rate for periods within the contractual term of the stock options is based on the U.S. Treasury yield curve in effect at the time of grant.

(3) The expected life is the number of years the Company estimates that options will be outstanding prior to exercise. The Company's computation of expected life was determined using a lattice-based model incorporating historical post vest exercise and employee termination behavior.

The following table summarizes information on options exercised for the periods indicated:

	Year ended December 31,		
	2017	2016	2015
	(in thousands)		
Cash received from options exercised	\$ 431	\$ 494	\$ 2,233
Intrinsic value of options exercised	\$ 51	\$ 1,165	\$ 2,089

*RSAs, RSUs, PSAs, PSUs*

RSAs are stock awards issued to employees that are subject to specified restrictions and a risk of forfeiture. RSUs are stock awards issued to employees that entitle the holder to receive shares of common stock as the awards vest. PSAs and PSUs are awards that result in a payment to a grantee in shares of common stock if certain performance goals and vesting criteria are achieved. These awards typically vest over one to five years and vesting is subject to the grantee's continued service with the Company and, in the case of performance awards, meeting the performance condition. The fair value of the awards is determined and fixed based on the closing price of the Company's common stock on the trading day prior to the date of grant.

The following table summarizes the equity activity of non-vested restricted shares and performance shares:

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## Veeco Instruments Inc. and Subsidiaries

## Notes to Consolidated Financial Statements (Continued)

	Number of Shares (in thousands)	Weighted Average Grant Date Fair Value
<b>Balance - December 31, 2014</b>	1,237	\$ 34.27
Granted	672	30.33
Vested	(389)	35.65
Forfeited	(122)	34.46
<b>Balance - December 31, 2015</b>	1,398	31.97
Granted	1,166	17.59
Vested	(349)	32.73
Forfeited	(266)	27.31
<b>Balance - December 31, 2016</b>	1,949	23.85
Granted	674	29.22
Performance award adjustments	(25)	20.95
Assumed from Ultratech	338	31.75
Vested	(831)	27.67
Forfeited	(225)	26.29
<b>Balance - December 31, 2017</b>	1,880	\$ 25.41

For performance awards, the final number of shares earned will vary depending on the achievement of the actual results relative to the performance targets. Each performance award is included in the table above at the grant date target share amount until the end of the performance period (if not previously forfeited). The total fair value of shares that vested during the years ended December 31, 2017, 2016, and 2015 was \$22.3 million, \$7.5 million, and \$9.6 million, respectively.

*Employee Stock Purchase Plan*

For the years ended December 31, 2017 and 2016, the Company received cash proceeds of \$2.6 million and \$1.2 million, and issued shares of 163,000 and 83,000, respectively, under the ESPP Plan. The weighted average estimated values of employee purchase rights as well as the weighted average assumptions that were used in calculating such values during fiscal years 2017 and 2016 were based on estimates at the date of grant as follows:

	Year ended December 31,			
	2017		2016	
Weighted average fair value	\$	7.09	\$	4.45
Dividend yield		0%		0%
Expected volatility factor(1)		36%		43%
Risk-free interest rate(2)		0.99%		0.35%
Expected life (in years)(3)		0.5		0.5

- (1) Expected volatility is measured using historical daily price changes of the Company's stock over the respective expected term of the options and the implied volatility derived from the market prices of the Company's traded options.
- (2) The risk-free rate for periods within the contractual term of the stock options is based on the U.S. Treasury yield curve in effect at the time of grant.
- (3) The expected life is the number of years the Company estimates that options will be outstanding prior to exercise. The Company's computation of expected life was determined using a lattice-based model incorporating historical post vest exercise and employee termination behavior.

Table of Contents**Veeco Instruments Inc. and Subsidiaries****Notes to Consolidated Financial Statements (Continued)****Note 16 Retirement Plans**

The Company maintains a defined contribution plan for the benefit of its U.S. employees. The plan is intended to be tax qualified and contains a qualified cash or deferred arrangement as described under Section 401(k) of the Internal Revenue Code. Eligible participants may elect to contribute a percentage of their base compensation, and the Company may make matching contributions, generally equal to fifty cents for every dollar employees contribute, up to the lesser of three percent of the employee's eligible compensation or three percent of the maximum the employee is permitted to contribute under then current Internal Revenue Code limitations. Generally, the plan calls for vesting in the Company contributions over the initial five years of a participant's employment. In addition, the Company assumed Ultratech's 401(k) plan as a result of the merger, and Ultratech's plan was merged into the Company's existing plan effective January 1, 2018. The Company recognized costs associated with these plans of approximately \$2.7 million, \$2.6 million, and \$2.5 million for the years ended December 31, 2017, 2016, and 2015, respectively.

During 2016, the Company finalized the process to terminate a defined benefit plan it had acquired in the year 2000. The plan had been frozen as of September 30, 1991, and no further benefits had been accrued by participants since that date. In connection with the termination, responsibility for the payment of benefits under the plan was transferred to an insurance company. As a result, the Company reclassified the minimum pension liability of \$0.9 million, net of a tax benefit of \$0.4 million, from Accumulated other comprehensive income in the Consolidated Balance Sheets to Other, net in the Consolidated Statements of Operations.

**Note 17 Income Taxes**

The amounts of income (loss) before income taxes attributable to domestic and foreign operations were as follows:

	2017	Year ended December 31, 2016		2015
		(in thousands)		
Domestic	\$ (96,809)	\$	(123,021)	\$ (53,553)
Foreign	15,909		3,577	30,907
Total	\$ (80,900)	\$	(119,444)	\$ (22,646)

Significant components of the expense (benefit) for income taxes consisted of the following:

	2017	Year ended December 31, 2016		2015
		(in thousands)		

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Current:			
Federal	\$	\$	\$ 139
Foreign	(2,246)	1,937	6,952
State and local	15	(111)	(407)
Total current expense (benefit) for income taxes	(2,231)	1,826	6,684
Deferred:			
Federal	(34,786)	1,459	2,104
Foreign	1,652	(646)	516
State and local	(742)	127	28
Total deferred expense (benefit) for income taxes	(33,876)	940	2,648
Total expense (benefit) for income taxes	\$ (36,107)	\$ 2,766	\$ 9,332

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Table of Contents**Veeco Instruments Inc. and Subsidiaries****Notes to Consolidated Financial Statements (Continued)**

The income tax expense was reconciled to the tax expense computed at the U.S. federal statutory tax rate as follows:

	2017	Year ended December 31, 2016	2015
		(in thousands)	
Income tax expense (benefit) at U.S. statutory rates	\$ (28,315)	\$ (41,806)	\$ (7,926)
State taxes, net of U.S. federal impact	(2,523)	(1,963)	(1,607)
Effect of international operations	9,355	8,849	(7,659)
Research and development tax credit	620	(801)	(1,628)
Net change in valuation allowance	1,342	50,520	23,655
Change in accrual for unrecognized tax benefits	(4,772)	(1,700)	4,876
Subsidiary liquidation		(12,435)	
Share-based compensation	99	2,133	
Effect of 2017 Tax Act	(11,344)		