Technology for Productivity

MKS INSTRUMENTS, INC.

ANNUAL REPORT 2013

MKS INSTRUMENTS, INC. (NASDAQ: MKSI) is a global provider of instruments, subsystems and process control solutions that measure, control, power, monitor and analyze critical parameters of advanced manufacturing processes to improve process performance and productivity.

FINANCIAL HIGHLIGHTS

SELECTED CONSOLIDATED FINANCIAL DATA
(in thousands, except per share data)

Year Ended December 31,	2013	2012	2011	2010	2009
Statement of Operations					
Net sales	$ 669,420	$ 643,508	$ 822,517	$ 853,114	$ 392,693
Gross profit	266,574	269,479	374,988	378,638	130,216
Income (loss) from operations (1)	58,387	74,223	184,925	195,507	(171,661)
Income (loss) from continuing operations	35,776	48,029	129,731	132,919	(149,361)
Income (loss) from discontinued operations,					
Net of taxes (2)	—	—	—	9,668	(63,298)
Net income (loss) (3)	$ 35,776	$ 48,029	$ 129,731	$ 142,587	$ (212,659)
Diluted income (loss) per share					
Continuing operations	$ 0.67	$ 0.90	$ 2.45	$ 2.61	$ (3.03)
Net income (loss)	$ 0.67	$ 0.90	$ 2.45	$ 2.80	$ (4.31)
Non-GAAP net earnings (loss)	48,388	53,337	127,930	133,407	(1,621)
Non-GAAP net earnings (loss) per share	$ 0.90	$ 1.00	$ 2.42	$ 2.62	$ (0.03)
Cash dividends paid per common share	$ 0.64	$ 0.62	$ 0.60	—	—
Balance Sheet					
Cash and cash equivalents	$ 278,502	$ 287,588	$ 312,916	$ 162,476	$ 111,009
Short-term investments	311,115	327,653	252,603	269,457	160,786
Working capital	748,010	788,871	788,470	643,209	461,581
Long-term investments	60,405	12,158	7,873	—	4,853
Total assets (4)	1,213,018	1,152,562	1,139,935	982,413	774,069
Short-term obligations	—	—	1,932	—	12,885
Stockholders' equity	$ 1,021,523	$ 1,012,156	$ 990,012	$ 847,039	$ 684,933

(1) Income from operations for 2013 includes $1.4 million of restructuring charges and $1.1 million from an insurance reimbursement related to a 2012 litigation settlement. Income from operations for 2012 includes $5.3 million for litigation settlements and $1.3 million of acquisition related costs from our acquisition of Plasmart, Inc. in August 2012. Loss from operations for 2009 includes an impairment charge of $143.0 million related to the write-down of goodwill, intangible and long-lived assets, and $5.5 million of restructuring charges.

(2) Income from discontinued operations, net of taxes for 2010, includes a $4.4 million gain on the sale of the two discontinued product lines. Loss from discontinued operations, net of taxes for 2009, includes charges related to the discontinued product lines of $53.8 million for the goodwill impairment and $7.3 million for the intangible assets impairment.

(3) Net income for 2013 includes charges, net of tax, of $0.9 million of restructuring costs and a benefit, net of tax, of $0.7 million for an insurance reimbursement related to a 2012 litigation settlement and $0.8 million of acquisition related costs. Net income for 2012 includes charges, net of tax, of $3.3 million for litigation settlements and $0.8 million of acquisition related costs. Net loss for 2009 includes charges, net of tax, of $202.7 million related to the write-down of goodwill, intangible and long-lived assets, and $3.6 million of restructuring charges.

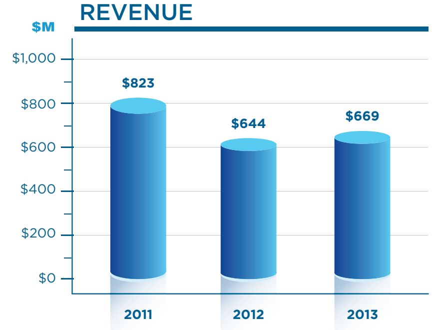
(4) For the year ended December 31, 2012 and 2011, total assets have been revised to adjust for a prior period error related to uncertain tax positions, which had been shown net instead of gross in the balance sheet.

Non-GAAP net earnings (loss) and Non-GAAP net earnings (loss) per share amounts exclude discontinued operations, certain excess and obsolete inventory adjustments, amortization of acquired intangible assets, costs associated with acquisitions and disposition related charges, restructuring charges, litigation settlements, a benefit related to an insurance reimbursement, certain supplemental executive retirement costs, and certain adjustments to income taxes. These non-GAAP measures are not in accordance with Accounting Principles Generally Accepted in the United States of America (GAAP). MKS management believes the presentation of these non-GAAP financial measures is useful to investors for comparing prior periods and analyzing ongoing business trends and operating results.

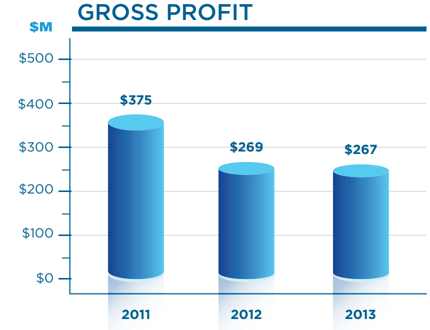
Special Note Regarding Forward-Looking Statements: MKS management believes that this Annual Report on Form 10-K contains "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995, Section 27A of the Securities Act and Section 21E of the Securities Exchange Act. When used herein, the words "believe," "anticipate," "plan," "expect," "estimate," "intend," "may," "see," "will," "would" and similar expressions are intended to identify forward-looking statements. These forward-looking statements reflect management's current opinions and are subject to certain risks and uncertainties that could cause actual results to differ materially from those stated or implied. MKS assumes no obligation to update this information. Risks and uncertainties include, but are not limited to, those discussed in the section entitled "Risk Factors."

PERFORMANCE & PROFITABILITY

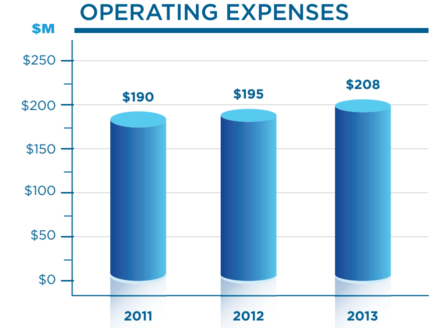
REVENUE



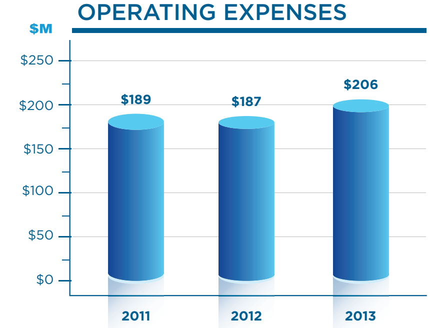
GROSS PROFIT



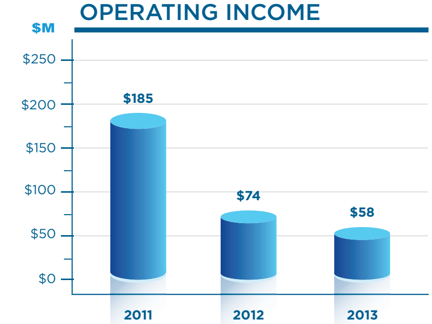
OPERATING EXPENSES



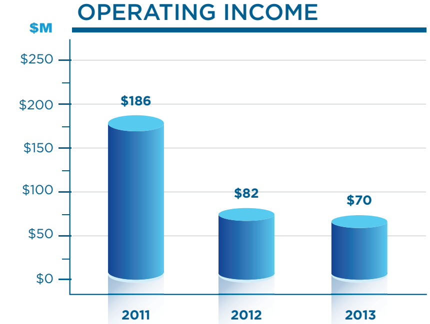
NON-GAAP OPERATING EXPENSES



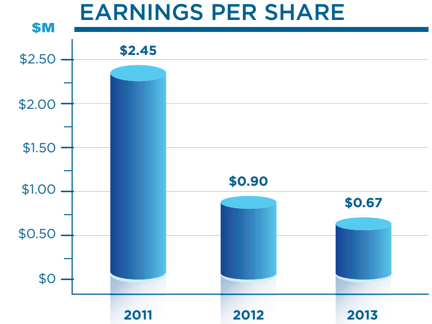
OPERATING INCOME



NON-GAAP OPERATING INCOME



EARNINGS PER SHARE



NON-GAAP EARNINGS PER SHARE

TO OUR SHAREHOLDERS

2013 ended on a high note. Sales increased each quarter, we introduced new products, acquired new technologies, and increased customer satisfaction with improvements in quality and reliability. Furthermore, we added new customers, achieved significant design wins, and initiated programs to work closer with the end users of our products. It is an exciting time at MKS as we sharpen our focus on strategic direction and growth.

At MKS, we have had a great history of achievement, and I am proud that for 31 years I have had the opportunity to contribute to this success. Under my leadership as CEO, we will continue our commitment to disciplined financial and operational execution, as well as to invest in new and existing markets. We will build on our past successes, but with a refined plan for the future.

We will manage MKS to continue to be the global leader in vacuum and related technology solutions to address the needs of semiconductor, thin film and other advanced markets. We will achieve this by concentrating on the following:

- Customer satisfaction
- Innovative technology solutions
- Brand leadership
- Sustainable and profitable growth
- Teamwork

Our plan is to strengthen our frontrunner position by targeting our efforts based on the principles above. First we want to **extend and amplify our initiatives in the area of customer satisfaction.** Long-term customer relationships are the foundation of our business and this has been a priority for MKS. Our primary focus has been, and will continue to be, on our semiconductor OEM customers, as well as on device makers, where we will continue to strengthen our close working relationships. Semiconductor chips continue to grow in importance and application in our everyday lives, and we are well positioned to continue to enable the technological advancements needed, and to benefit from the industry as it grows.

Second we will **invest in talent and infrastructure to develop and provide innovative technology solutions** in our core markets—as well as new ones. Closer relationships with our customers help us understand the issues they face and apply that insight as we develop products which are not only innovative but address real needs.

In the markets we serve, our reputation is as an innovator of leading edge, advanced instrumentation and technologies which, enabled by our investments in operational efficiency, are delivered with great flexibility to support the cyclical nature of our industries.

We plan to **extend this brand recognition** more extensively into our current markets, as well as into the new markets we are targeting.

Fundamental to success is financial performance, and we will **direct and manage the business for sustainable and profitable growth,** by expanding our core business and continuing to invest in, and expand into, other high-potential advanced markets. We will focus on capital deployment as a key strategic differentiator for MKS. Over the years we have demonstrated our ability to generate significant cash flows, and since 2007, we have generated nearly $700 million in free cash flow and have returned $330 million of that to shareholders through stock repurchases and dividends. We have purchased $16 million of stock under our current program which is authorized for up to $200 million. We are committed to deploying capital to the long-term benefit of our shareholders.

Lastly, though by far not the least important, is **teamwork—for all of our MKS team members to work with common goals and objectives,** and harness the strength and power of our people and our company. We have a deep bench of highly capable managers and employees across the globe, and I have never been more confident in our company's ability to deliver results and respond to changes in the marketplace, whether technological, operational, financial or strategic.

I am proud and excited to be leading MKS as CEO, and in closing, I want to thank you, our customers, employees and shareholders, for your continued support of MKS.

Gerald G. Colella

Gerald G. Colella
Chief Executive Officer and President

EXECUTIVE LEADERSHIP TEAM (L-R): Kathleen Burke (Vice President and General Counsel), John Ippolito (Vice President, Corporate Development), Seth Bagshaw (Vice President, Chief Financial Officer and Treasurer), Eric Snyder (Vice President, Quality and Reliability), Gerald Colella (Chief Executive Officer and President), John T.C. Lee (Senior Vice President, Business Units), Brian Quirk (Senior Vice President, Global Operations), Catherine Langtry (Vice President, Global Human Resources), John Abrams (Senior Vice President, Global Sales)

RECONCILIATION

RECONCILIATION OF GAAP INCOME (LOSS) FROM CONTINUING OPERATIONS TO NON-GAAP NET EARNINGS (LOSS)

(in thousands, except per share data)

Year Ended December 31,	2013	2012	2011	2010	2009
Income (loss) from continuing operations	$ 35,776	$ 48,029	$ 129,731	$ 132,919	$ (149,361)
Adjustments (net of tax if applicable)					
Amortization of acquired intangible assets	2,139	1,036	1,015	1,283	2,762
Executive retirement costs	2,581	—	—	—	—
Gain on sale of assets	—	—	—	(682)	—
Excess and obsolete inventory adjustment	6,423	—	—	—	12,900
Restructuring, asset impairment and other charges	1,364	343	—	—	147,225
Special tax (benefit) expense	2,928	—	(2,548)	—	(6,370)
Completed acquisition costs	171	1,258	—	—	—
Acquisition inventory step-up	—	303	—	—	—
Litigation	—	5,316	—	—	—
Insurance reimbursement	(1,071)	—	—	—	—
Tax effect of adjustments	(1,923)	(2,948)	(268)	(113)	(8,777)
Non-GAAP net earnings (loss)	$ 48,388	$ 53,337	$ 127,930	$ 133,407	$ (1,621)

RECONCILIATION OF GAAP OPERATING EXPENSES TO NON-GAAP OPERATING EXPENSES

Year Ended December 31,	2013	2012	2011	2010
GAAP operating expenses	$ 208,187	$ 195,256	$ 190,063	$ 183,131
Adjustments (net of tax if applicable)				
Amortization of acquired intangible assets	(2,139)	(1,036)	(1,015)	(1,283)
Gain on sale of assets	—	—	—	682
Restructuring	(1,364)	(343)	—	—
Completed acquisition costs	(171)	(1,258)	—	—
Acquisition inventory step-up	—	(303)	—	—
Litigation	—	(5,316)	—	—
Insurance reimbursement	1,071	—	—	—
Non-GAAP operating expenses	$ 205,584	$ 187,000	$ 189,048	$ 182,530

RECONCILIATION OF GAAP INCOME FROM OPERATIONS TO NON-GAAP INCOME FROM OPERATIONS

Year Ended December 31,	2013	2012	2011	2010
Income from operations	$ 58,387	$ 74,223	$ 184,925	$ 195,507
Adjustments (net of tax if applicable)				
Amortization of acquired intangible assets	2,139	1,036	1,015	1,283
Executive retirement costs	2,581	—	—	—
Excess and obsolete charge	6,423	—	—	—
Gain on sale of assets	—	—	—	(682)
Restructuring	1,364	343	—	—
Completed acquisition costs	171	1,258	—	—
Acquisition inventory step-up	—	303	—	—
Litigation	—	5,316	—	—
Insurance reimbursement	(1,071)	—	—	—
Non-GAAP income from operations	$ 69,994	$ 82,479	$ 185,940	$ 196,108

RECONCILIATION OF GAAP NET INCOME (LOSS) PER SHARE FROM CONTINUING OPERATIONS TO NON-GAAP NET EARNINGS (LOSS) PER SHARE

Year Ended December 31,	2013	2012	2011	2010	2009
GAAP net income (loss) per share from continuing operations	$ 0.67	$ 0.90	$ 2.45	$ 2.61	$ (3.03)
Adjustments (net of tax if applicable)					
Amortization of acquired intangible assets	0.04	0.02	0.02	0.03	0.06
Executive retirement costs	0.05	—	—	—	—
Gain on sale of assets	—	—	—	(0.01)	—
Excess and obsolete inventory adjustment	0.12	—	—	—	0.26
Restructuring, asset impairment and other charges	0.03	0.01	—	—	2.99
Foreign exchange gain from legal entity restructuring	—	—	—	—	—
Special tax (benefit) expense	0.05	—	(0.05)	—	(0.13)
Completed acquisition costs	—	0.02	—	—	—
Acquisition inventory step-up	—	0.01	—	—	—
Litigation	—	0.10	—	—	—
Insurance reimbursement	(0.02)	—	—	—	—
Tax effect of adjustments	(0.04)	(0.06)	(0.01)	(0.00)	(0.18)
Non-GAAP net earnings (loss) per share	$ 0.90	$ 1.00	$ 2.42	$ 2.62	$ (0.03)
Weighted average shares outstanding	53,481	53,234	52,847	50,927	49,318

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

Form 10-K

(MARK ONE)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the fiscal year ended December 31, 2013

or

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the transition period from to

Commission File number 0-23621

MKS INSTRUMENTS, INC.
(Exact Name of Registrant as Specified in Its Charter)

Massachusetts	**04-2277512**
(State or other Jurisdiction of Incorporation or Organization)	*(IRS Employer Identification No.)*
2 Tech Drive, Suite 201, Andover, Massachusetts	**01810**
(Address of Principal Executive Offices)	*(Zip Code)*

(Registrant's Telephone Number, including area code)
(978) 645-5500

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

Title of class	Name of exchange on which registered
Common Stock, no par value	NASDAQ Global Select 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 (§ 232.405 of this chapter) 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 reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☒

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

Large accelerated filer ☒	Accelerated filer ☐	Non-accelerated filer ☐ (Do not check if a smaller reporting company)	Smaller reporting company ☐

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

Aggregate market value of the voting and non-voting common equity held by nonaffiliates of the registrant as of June 30, 2013 based on the closing price of the registrant's Common Stock on such date as reported by the NASDAQ Global Select Market: $1,410,691,554.

Number of shares outstanding of the issuer's Common Stock, no par value, as of February 19, 2014: 53,389,633

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive Proxy Statement for MKS' Annual Meeting of Stockholders to be held on May 5, 2014 are incorporated by reference into Part III of this Form 10-K.

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995, Section 27A of the Securities Act and Section 21E of the Securities Exchange Act. When used herein, the words "believe," "anticipate," "plan," "expect," "estimate," "intend," "may," "see," "will," "would" and similar expressions are intended to identify forward-looking statements although not all forward looking statements contain these identifying words. These forward-looking statements reflect management's current opinions and are subject to certain risks and uncertainties that could cause actual results to differ materially from those stated or implied. MKS assumes no obligation to update this information. Risks and uncertainties include, but are not limited to, those discussed in the section entitled "Risk Factors" of this annual report on Form 10-K.

PART I

Item 1. *Business*

MKS Instruments, Inc. (the "Company" or "MKS") was founded in 1961 as a Massachusetts corporation. We are a global provider of instruments, subsystems and process control solutions that measure, control, power, monitor and analyze critical parameters of advanced manufacturing processes to improve process performance and productivity. We also provide services relating to the maintenance and repair of our products, software maintenance, installation services and training.

We group our products into four groups of similar products based upon the similarity of product function. These four groups of products are: Instruments and Control Products, Power and Reactive Gas Products, Vacuum Products and Analytical Solutions Group Products. Our products are derived from our core competencies in pressure measurement and control, materials delivery, gas composition analysis, control and information technology, power and reactive gas generation and vacuum technology. Our products are used in diverse markets, applications and processes. Our primary served markets are manufacturers of capital equipment for semiconductor devices, and for other thin film applications including flat panel displays, solar cells, light emitting diodes ("LEDs"), data storage media and other advanced coatings. We also leverage our technology into other markets with advanced manufacturing processes including medical equipment, pharmaceutical manufacturing, energy generation and environmental monitoring.

We have four reportable segments: Advanced Manufacturing Capital Equipment, Analytical Solutions Group, Europe Region Sales & Service and Asia Region Sales & Service. The Advanced Manufacturing Capital Equipment segment includes the development, manufacture, sales and servicing of instruments and control products, power and reactive gas products, materials delivery products and vacuum products, all of which are utilized in semiconductor processing and other similar advanced manufacturing processes. Sales in this segment include both external sales and intercompany sales (which are recorded at agreed upon transfer prices). External sales of these products made in Europe or Asia are reported as sales in the Europe Region Sales & Service or Asia Region Sales & Service segments. The Analytical Solutions Group includes, gas composition analysis, information technology products and custom fabrication services. The Europe and Asia region sales and service segments mainly resell and service the Advanced Manufacturing Capital Equipment and Analytical Solutions Group products sold into their respective regions. For further information on our segments please see Note 21 to the Notes to the Consolidated Financials contained in this Annual Report on Form 10-K.

For over 50 years, we have focused on satisfying the needs of our customers by establishing long-term, collaborative relationships. We have a diverse base of customers that includes manufacturers of semiconductor capital equipment and semiconductor devices, thin film capital equipment used in the manufacture of flat panel displays, LEDs, solar cells, data storage media and other coating applications; and other industrial, medical, pharmaceutical manufacturing, energy generation, environmental monitoring and other advanced manufacturing companies, as well as university, government and industrial research laboratories.

We file reports, proxy statements and other documents with the Securities and Exchange Commission ("SEC"). You may read and copy any document we file at the SEC Headquarters at the Office of Investor Education and Assistance, 100 F Street, NE, Washington, D.C. 20549. You should call 1-800-SEC-0330 for more information on the public reference room. Our SEC filings are also available to you on the SEC's internet site at http://www.sec.gov.

Our internet address is http://www.mksinst.com. We are not including the information contained in our website as part of, or incorporating it by reference into, this annual report on Form 10-K. We make available free of charge through our internet site our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to these reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), as soon as reasonably practicable after we electronically file such materials with, or furnish them to the SEC.

Markets and Applications

We are focused on improving process performance and productivity by measuring, controlling, powering, monitoring and analyzing advanced manufacturing processes in semiconductor, thin film and certain other advanced market sectors. Approximately 68%, 62% and 61% of our net sales for the years 2013, 2012 and 2011, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. Approximately 32%, 38% and 39% of our net sales in the years 2013, 2012 and 2011, respectively, were for other advanced manufacturing applications. These include, but are not limited to, thin film processing equipment applications such as flat panel displays, LEDs, solar cells, data storage media and other thin film coatings as well as medical equipment; pharmaceutical manufacturing, energy generation and environmental monitoring processes; other industrial manufacturing; and university, government and industrial research laboratories.

During the years 2013, 2012 and 2011, international net sales accounted for approximately 46%, 49% and 52% of our net sales, respectively. Net sales by our Japan and Korea subsidiaries were 20%, 23% and 16% for the years 2013, 2012 and 2011, respectively. Long-lived assets, excluding long-term income tax receivables located in the U.S. were $60.7 million, $62.2 million and $56.8 million as of December 31, 2013, 2012 and 2011, respectively. Long-lived assets, excluding long-term income tax receivable located outside the U.S. were $19.0 million, $20.5 million and $17.7 million as of December 31, 2013, 2012 and 2011, respectively.

Semiconductor Manufacturing Applications

The majority of our sales are derived from products sold to semiconductor capital equipment manufacturers and semiconductor device manufacturers. Our products are used in the major semiconductor processing steps such as depositing thin films of material onto silicon wafer substrates and etching and cleaning circuit patterns. In addition, we provide specialized instruments and software to monitor and analyze process performance.

We anticipate that the semiconductor manufacturing market will continue to account for a substantial portion of our sales. While the semiconductor device manufacturing market is global, major semiconductor capital equipment manufacturers are concentrated in Japan, Korea, Taiwan and the United States.

Other Advanced Manufacturing Applications

Our products are used in the manufacture of flat panel displays, LEDs, data storage media, solar cells and other coating applications including architectural glass that require the same or similar thin film processes as semiconductor manufacturing.

Flat Panel Display Manufacturing

Flat panel displays are used in electronic hand-held devices, laptop computers, desktop computer monitors and television sets. We sell products to flat panel display equipment manufacturers and to end-users in the flat panel display market. Major manufacturers of flat panel displays are concentrated in China, Japan, Korea and Taiwan, and major manufacturers of flat panel display equipment are concentrated in Japan and the United States. The transition to larger panel sizes and higher display resolution is driving the need for improved process control to reduce defects.

Light Emitting Diodes

LEDs are made using vacuum processes similar to semiconductor chip manufacturing. Because of their high brightness and long life, as well as environmentally friendly benefits such as lower power consumption, LEDs are expected to experience rapid acceptance in back side lighting of flat screen television displays and are emerging in general lighting applications.

Solar Cells

Our products are used in crystalline silicon and emerging thin film processes to manufacture photovoltaic cells. Crystalline silicon technology requires wafer based deposition systems and is currently the dominant manufacturing technology. Thin film deposition on a non-silicon substrate, such as glass, is the emerging technology.

Data Storage Media

Our products are used to manufacture storage media that store and read data magnetically; optical storage media that store and read data using laser technology; hard disks; data storage devices; and digital video discs.

The transition to higher density storage capacity requires manufacturing processes incorporating tighter process controls. Major manufacturers of storage media are concentrated in Japan and the Asia Pacific region, and major manufacturers of storage media capital equipment are concentrated in Europe, Japan and the United States.

Other Advanced Coatings

Thin film coatings for diverse applications such as architectural glass and packaging are deposited using processes similar to those used in semiconductor manufacturing. Thin film processing manufacturers are concentrated in Europe, Japan and the United States.

Other Advanced Applications

Our products are used in other advanced applications, including energy generation and environmental monitoring processes such as nuclear fuel processing, fuel cell research, greenhouse gas monitoring, and chemical agent detection; medical instrument sterilization; consumable medical supply manufacturing and pharmaceutical applications. Our power delivery products are also incorporated into other end-market products such as medical imaging equipment. In addition, our products are sold to government, university and industrial laboratories for vacuum applications involving research and development in materials science, physical chemistry and electronics materials. Major equipment and process providers and research laboratories are concentrated in Europe, Japan and the United States.

Product Groups

We group our products into four product groups, based upon the similarity of the product function, type of product and manufacturing processes. These four groups of products are: Instruments and Control Products, Power and Reactive Gas Products, Vacuum Products and Analytical Solutions Group Products.

Instruments and Control Products

This product group includes pressure measurement and control, materials delivery and control products.

Pressure Measurement and Control Products. Each of our pressure measurement and control product lines consists of products that are designed for a variety of pressure ranges and accuracies.

Baratron® Pressure Measurement Products. These products are typically used to measure the pressure of the gases being distributed upstream of the process chambers, process chamber pressures and pressures between process chambers, vacuum pumps and exhaust lines. We believe we offer the widest range of gas pressure measurement instruments in the semiconductor and advanced thin film materials processing industries.

Automatic Pressure and Vacuum Control Products. These products enable precise control of process pressure by electronically actuating valves that control the flow of gases in and out of the process chamber to minimize the difference between desired and actual pressure in the chamber.

In most cases, Baratron® pressure measurement instruments provide the pressure input to the automatic pressure control device. Together, these components create an integrated automatic pressure control subsystem. Our pressure control products can also accept inputs from other measurement instruments, enabling the automatic control of gas input or exhaust based on parameters other than pressure.

Materials Delivery Products. Each of our materials delivery product lines combines MKS flow, pressure measurement and control technologies to provide customers with integrated subsystems and precise control capabilities that are optimized for a given application.

Flow Measurement and Control Products. Flow measurement products include gas flow measurement products based upon thermal conductivity and pressure technologies. The flow control products combine the flow measurement device with valve control elements based upon solenoid, piezo-electric and piston pump technologies. These products measure and automatically control the mass flow rate of gases into the process chamber.

Control Products. We design and manufacture a suite of products that allow semiconductor and other manufacturing customers to better control their processes through computer-controlled automation. These products include digital control network products, process chamber, system controllers and connectivity products.

Digital control network products are used to connect sensors, actuators and subsystems to the chamber and system control computers. They support a variety of industry-standard connection methods as well as conventional discrete digital and analog signals. Chamber and system control computers process these signals in real time and allow customers to precisely manage the process conditions.

Connecting sensors, chambers and tools to the factory network is essential for improving quality and productivity. Our connectivity products allow information to flow from the process sensors and subsystems and from the process tool control computer to the factory network. By enabling this information flow, we believe that we help customers optimize their processes through advanced process control, and diagnose equipment problems from a remote location, which is referred to as “e-diagnostics.”

Power and Reactive Gas Products

This group of products includes power delivery and reactive gas generation products used in semiconductor and other thin film applications and in medical imaging equipment applications.

Power Delivery Products. We design and manufacture microwave, direct current and radio frequency power delivery systems as well as radio frequency matching networks and metrology products. In the semiconductor, thin film and other market sectors, our power supplies are used to provide energy to various etching, stripping and deposition processes. Our power amplifiers are also used in medical imaging equipment.

Reactive Gas Generation Products. We design and manufacture reactive gas generation products, which create reactive species. A reactive species is an atom or molecule in an unstable state, which is used to facilitate various chemical reactions in processing of thin films (deposition of films, etching and cleaning of films and surface modifications). A number of different technologies are used to create reactive gas including different plasma technologies and barrier discharge technologies.

Processing Thin Films. Our reactive gas products include ozone generators and subsystems used for deposition of insulators onto semiconductor devices, ozonated water delivery systems for advanced semiconductor wafer and flat panel display cleaning, microwave plasma based products for photo resist removal and a line of remote plasma generators which provide reactive gases for a wide range of semiconductor, flat panel and other thin film process applications.

Equipment Cleaning. As materials are deposited on wafers, films, or solar cells, the deposited material also accumulates on the walls of the vacuum process chamber. Our atomic fluorine generators are used to clean the process chambers between deposition steps to reduce particulates and contamination caused by accumulated build up on the chamber walls.

Vacuum Products

This group of products consists of vacuum technology products, including vacuum containment components, vacuum gauges, vacuum valves, effluent management subsystems and custom stainless steel chambers, vessels and pharmaceutical process equipment hardware and housings.

Vacuum Gauging Products. We offer a wide range of vacuum instruments consisting of vacuum measurement sensors and associated power supply and readout units as well as transducers where the sensor and electronics are integrated within a single package. These gauges complement our Baratron® capacitance manometers for medium and high vacuum ranges. Our indirect gauges use thermal conductivity and ionization gauge technologies to measure pressure and vacuum levels, and our direct gauges use the pressure measurement technology of a Micro-electromechanical systems (MEMS)-based piezo sensor.

Vacuum Valves, Stainless Steel Components, Process Solutions and Custom Stainless Steel Hardware. Our vacuum valves are used for vacuum isolation of vacuum lines, load locks, vacuum chambers and pumps for chamber isolation and vacuum containment. Our vacuum process solutions consist of vacuum fittings, traps and heated lines that are used downstream from the semiconductor process chamber to control process effluent gases by preventing condensable materials from depositing particles near or back into the process chamber.

Custom Manufactured Components. Our design and manufacturing facilities build high purity chambers for material and thin film coating processes. We design and build custom panels, weldments, American Society of Manufacturing Engineers vessels and housings, as well as a line of Bioprocessing Equipment Standard certified components for biopharmaceutical processes.

Analytical Solutions Group Products

This product group includes gas composition analysis products, information technology products and custom fabrication services.

Gas Composition Analysis Products. Gas composition analysis instruments are sold to a wide variety of industries including the engine development, environmental emissions monitoring, air safety monitoring and semiconductor industries.

Mass Spectrometry-Based Gas Composition Analysis Instruments. These products are based on quadrupole mass spectrometer sensors that separate gases based on molecular weight. These sensors include built-in electronics and are provided with software that analyzes the composition of background and process gases in the process chamber. These instruments are provided both as bench top laboratory systems and as process gas monitoring systems used in the diagnosis of semiconductor manufacturing process systems.

Fourier Transform Infra-Red (FTIR) Based Gas Composition Analysis Products. FTIR-based products provide information about the composition of gases by measuring the absorption of infra-red light as it passes through the sample being measured. Gas analysis applications include measuring the compositions of mixtures of reactant gases; measuring the purity of individual process gases; measuring the composition of process exhaust gas streams to determine process health; monitoring emissions to ensure environmental compliance and monitoring ambient air for safety. These instruments are provided as standalone monitors and as process gas monitoring systems.

Mass spectrometry-based and FTIR-based gas monitoring systems can indicate out-of-bounds conditions, such as the presence of undesirable contaminant gases and water vapor or out-of-tolerance amounts of specific gases in the process, which alert operators to diagnose and repair faulty equipment.

Information Technology Products. We design software products including design of experiment and multivariate analysis software for analyzing large and complex data sets. Our focus is on providing solutions which improve the quality and yield of manufacturing processes for the pharmaceutical, biotech and other industries.

Custom Fabrication. Our fabrication facility builds precision machined components and electromechanical assemblies for the analytical instrument, scientific, semiconductor and medical industries to ultra-high vacuum standards.

Customers

Our largest customers include leading semiconductor capital equipment manufacturers such as Applied Materials and Lam Research. Sales to our top ten customers accounted for approximately 46%, 42% and 41% of net sales for the years 2013, 2012 and 2011, respectively. Applied Materials accounted for approximately 17%, 14% and 14% and Lam Research accounted for 12%, 10% and 9% of our net sales for the years 2013, 2012 and 2011, respectively.

Sales, Marketing, Service and Support

Our worldwide sales, marketing, service and support organization is critical to our strategy of maintaining close relationships with semiconductor capital equipment and device manufacturers, and manufacturers of other advanced applications. We sell our products primarily through our direct sales force. As of December 31, 2013, we had 163 sales employees worldwide, located in China, France, Germany, Japan, Korea, the Netherlands, Singapore, Sweden, Taiwan, the United Kingdom and the United States. We also maintain sales representatives and agents in a number of countries, who supplement our direct sales force. We maintain a marketing staff that identifies customer requirements, assists in product planning and specifications, and focuses on future trends in semiconductor and other markets.

As semiconductor device manufacturers have become increasingly sensitive to the significant costs of system downtime, they have required that suppliers offer comprehensive local repair service and close customer support. Manufacturers require close support to enable them to repair, modify, upgrade and retrofit their equipment to improve yields and adapt new materials or processes. To meet these market requirements, we maintain internal worldwide sales and support organizations in nine countries and external third party worldwide sales and support organizations in six countries. Technical support is provided from offices in China, France, Germany, Japan, Korea, Singapore, Taiwan, the United Kingdom and the United States. Repair and calibration services are provided at nineteen internal and four third party service depots located worldwide. We typically provide warranties from one to three years, depending upon the type of product, with the majority of our products ranging from one to two years.

Research and Development

Our products incorporate sophisticated technologies to power, measure, control and monitor increasingly complex gas-related semiconductor and other advanced manufacturing processes, thereby enhancing uptime, yield and throughput for our customers. Our products have continuously advanced as we strive to meet our customers' evolving needs. We have developed, and continue to develop, new products to address industry trends, such as the shrinking of integrated circuit critical dimensions to 22 nanometers and below and, in the flat panel display and solar markets, the transition to larger substrate sizes, which require more advanced process control technology. In addition, we have developed, and continue to develop, products that support the migration to new classes of materials and ultra-thin layers, such as copper for low resistance conductors, high-k dielectric materials for capacitors and gates and low-k dielectric materials for low loss insulators that are used in small geometry manufacturing. We involve our marketing, engineering, manufacturing and sales personnel in the development of new products in order to reduce the time to market for new products. Our employees also work closely with our customers' development personnel helping us to identify and define future technical needs on which to focus research and development efforts. We support research at academic institutions targeted at advances in materials science and semiconductor process development.

As of December 31, 2013, we had 350 research and development employees, primarily located in the United States. Our research and development expenses were $63.6 million, $60.1 million and $61.0 million for the years 2013, 2012 and 2011, respectively. Our research and development efforts include numerous projects, none of which are individually material, and generally have a duration of 3 to 30 months depending upon whether the product is an enhancement of existing technology or a new product. Our current initiatives include projects to enhance the performance characteristics of older products, to develop new products and to integrate various technologies into subsystems.

Manufacturing

Our primary manufacturing facilities are located primarily in the United States, China, Mexico, Korea, Germany, the United Kingdom and Israel. Manufacturing activities include the assembly and testing of components and subassemblies, which are integrated into our products. We outsource some of our subassembly work. We purchase a wide range of electronic, mechanical and electrical components, some of which are designed to our specifications. We consider our lean manufacturing techniques and responsiveness to customers' significantly fluctuating product demands to be a competitive advantage. As of December 31, 2013, we had 1,543 manufacturing related employees located mostly in the United States and China.

Competition

The market for our products is highly competitive. Principal competitive factors include:

- historical customer relationships;
- product quality, performance and price;

- breadth of product line;
- manufacturing capabilities; and
- customer service and support.

Although we believe that we compete favorably with respect to these factors, there can be no assurance that we will continue to do so.

We encounter substantial competition in most of our product lines, although no single competitor competes with us across all product lines. Certain of our competitors may have greater financial and other resources than us. In some cases, competitors are smaller than we are, but are well established in specific product niches. Hitachi and Horiba offer materials delivery products that compete with our product line of mass flow controllers. Nor-Cal Products, Inc. and VAT, Inc. offer products that compete with our vacuum components. Inficon offers products that compete with our vacuum measurement and gas analysis products. Brooks Automation and Inficon offer products that compete with our vacuum gauging products. Advanced Energy offers products that compete with our power delivery and reactive gas generator products.

Patents and Other Intellectual Property Rights

We rely on a combination of patent, copyright, trademark and trade secret laws and license agreements to establish and protect our proprietary rights. As of December 31, 2013, we owned 338 U.S. patents, 589 foreign patents and had 93 pending U.S. patent applications that expire at various dates through 2033. Foreign counterparts of certain of these applications have been filed or may be filed at the appropriate time.

We require each of our employees, including our executive officers, to enter into standard agreements pursuant to which the employee agrees to keep confidential all of our proprietary information and to assign to us all inventions while they are employed by us.

Employees

As of December 31, 2013, we employed 2,394 persons. We believe that our ongoing success depends upon our continued ability to attract and retain highly skilled employees for whom competition is intense. None of our employees are represented by a labor union or are party to a collective bargaining agreement. We believe that our employee relations are good.

Acquisitions

On March 12, 2013, we acquired Alter S.r.l. ("Alter") located in Reggio Emilia, Italy. Alter develops advanced microwave power generators, components and systems for industrial microwave heating, microwave plasma coating and semiconductor applications. The purchase price net of cash acquired and after final debt and working capital adjustments, was $2.4 million. Total cash paid as of June 30, 2013, net of cash acquired was $2.0 million. During June 2013, one of two holdback provisions was met and we released $0.1 million. We will pay the remaining $0.4 million subject to a final holdback provision being met.

In August 2013, the Company purchased $268 thousand of net assets of which $388 thousand was completed technology.

On August 29, 2012, we acquired Plasmart, Inc. ("Plasmart") located in Daejeon, Korea. Plasmart develops radio frequency (RF), plasma generation and monitoring systems for the semiconductor, flat panel display, active matrix organic light emitting diodes and solar photovoltaic industries. The purchase price was $22.6 million, net of $0.1 million of cash acquired.

Item 1A. *Risk Factors*

The following factors could materially affect MKS' business, financial condition or results of operations and should be carefully considered in evaluating the Company and its business, in addition to other information presented elsewhere in this report.

Our business depends substantially on capital spending in the semiconductor industry which is characterized by periodic fluctuations that may cause a reduction in demand for our products.

Approximately 68%, 62% and 61% of our net sales for the years 2013, 2012 and 2011, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers, and we expect that sales to such customers will continue to account for a substantial portion of our sales. Our business depends upon the capital expenditures of semiconductor device manufacturers, which in turn depends upon the demand for semiconductors.

Historically, the semiconductor market has been highly cyclical and has experienced periods of overcapacity, resulting in significantly reduced demand for capital equipment which may result in lower gross margins due to reduced absorption of manufacturing overhead. In addition, many semiconductor manufacturers have operations and customers in Asia, a region that in past years has experienced serious economic problems including currency devaluations, debt defaults, lack of liquidity and recessions.

The cyclicality of the semiconductor market is demonstrated by the changes in sales to semiconductor capital equipment and device manufacturers in past years. For example, our sales to semiconductor capital equipment manufacturers and semiconductor device manufacturers increased by 14% in 2013, but decreased by 20% and 8% in 2012 and 2011, respectively, compared to the prior year. We cannot be certain of the timing or magnitude of future semiconductor industry downturns or recoveries. A decline in the level of orders as a result of any additional downturn or slowdown in the semiconductor capital equipment industry could have a material adverse effect on our business, financial condition and results of operations.

We are exposed to risks associated with instability in the financial markets and any weakness in the global economy.

The markets for semiconductors and flat panel displays in particular depend largely on consumer spending. Economic uncertainty exacerbates negative trends in consumer spending and may cause certain of our customers to push out, cancel, or refrain from placing equipment or service orders, which may affect our ability to convert backlog to sales and may reduce our net sales. Difficulties in obtaining capital and deteriorating market conditions may also lead to the inability of some customers to obtain affordable financing, resulting in lower sales for us. Customers with liquidity issues may lead to additional bad debt expense for us. These conditions may also similarly affect key suppliers, which could affect their ability to deliver parts and result in delays for our products. Further, these conditions and uncertainty about future economic conditions make it challenging for us to forecast our operating results, make business decisions, and identify the risks that may affect our business, financial condition and results of operations. If we are not able to timely and appropriately adapt to changes resulting from a difficult macroeconomic environment, our business, financial condition or results of operations may be materially and adversely affected.

International sales accounted for approximately 46%, 49% and 52%, of net sales for the years 2013, 2012 and 2011, respectively, a substantial portion of which were sales to China, Japan, Korea and other Asian countries and we anticipate that international sales will continue to account for a significant portion of our net sales. In addition, certain of our key domestic customers derive a significant portion of their revenues from sales in international markets. Therefore, our sales and results of operations could be adversely affected by economic slowdowns affecting the global economy generally, as well as economic slowdowns in particular regions, such as Asia, Europe, or specific countries such as Japan and Korea.

Our quarterly operating results have fluctuated, and are likely to continue to vary significantly, which may result in volatility in the market price of our Common Stock.

A substantial portion of our shipments occurs shortly after an order is received and therefore, we operate with a low level of backlog. As a result, a decrease in demand for our products from one or more customers could occur with limited advance notice and could have a material adverse effect on our results of operations in any particular period. A significant percentage of our expenses is relatively fixed and based in part on expectations of future net sales. The inability to adjust spending quickly enough to compensate for any shortfall would magnify the adverse impact of a shortfall in net sales on our results of operations. Factors that could cause fluctuations in our net sales include:

- the timing of the receipt of orders from major customers;
- shipment delays;
- disruption in sources of supply;
- seasonal variations in capital spending by customers;
- production capacity constraints; and
- specific features requested by customers.

In addition, our quarterly operating results may be adversely affected due to charges incurred in a particular quarter, for example, relating to inventory obsolescence, warranty, bad debt or asset impairments.

As a result of the factors discussed above, it is likely that we may in the future experience quarterly or annual fluctuations and that, in one or more future quarters, our operating results may fall below the expectations of public market analysts or investors. In any such event, the price of our Common Stock could fluctuate or decline significantly.

The loss of net sales to any one of our major customers would likely have a material adverse effect on us.

Our top ten customers accounted for approximately 46%, 42% and 41% of our net sales for the years 2013, 2012 and 2011, respectively. During the years 2013, 2012 and 2011, one customer, Applied Materials, accounted for approximately 17%, 14% and 14%, respectively, of our net sales and another customer Lam Research, accounted for 12%, 10% and 9%, respectively. The loss of a major customer or any reduction in orders by these customers, including reductions due to market or competitive conditions, would likely have a material adverse effect on our business, financial condition and results of operations. None of our significant customers have entered into an agreement with us requiring it to purchase any minimum quantity of our products. The demand for our products from our semiconductor capital equipment customers depends on the cyclicality of our served markets, specifically semiconductor device manufacturer customers.

Attempts to lessen the adverse effect of any loss or reduction of net sales through the rapid addition of new customers could be difficult because prospective customers typically require lengthy qualification periods prior to placing volume orders with a new supplier. Our future success will continue to depend upon:

- our ability to maintain relationships with existing key customers;
- our ability to attract new customers and satisfy any required qualification periods;
- our ability to introduce new products in a timely manner for existing and new customers; and
- the successes of our customers in creating demand for their capital equipment products that incorporate our products.

As part of our business strategy, we have entered into and may enter into or seek to enter into business combinations and acquisitions that may be difficult and costly to integrate, may be disruptive to our business, may dilute stockholder value or may divert management attention.

We have made acquisitions and, as a part of our business strategy, we may enter into additional business combinations and acquisitions. Acquisitions are typically accompanied by a number of risks, including the difficulty of integrating the operations, technology and personnel of the acquired companies, the potential disruption of our ongoing business and distraction of management, possible internal control weaknesses of the acquired companies, expenses related to the acquisition and potential unknown liabilities associated with acquired businesses. If we are not successful in completing acquisitions that we may pursue in the future, we may be required to re-evaluate our growth strategy, and we may incur substantial expenses and devote significant management time and resources in seeking to complete proposed acquisitions that may not generate benefits for us.

In addition, with future acquisitions, we could use substantial portions of our available cash as all or a portion of the purchase price. We could also issue additional securities as consideration for these acquisitions, which could cause significant stockholder dilution, or obtain debt financing, which could reduce our future cash flow from operations, without achieving the desired accretion to our business. Further, our prior acquisitions and any future acquisitions may not ultimately help us achieve our strategic goals and may pose other risks to us.

As a result of our previous acquisitions, we have several different decentralized operating and accounting systems. We will need to continue to modify our accounting policies, internal controls, procedures and compliance programs to provide consistency across all of our operations. In order to increase efficiency and operating effectiveness and improve corporate visibility into our decentralized operations, we are currently implementing a worldwide Enterprise Resource Planning ("ERP") system. We expect to continue to implement the ERP system in phases over the next few years. Any future implementations may risk potential disruption of our operations during the conversion periods and the implementations could require significantly more management time and higher implementation costs than currently estimated.

An inability to convince semiconductor device manufacturers to specify the use of our products to our customers that are semiconductor capital equipment manufacturers would weaken our competitive position.

The markets for our products are highly competitive. Our competitive success often depends upon factors outside of our control. For example, in some cases, particularly with respect to mass flow controllers, semiconductor device manufacturers may direct semiconductor capital equipment manufacturers to use a specified supplier's product in their equipment. Accordingly, for such products, our success will depend in part on our ability to have semiconductor device manufacturers specify that our products be used at their semiconductor fabrication facilities. In addition, we may encounter difficulties in changing established relationships of competitors that already have a large installed base of products within such semiconductor fabrication facilities.

If our products are not designed into successive generations of our customers' products, we will lose significant net sales during the lifespan of those products.

New products designed by capital equipment manufacturers typically have a lifespan of five to ten years. Our success depends on our products being designed into new generations of equipment. We must develop products that are technologically advanced so that they are positioned to be chosen for use in each successive generation of capital equipment. If customers do not choose our products, our net sales may be reduced during the lifespan of our customers' products. In addition, we must make a significant capital investment to develop products for our customers well before our products are introduced and before we can be sure that we will recover our capital investment through sales to the customers in significant volume. We are thus also at risk during the development phase that our products may fail to meet our customers' technical or cost requirements and may be replaced by a competitive product or alternative technology solution. If that happens, we may be unable to recover our development costs.

The semiconductor industry is subject to rapid demand shifts which are difficult to predict. As a result, our inability to expand our manufacturing capacity in response to these rapid shifts may cause a reduction in our market share.

Our ability to increase sales of certain products depends in part upon our ability to expand our manufacturing capacity for such products in a timely manner. If we are unable to expand our manufacturing capacity on a timely basis or to manage such expansion effectively, our customers could implement our competitors' products and, as a result, our market share could be reduced. Because the semiconductor industry is subject to rapid demand shifts which are difficult to foresee, we may not be able to increase capacity quickly enough to respond to a rapid increase in demand. Additionally, capacity expansion could increase our fixed operating expenses and if sales levels do not increase to offset the additional expense levels associated with any such expansion, our business, financial condition and results of operations could be materially adversely affected.

Manufacturing interruptions or delays could affect our ability to meet customer demand and lead to higher costs, while the failure to estimate customer demand accurately could result in excess or obsolete inventory.

Our business depends on its timely supply of equipment, services and related products that meet the rapidly changing technical and volume requirements of our customers, which depends in part on the timely delivery of parts, components and subassemblies (collectively, parts) from suppliers, including contract manufacturers. Cyclical industry conditions and the volatility of demand for manufacturing equipment increase capital, technical, operational and other risks for us and for companies throughout our supply chain. We may also experience significant interruptions of our manufacturing operations, delays in our ability to deliver products or services, increased costs or customer order cancellations as a result of:

- volatility in the availability and cost of materials, including rare earth elements;
- information technology or infrastructure failures; and
- natural disasters or other events beyond our control (such as earthquakes, floods or storms, regional economic downturns, pandemics, social unrest, political instability, terrorism, or acts of war), particularly where we conduct manufacturing.

In addition, if we need to rapidly increase our business and manufacturing capacity to meet increases in demand or expedited shipment schedules, this may exacerbate any interruptions in our manufacturing operations and supply chain and the associated effect on our working capital. Moreover, if actual demand for our products is different than expected, we may purchase more/fewer parts than necessary or incur costs for canceling, postponing or expediting delivery of parts. If we purchase inventory in anticipation of customer demand that does not materialize, or if our customers reduce or delay orders, we may incur excess inventory charges. Any or all of these factors could materially and adversely affect our business, financial condition and results of operations.

A material amount of our assets represents goodwill and intangible assets, and our net income would be reduced if our goodwill or intangible assets become impaired.

As of December 31, 2013, our goodwill and intangible assets, net, represented approximately \$164.0 million, or 13.5% of our total assets. Goodwill is generated in our acquisitions when the cost of an acquisition exceeds the fair value of the net tangible and identifiable intangible assets we acquire. Goodwill is subject to an impairment analysis at least annually based on the fair value of the reporting unit. Intangible assets, which relate primarily to the developed technologies, customer relationships, patents and trademarks and in-process research and development acquired by us as part of our acquisitions of other companies, are subject to an impairment analysis whenever events or changes in circumstances exist that indicate that the carrying value of the intangible asset might not be recoverable. We will continue to monitor and evaluate the carrying value of goodwill and intangible assets. If market and economic conditions or business performance deteriorate, the likelihood of the Company recording an impairment charge would increase, which could materially and adversely affect our results of operations.

We operate in a highly competitive industry.

The market for our products is highly competitive. Principal competitive factors include:

- historical customer relationships;
- product quality, performance and price;
- breadth of product line;
- manufacturing capabilities; and
- customer service and support.

Although we believe that we compete favorably with respect to these factors, we may not be able to continue to do so. We encounter substantial competition in most of our product lines. Certain of our competitors may have greater financial and other resources than we have. In some cases, competitors are smaller than we are, but well established in specific product niches. We may encounter difficulties in changing established relationships of competitors with a large installed base of products at such customers' fabrication facilities. In addition, our competitors can be expected to continue to improve the design and performance of their products. Competitors may develop products that offer price or performance features superior to those of our products. If our competitors develop superior products, we may lose existing customers and market share.

We have significant foreign operations, and outsource certain operations offshore, which pose significant risks.

We have significant international sales, service, engineering and manufacturing operations in Europe, Israel and Asia, and have outsourced a portion of our manufacturing and service to a subcontractor in Mexico. In the future, we may expand the level of manufacturing and certain other operations that we perform offshore in order to take advantage of cost efficiencies available to us in those countries. However, we may not achieve the significant cost savings or other benefits that we would anticipate from moving manufacturing and other operations to a lower cost region. These foreign operations expose us to operational and political risks that may harm our business, including:

- political and economic instability;
- fluctuations in the value of currencies, particularly in Asia and Europe;
- changes in labor conditions and difficulties in staffing and managing foreign operations, including, but not limited to, the formation of labor unions;
- reduced or less certain protection for intellectual property rights;
- greater difficulty in collecting accounts receivable and longer payment cycles;
- burdens and costs of compliance with a variety of foreign laws;
- increases in duties and taxation;
- costs associated with compliance programs for import and export regulations;
- imposition of restrictions on currency conversion or the transfer of funds;
- changes in export duties and limitations on imports or exports;
- expropriation of private enterprises; and
- unexpected changes in foreign regulations.

If any of these risks materialize, our operating results may be adversely affected.

The Company may have risks associated with export violations in its Shanghai office.

In May 2012, an employee from the our Shanghai, China subsidiary was arrested as part of a U.S. government investigation into violations of U.S. law, including providing false information to obtain U.S. export licenses for certain MKS pressure transducers. U.S. government authorities have made it clear that MKS is not a target of the investigation. MKS is cooperating with the government's investigation. In addition, MKS conducted its own investigation into these matters. Although MKS has taken corrective human resources actions and has implemented additional export compliance procedures, we cannot be certain these efforts will be sufficient to avoid similar situations. While MKS does not expect any of the alleged violations to have a material adverse effect upon its business, the Company cannot be certain of the outcome of the governmental investigation, which could include the identification of other violations, fines, penalties, restrictions on export activities or other governmental actions.

Unfavorable currency exchange rate fluctuations may lead to lower operating margins or may cause us to raise or reduce prices, which could result in reduced sales.

Currency exchange rate fluctuations could have an adverse effect on our net sales and results of operations and we could experience losses with respect to our hedging activities. Unfavorable currency fluctuations could require us to increase or decrease prices to foreign customers, which could result in lower net sales by us to such customers. Alternatively, if we do not adjust the prices for our products in response to unfavorable currency fluctuations, our results of operations could be adversely affected. In addition, most sales made by our foreign subsidiaries are denominated in the currency of the country in which these products are sold and the currency they receive in payment for such sales could be less valuable at the time of receipt as a result of exchange rate fluctuations. We enter into forward foreign exchange contracts to reduce currency exposure arising from intercompany sales of inventory. However, we cannot be certain that our efforts will be adequate to protect us against significant currency fluctuations or that such efforts will not expose us to additional exchange rate risks.

Changes in tax rates or tax regulation could affect results of operations.

As a global company, we are subject to taxation in the United States and various other countries. Significant judgment is required to determine and estimate worldwide tax liabilities. Our future annual and quarterly effective tax rates could be affected by numerous factors, including changes in the: applicable tax laws; composition of pre-tax income in countries with differing tax rates; and/or valuation of our deferred tax assets and liabilities. In addition, we are subject to regular examination by the Internal Revenue Service, state, local and foreign tax authorities. We regularly assess the likelihood of favorable or unfavorable outcomes resulting from these examinations to determine the adequacy of our provision for income taxes. Although we believe our tax estimates are reasonable, there can be no assurance that any final determination will not be materially different from the treatment reflected in our historical income tax provisions and accruals, which could materially and adversely affect our financial condition and results of operations.

Key personnel may be difficult to attract and retain.

Our success depends to a large extent upon the efforts and abilities of a number of key employees and officers, particularly those with expertise in the semiconductor manufacturing and similar industrial manufacturing industries. The loss of key employees or officers could have a material adverse effect on our business, financial condition and results of operations. We believe that our future success will depend in part on our ability to attract and retain highly skilled technical, financial, managerial and sales and marketing personnel. We cannot be certain that we will be successful in attracting and retaining such personnel.

Our proprietary technology is important to the continued success of our business. Our failure to protect this proprietary technology may significantly impair our competitive position.

As of December 31, 2013, we owned 338 U.S. patents, 589 foreign patents and had 93 pending U.S. patent applications that expire at various dates through 2033. Although we seek to protect our intellectual property rights through patents, copyrights, trade secrets and other measures, we cannot be certain that:

- we will be able to protect our technology adequately;
- competitors will not be able to develop similar technology independently;
- any of our pending patent applications will be issued;
- domestic and international intellectual property laws will protect our intellectual property rights; or
- third parties will not assert that our products infringe patent, copyright or trade secrets of such parties.

Protection of our intellectual property rights may result in costly litigation.

Litigation may be necessary in order to enforce our patents, copyrights or other intellectual property rights, to protect our trade secrets, to determine the validity and scope of the proprietary rights of others or to defend against claims of infringement. We are, from time to time, involved in lawsuits enforcing or defending our intellectual property rights. Such litigation could result in substantial costs and diversion of resources and could have a material adverse effect on our business, financial condition, results of operations, or cash flows.

We may need to expend significant time and expense to protect our intellectual property regardless of the validity or successful outcome of such intellectual property claims. If we lose any litigation, we may be required to seek licenses from others, pay royalties, change, stop manufacturing or stop selling some of our products.

The market price of our Common Stock has fluctuated and may continue to fluctuate for reasons over which we have no control.

The stock market has from time to time experienced, and is likely to continue to experience, extreme price and volume fluctuations. Prices of securities of technology companies have been especially volatile and have often fluctuated for reasons that are unrelated to the operating performance of the companies. Historically, the market price of shares of our Common Stock has fluctuated greatly and could continue to fluctuate due to a variety of factors. In the past, companies that have experienced volatility in the market price of their stock have been the objects of securities class action litigation. If we were the object of securities class action litigation, it could result in substantial costs and a diversion of our management's attention and resources.

We may not pay dividends on our Common Stock.

Holders of our Common Stock are only entitled to receive such dividends when and if they are declared by our board of directors. Although we have declared cash dividends on our Common Stock for the past few years, we are not required to do so and may reduce or eliminate our cash dividend in the future. This could adversely affect the market price of our Common Stock.

Our dependence on sole, limited source suppliers, and international suppliers, could affect our ability to manufacture products and systems.

We rely on sole, limited source suppliers and international suppliers for a few of our components and subassemblies that are critical to the manufacturing of our products. This reliance involves several risks, including the following:

- the potential inability to obtain an adequate supply of required components;
- reduced control over pricing and timing of delivery of components; and
- the potential inability of our suppliers to develop technologically advanced products to support our growth and development of new systems.

We believe we could obtain and qualify alternative sources for most sole, limited source and international supplier parts however, the transition time may be long. Seeking alternative sources for these parts could require us to redesign our systems, resulting in increased costs and likely shipping delays. We may be unable to redesign our systems, which could result in further costs and shipping delays. These increased costs would decrease our profit margins if we could not pass the costs to our customers. Further, shipping delays could damage our relationships with current and potential customers and have a material adverse effect on our business and results of operations.

We are subject to governmental regulations. If we fail to comply with these regulations, our business could be harmed.

We are subject to federal, state, local and foreign regulations, including environmental regulations and regulations relating to the design and operation of our products. We must ensure that the affected products meet a variety of standards, many of which vary across the countries in which our systems are used. For example, the European Union has published directives specifically relating to power supplies. In addition, the European Union has issued directives relating to regulation of recycling and hazardous substances, which may be applicable to our products, or to which some customers may voluntarily elect to adhere to. China has adopted, and certain other Asian countries have indicated, an intention to adopt similar regulations. We must comply with any applicable regulation adopted in connection with these types of directives in order to ship affected products into countries that adopt these types of regulations. We believe we are in compliance with current applicable regulations, directives and standards and have obtained all necessary permits, approvals and authorizations to conduct our business. However, compliance with future regulations, directives and standards, or customer demands beyond such requirements, could require us to modify or redesign certain systems, make capital expenditures or incur substantial costs. If we do not comply with current or future regulations, directives and standards:

- we could be subject to fines;
- our production could be suspended; or
- we could be prohibited from offering particular systems in specified markets.

New regulations and customer demands related to conflict minerals and hazardous materials may adversely affect us

The Dodd-Frank Wall Street Reform and Consumer Protection Act imposes new disclosure requirements regarding the use in our products of "conflict minerals" mined from the Democratic Republic of Congo and adjoining countries, whether or not the components of our products are manufactured by us or third parties. To meet the initial disclosure requirements, which begin in 2014, we began due diligence in 2013 to determine the sources of the conflict minerals in our very broad product portfolio. In addition, several of our customers have recently requested us to disclose to them our use of numerous other hazardous materials in our products. Our supply chain is very complex and we may be unable to verify the origin for all metals used in our products. This new requirement could affect the pricing, sourcing and availability of minerals used in the manufacture of components we use in our products. In addition, there are additional costs associated with complying with the disclosure requirements and customer requests, such as costs related to our due diligence to determine the source of any conflict minerals or any other hazardous materials used in our products. We may face difficulties in satisfying customers who may require that all of the components of our products are certified as conflict mineral free and/or free of numerous other hazardous materials.

Some provisions of our restated articles of organization, as amended, our amended and restated by-laws and Massachusetts law could discourage potential acquisition proposals and could delay or prevent a change in control.

Anti-takeover provisions could diminish the opportunities for stockholders to participate in tender offers, including tender offers at a price above the then current market price of the Common Stock. Such provisions may also inhibit increases in the market price of the Common Stock that could result from takeover attempts. For example, while we have no present plans to issue any preferred stock, our board of directors, without further stockholder approval, may issue preferred stock that could have the effect of delaying, deterring or preventing a change in control of us. The issuance of preferred stock could adversely affect the voting power of the holders of our Common Stock, including the loss of voting control to others. In addition, our amended and restated by-laws provide for a classified board of directors consisting of three classes. The classified board could also have the effect of delaying, deterring or preventing a change in control of the Company.

Changes in financial accounting standards may adversely affect our reported results of operations.

A change in accounting standards or practices could have a significant effect on our reported results and may even affect our reporting of transactions completed before the change was effective. New accounting pronouncements and varying interpretations of existing accounting pronouncements have occurred and may occur in the future. Such changes may adversely affect our reported financial results or may impact our related business practice.

Item 1B. *Unresolved Staff Comments*

None.

Item 2. *Properties*

The following table provides information concerning MKS' principal and certain other owned and leased facilities as of December 31, 2013:

Location	Sq. Ft.	Activity	Reportable Segment	Lease Expires
Akishima, Japan	26,500	Manufacturing, Customer Support and Service	Asia Region Sales & Service	September 11, 2018
Andover, Massachusetts	118,000	Manufacturing, Research & Development and Corporate Headquarters	Advanced Manufacturing Capital Equipment and Analytical Solutions Group	(1)
Austin, Texas	20,880	Manufacturing, Sales, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment and Analytical Solutions Group	June 30, 2015
Berlin, Germany	20,750	Manufacturing, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment	December 13, 2014
Boulder, Colorado	124,000	Manufacturing, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment	(2)
Carmiel, Israel	11,800	Manufacturing and Research & Development	Advanced Manufacturing Capital Equipment	December 31, 2017
Cheshire, United Kingdom	16,000	Manufacturing, Sales, Customer Support and Service	Analytical Solutions Group and Europe Region Sales & Service	November 6, 2018
Colorado Springs, Colorado	24,000	Research & Development	Advanced Manufacturing Capital Equipment	(3)
Daejeon, Korea	21,400	Manufacturing, Sales, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment	(4)

Location	Sq. Ft.	Activity	Reportable Segment	Lease Expires
Filderstadt, Germany	9,300	Sales and Service	Europe Region Sales & Service	July 31, 2014
Hellebaek, Denmark	6,400	Manufacturing and Research & Development	Advanced Manufacturing Capital Equipment	December 31, 2014
Kyunggi, Korea	45,600	Sales, Customer Support and Service	Asia Region Sales & Service	(5)
Lawrence, Massachusetts	40,000	Manufacturing	Advanced Manufacturing Capital Equipment and Analytical Solutions Group	(3)
Lod, Israel	7,600	Customer Support and Research & Development	Advanced Manufacturing Capital Equipment	December 31, 2014
Methuen, Massachusetts	85,000	Manufacturing, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment and Analytical Solutions Group	(3)
Munich, Germany	20,100	Manufacturing, Sales, Customer Support, Service and Research & Development	Europe Region Sales & Service	(6)
Nogales, Mexico	101,600	Manufacturing and Service	Advanced Manufacturing Capital Equipment	August 31, 2022
Reggio Emilia, Italy	10,000	Manufacturing, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment	August 31, 2019
Rochester, New York	156,000	Manufacturing, Sales, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment	(3)
San Jose, California	20,400	Sales, Customer Support and Service	Advanced Manufacturing Capital Equipment and Analytical Solutions Group	January 31, 2018
Shanghai, China	18,700	Sales, Customer Support and Service	Asia Region Sales & Service	February 28, 2014
Shenzhen, China	242,000	Manufacturing	Advanced Manufacturing Capital Equipment	May 31, 2017
Shropshire, United Kingdom	25,000	Manufacturing	Analytical Solutions Group	June 23, 2022
Singapore	13,700	Sales, Customer Support and Service	Asia Region Sales & Service	November 30, 2015
Taiwan	24,900	Sales, Customer Support and Service	Asia Region Sales & Service	August 31, 2015
Tokyo, Japan	6,000	Sales and Customer Support	Asia Region Sales & Service	December 31, 2014
Umea, Sweden	7,000	Sales, Customer Support and Research & Development	Analytical Solutions Group	December 31, 2014
Wilmington, Massachusetts	118,000	Manufacturing, Sales, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment	(3)

(1) MKS owns one facility with 82,000 square feet of space used for manufacturing and research and development and leases 36,000 square feet of space used for its corporate headquarters with a lease term that expires on May 31, 2018.

(2) MKS leases two facilities, of which one has 39,000 square feet of space and the other has 38,000 square feet of space. Both leases expire on May 31, 2015. MKS also owns a third and fourth facility with 27,000 and 20,000 square feet of space, respectively.

(3) This facility is owned by MKS.

(4) MKS owns 18,100 square feet of space and leases 3,300 square feet of space with an expiration date of March 1, 2014.

(5) MKS leases 36,500 square feet of space with an expiration date of May 2, 2020. MKS leases 9,100 square feet of space with an expiration date of January 31, 2015.

(6) MKS owns 14,800 square feet of space and leases 1,600 square feet of space with an expiration date of August 31, 2014 and 2,400 square feet of space with an expiration date of December 31, 2014.

In addition to manufacturing and other operations conducted at the foregoing leased or owned facilities, MKS provides worldwide sales, customer support and services from various other leased facilities throughout the world not listed in the table above. See "Business—Sales, Marketing, Service and Support."

Item 3. *Legal Proceedings*

We are subject to various legal proceedings and claims, which have arisen in the ordinary course of business. In the opinion of management, the ultimate disposition of these matters will not have a material adverse effect on our results of operations, financial condition or cash flows.

Item 4. *Mine Safety Disclosures*

Not applicable.

PART II

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

Price Range of Common Stock

Our Common Stock is traded on the NASDAQ Global Select Market under the symbol MKSI. On February 19, 2014, the closing price of our Common Stock, as reported on the NASDAQ Global Select Market, was $29.55 per share. The following table sets forth for the periods indicated the high and low sales prices per share of our Common Stock as reported by the NASDAQ Global Select Market.

	2013		2012	
	High	Low	High	Low
First Quarter	$29.45	$25.67	$34.99	$27.33
Second Quarter	29.02	24.64	29.75	23.93
Third Quarter	28.97	24.71	29.75	24.18
Fourth Quarter	31.00	26.39	25.87	22.45

On February 19, 2014, we had approximately 130 stockholders of record.

Dividend Policy and Cash Dividends

Holders of our Common Stock are entitled to receive dividends when and if they are declared by our board of directors. During 2013, our board of directors declared four quarterly dividends of $0.16 per share, which totaled $34.0 million or $0.64 per share. During 2012, our board of directors declared four quarterly dividends, two quarterly dividends of $0.15 per share and two quarterly dividends of $0.16 per share, which totaled $32.7 million or $0.62 per share. Future dividend declarations, if any, as well as the record and payment dates for such dividends, are subject to the final determination of our board of directors. The board of directors intends to declare and pay cash dividends on our Common Stock based on the financial conditions and results of operations of the Company, although it has no obligation to do so.

On February 10, 2014, our board of directors declared a quarterly cash dividend of $0.16 per share to be paid on March 14, 2014 to shareholders of record as of March 3, 2014.

Purchase of Equity Shares

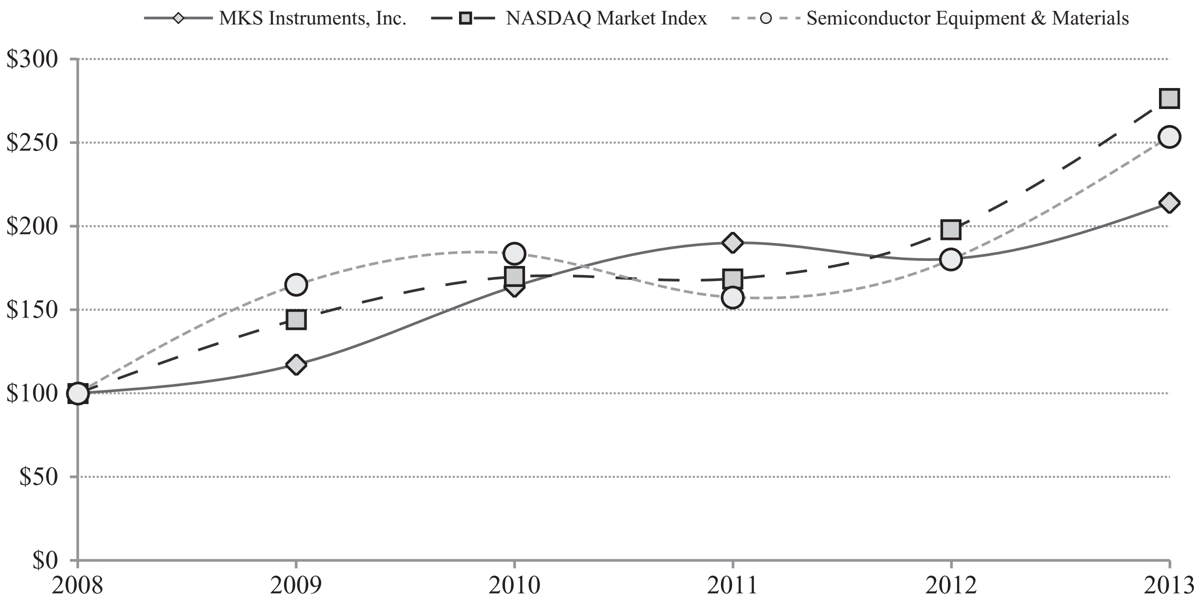
On July 25, 2011, our board of directors approved and on July 27, 2011, we publicly announced, a share repurchase program for the repurchase of up to an aggregate of $200 million of our outstanding Common Stock from time to time in open market purchases, privately negotiated transactions or through other appropriate means (the "Program"). The timing and quantity of any shares repurchased will depend upon a variety of factors, including business conditions, stock market conditions and business development activities, including, but not limited to, merger and acquisition opportunities. These repurchases may be commenced, suspended or discontinued at any time without prior notice. During the twelve months ended December 31, 2013, we repurchased approximately 107,000 shares of our common stock for $2.9 million at an average price of $26.87 per share. No repurchases occurred during the three months ended December 31, 2013.

We have repurchased approximately 627,000 shares of our common stock pursuant to the Program since its adoption.

Comparative Stock Performance

The following graph compares the cumulative total shareholder return (assuming reinvestment of dividends) from investing $100 on December 31, 2008, and plotted at the last trading day of each of the fiscal years ended December 31, 2009, 2010, 2011, 2012 and 2013, in each of MKS' Common Stock; an industry group index of semiconductor equipment/material manufacturers (the "Morningstar Semiconductor Equipment & Materials Industry Group"), compiled by Morningstar, Inc.; and the NASDAQ Market Index of companies. The stock price performance on the graph below is not necessarily indicative of future price performance. Our Common Stock is listed on the NASDAQ Global Select Market under the ticker symbol MKSI.

Performance Graph



	2008	2009	2010	2011	2012	2013
MKS Instruments, Inc.	$100.00	$117.65	$165.65	$192.52	$182.58	$216.89
NASDAQ Market Index	$100.00	$145.34	$171.70	$170.34	$200.57	$281.14
Morningstar Semiconductor Equipment & Materials Industry Group	$100.00	$166.62	$185.72	$158.90	$182.29	$257.49

Item 6. ***Selected Financial Data***

Selected Consolidated Financial Data

	Years Ended December 31,				
	2013	2012	2011	2010	2009
	(in thousands, except per share data)				
Statement of Operations Data					
Net sales	$ 669,420	$ 643,508	$ 822,517	$ 853,114	$ 392,693
Gross profit	266,574	269,479	374,988	378,638	130,216
Income (loss) from operations(1)	58,387	74,223	184,925	195,507	(171,661)
Income (loss) from continuing operations	35,776	48,029	129,731	132,919	(149,361)
Income (loss) from discontinued operations, net of taxes(2)	—	—	—	9,668	(63,298)
Net income (loss)(3)	$ 35,776	$ 48,029	$ 129,731	$ 142,587	$(212,659)
Basic income (loss) per share:					
Continuing operations	$ 0.67	$ 0.91	$ 2.49	$ 2.66	$ (3.03)
Net income (loss)	$ 0.67	$ 0.91	$ 2.49	$ 2.85	$ (4.31)
Diluted income (loss) per share:					
Continuing operations	$ 0.67	$ 0.90	$ 2.45	$ 2.61	$ (3.03)
Net income (loss)	$ 0.67	$ 0.90	$ 2.45	$ 2.80	$ (4.31)
Cash dividends paid per common share	$ 0.64	$ 0.62	$ 0.60	$ —	$ —
Balance Sheet Data					
Cash and cash equivalents	$ 288,902	$ 287,588	$ 312,916	$ 162,476	$ 111,009
Short-term investments	300,715	327,653	252,603	269,457	160,786
Working capital	748,010	788,871	788,470	643,209	461,581
Long-term investments	60,405	12,158	7,873	—	4,853
Total assets(4)	1,213,018	1,152,562	1,133,935	982,413	774,069
Short-term obligations	—	—	1,932	—	12,885
Stockholders' equity	$1,021,523	$1,012,156	$ 990,012	$ 847,039	$ 684,933

(1) Income from operations for 2013 includes $1.4 million of restructuring charges and $1.1 million from an insurance reimbursement related to a 2012 litigation settlement. Income from operations for 2012 includes $5.3 million for litigation settlement and $1.3 million of acquisition related costs from our acquisition of Plasmart, Inc. in August 2012. Loss from operations for 2009 includes an impairment charge of $143.0 million related to the write-down of goodwill, intangible, and long-lived assets and $5.5 million of restructuring charges.

(2) Income from discontinued operations, net of taxes for 2010 includes a $4.4 million gain on the sale of the two discontinued product lines. Loss from discontinued operations, net of taxes for 2009 includes charges related to the discontinued product lines of $53.8 million for the goodwill impairment and $7.3 million for the intangible assets impairment.

(3) Net income for 2013 includes charges, net of tax, of $0.9 million of restructuring costs and a benefit, net of tax, of $0.7 million for an insurance reimbursement related to a 2012 litigation settlement. Net income for 2012 includes charges, net of tax, of $3.3 million for a litigation settlement and $0.8 million of acquisition related costs. Net loss for 2009 includes charges, net of tax, of $202.7 million related to the write-down of goodwill, intangible and long-lived assets and $3.6 million of restructuring charges.

(4) For the year ended December 31, 2012 and 2011, total assets have been revised to adjust for a prior period error related to uncertain tax benefits, which had been shown net instead of gross in the balance sheet.

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

Overview

We are a global provider of instruments, subsystems and process control solutions that measure, control, power, monitor and analyze critical parameters of advanced manufacturing processes to improve process performance and productivity. We also provide services relating to the maintenance and repair of our products, software maintenance, installation services and training.

Our products are derived from our core competencies in pressure measurement and control, materials delivery, gas composition analysis, control and information technology, power and reactive gas generation and vacuum technology. Our products are used in diverse markets, applications and processes. Our primary service markets are manufacturers of capital equipment for semiconductor devices, and for other thin film applications including flat panel displays, solar cells and light emitting diodes ("LEDs"), data storage media and other advanced coatings. We also leverage our technology into other markets with advanced manufacturing applications including medical equipment, pharmaceutical manufacturing, energy generation and environmental monitoring.

We have a diverse base of customers that includes manufacturers of semiconductor capital equipment and semiconductor devices, thin film capital equipment used in the manufacture of flat panel displays, LEDs, solar cells, data storage media and other coating applications; and other industrial, medical, energy generation, environmental monitoring and manufacturing companies, and university, government and industrial research laboratories. During the years 2013, 2012 and 2011, approximately 68%, 62% and 61% of our net sales, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. We expect that sales to semiconductor capital equipment manufacturers and semiconductor device manufacturers will continue to account for a substantial portion of our sales.

We have four reportable segments: Advanced Manufacturing Capital Equipment, Analytical Solutions Group, Europe Region Sales & Service and Asia Region Sales & Service. The Advanced Manufacturing Capital Equipment segment includes the development, manufacture, sales and servicing of instruments and control products, power and reactive gas products and vacuum products, all of which are utilized in semiconductor processing and other similar advanced manufacturing processes. Sales in this segment include both external sales and intercompany sales (which are recorded at agreed upon transfer prices). External sales of these products made in Europe or Asia are reported as sales in the Europe Region Sales & Service or Asia Region Sales & Service segments. The Analytical Solutions Group includes, gas composition analysis, information technology products and custom fabrication services. The Europe and Asia Region Sales and Service groups mainly resell and service the Advanced Manufacturing Capital Equipment and Analytical Solutions Group products sold into their respective regions.

We group our products into four groups of similar products based upon similarity of product function. These four groups of products are: Instruments and Control Products, Power and Reactive Gas Products, Vacuum Products and Analytical Solutions Group Products.

Net revenues to semiconductor capital equipment manufacture and semiconductor device manufacture customers increased by 14% in 2013 compared to the prior year. Throughout all of 2012, we witnessed a drop in semiconductor capital spending, but conditions stabilized in the fourth quarter of 2012 and our semiconductor net revenues increased sequentially in each quarter of 2013. Net revenues to semiconductor capital equipment manufacture and semiconductor device manufacture customers declined by 20% in 2012 compared to 2011, and declined by 8% in 2011 compared to 2010. The semiconductor capital equipment industry is subject to rapid demand shifts, which are difficult to predict, and we are uncertain as to the timing or extent of future demand or any future weakness in the semiconductor capital equipment industry.

Our net revenues sold to other advanced markets, which exclude semiconductor capital equipment and semiconductor device product applications, decreased 13% in 2013 compared to the prior year. These advanced markets include general industrial, medical, solar, thin films, pharmaceutical and other markets. The decline in other advanced markets was primarily caused by a significant decrease in our solar product revenues, which declined by 73% in 2013 compared to the prior year, as the industry has contracted over the past few years due to oversupply. Excluding sales to customers in the solar market, revenues to other advanced markets declined by 5% in 2013 compared to the prior year. Approximately 32% of our net sales for 2013 were to other advanced markets and we anticipate that these markets will grow and could represent a larger portion of our revenue.

A significant portion of our net sales, is in international markets. During the years 2013, 2012 and 2011, international net sales accounted for approximately 46%, 49% and 52% of our net sales, respectively. A significant portion of our international net sales were sales in Japan and Korea. We expect that international net sales will continue to represent a significant percentage of our total net sales.

On March 12, 2013, we completed our acquisition of Alter S.r.l. ("Alter") located in Reggio Emilia, Italy. Alter develops advanced microwave power generators, components and systems for industrial microwave heating, microwave plasma coating and semiconductor applications. The purchase price net of cash acquired and after final debt and working capital adjustments, was $2.4 million. Total cash paid as of June 30, 2013, net of cash acquired was $2.0 million. During June 2013, one of two holdback provisions was met and we released $0.1 million. We will pay the remaining $0.4 million, subject to a final holdback provision being met.

In August 2013, we purchased $268 thousand of net assets of which $388 thousand was completed technology.

On August 29, 2012, we completed our acquisition of Plasmart, Inc. ("Plasmart") located in Daejeon, Korea. Plasmart develops radio frequency (RF), plasma generation and monitoring systems for the semiconductor, flat panel display, active matrix organic light emitting diodes and solar photovoltaic industries. The purchase price was $22.6 million, net of $0.1 million of cash acquired, after final working capital post-close adjustments.

Critical Accounting Policies and Estimates

Management's Discussion and Analysis of Financial Condition and Results of Operations discusses 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 requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. On an on-going basis, we evaluate our estimates and judgments, including those related to revenue recognition, allowance for doubtful accounts, inventory, warranty costs, stock-based compensation expense, intangible assets, goodwill and other long-lived assets, in-process research and development and income taxes. We base our estimates and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

We believe the following critical accounting policies affect the most significant judgments, assumptions and estimates we use in preparing our consolidated financial statements:

Revenue Recognition and Allowance for Doubtful Accounts. Revenue from product sales is recorded upon transfer of title and risk of loss to the customer provided that there is evidence of an arrangement, the sales price is fixed or determinable, and collection of the related receivable is reasonably assured. In most transactions, we have no obligations to our customers after the date products are shipped other than pursuant to warranty obligations. The Company does not frequently enter into arrangements with multiple deliverables however, for those revenue arrangements with multiple deliverables, we allocate revenue to each element based upon their relative selling price using vendor-specific objective evidence ("VSOE"), or third-party evidence ("TPE") or based upon the relative selling price using estimated prices if VSOE or TPE does not exist. We then recognize revenue on each deliverable in accordance with our policies for product and service revenue recognition. We defer the fair value of any undelivered elements until the undelivered element is delivered. Fair value is the price charged when the element is sold separately. Shipping and handling fees billed to customers, if any, are recognized as revenue. The related shipping and handling costs are recognized in cost of sales.

We monitor and track the amount of product returns, provide for sales return allowances and reduce revenue at the time of shipment for the estimated amount of such future returns, based on historical experience. While product returns have historically been within our expectations and the provisions established, there is no assurance that we will continue to experience the same return rates that we have in the past. Any significant increase in product return rates could have a material adverse impact on our operating results for the period or periods in which such returns materialize.

While we maintain a credit approval process, significant judgments are made by management in connection with assessing our customers' ability to pay at the time of shipment. Despite this assessment, from time to time, our customers are unable to meet their payment obligations. We continuously monitor our customers' credit worthiness, and use our judgment in establishing a provision for estimated credit losses based upon our historical experience and any specific customer collection issues that we have identified. While such credit losses have historically been within our expectations and the provisions established, there is no assurance that we will continue to experience the same credit loss rates that we have in the past. A significant change in the liquidity or financial position of our customers could have a material adverse impact on the collectability of accounts receivable and our future operating results.

Inventory. We value our inventory at the lower of cost (first-in, first-out method) or market. We regularly review inventory quantities on hand and record a provision to write-down excess and obsolete inventory to its estimated net realizable value, if less than cost, based primarily on our estimated forecast of product demand. Once our inventory value is written-down and a new cost basis has been established, the inventory value is not increased due to demand increases. Demand for our products can fluctuate significantly. A significant increase in the demand for our products could result in a short-term increase in the cost of inventory purchases as a result of supply shortages or a decrease in the cost of inventory purchases as a result of volume discounts, while a significant decrease in demand could result in an increase in the charges for excess inventory quantities on hand. In addition, our industry is subject to technological change, new product development and product technological obsolescence that could result in an increase in the amount of obsolete inventory quantities on hand. Therefore, any significant unanticipated changes in demand or technological developments could have a significant impact on the value of our inventory and our reported operating results. For 2013, 2012 and 2011, our total charges for excess and obsolete inventory totaled $21.7 million, $15.0 million and $14.9 million, respectively. Included in our total charges for excess and obsolete inventory in 2013 is $6.4 million of special charges for obsolete inventory related to a unique product in a solar application as a result of slowing market conditions, which provided uncertainty as to the net realizable value of this inventory.

Warranty Costs. We provide for the estimated costs to fulfill customer warranty obligations upon the recognition of the related revenue. We provide warranty coverage for our products ranging from 12 to 36 months, with the majority of our products ranging from 12 to 24 months. We estimate the anticipated costs of repairing our products under such warranties based on the historical costs of the repairs and any known specific product issues. The assumptions we use to estimate warranty accruals are re-evaluated periodically in light of actual experience and, when appropriate, the accruals are adjusted. Our determination of the appropriate level of warranty accrual is based upon estimates. Should product failure rates differ from our estimates, actual costs could vary significantly from our expectations.

Stock-Based Compensation Expense. We record compensation expense for all share-based payment awards to employees and directors based upon the estimated fair market value of the underlying instrument. Accordingly, share-based compensation cost is measured at the grant date, based upon the fair value of the award.

We typically issue restricted stock units ("RSUs") as stock-based compensation. We also provide employees the opportunity to purchase shares through an Employee Stock Purchase Plan ("ESPP"). For RSUs, the fair value is the stock price on the date of grant. For shares issued under our ESPP, we have estimated the fair value on the date of grant using the Black Scholes pricing model, which is affected by our stock price as well as assumptions regarding a number of complex and subjective variables. These variables include our expected stock price volatility over the term of the awards, expected life, risk free interest rate and expected dividends. Management determined that blended volatility, a combination of historical and implied volatility, is more reflective of market conditions and a better indicator of expected volatility than historical or implied volatility alone. We are also required to estimate forfeitures at the time of grant and revise those estimates in subsequent periods if actual forfeitures differ from those estimates.

Certain RSUs involve stock to be issued upon the achievement of performance conditions (performance shares) under our stock incentive plans. Such performance shares become available subject to time-based vesting conditions if, and to the extent that, financial or operational performance criteria for the applicable period are achieved. Accordingly, the number of performance shares earned will vary based on the level of achievement of financial or operational performance objectives for the applicable period. Until such time that our performance can ultimately be determined, each quarter we estimate the number of performance shares more likely than not to be earned based on an evaluation of the probability of achieving the performance objectives. Such estimates are revised, if necessary, in subsequent periods when the underlying factors change our evaluation of the probability of achieving the performance objectives. Accordingly, share-based compensation expense associated with performance shares may differ significantly from the amount recorded in the current period.

The assumptions used in calculating the fair value of share-based payment awards represents management's best estimates, but these estimates involve inherent uncertainties and the application of management's judgment. As a result, if factors change and we use different assumptions, our stock-based compensation expense could be materially different in the future.

Intangible Assets, Goodwill and Other Long-Lived Assets. As a result of our acquisitions, we have identified intangible assets and generated significant goodwill. Definite-lived intangible assets are valued based on estimates of future cash flows and amortized over their estimated useful life. Goodwill and indefinite-lived intangible assets are subject to annual impairment testing as well as testing upon the occurrence of any event that indicates a potential impairment. Intangible assets and other long-lived assets are also subject to an impairment test if there is an indicator of impairment. The carrying value and ultimate realization of these assets is dependent upon estimates of future earnings and benefits that we expect to generate from their use. If our expectations of future results and cash flows are significantly diminished, intangible assets and goodwill may be impaired and the resulting charge to operations may be material. When we determine that the carrying value of intangibles or other long-lived assets may not be recoverable based upon the existence of one or more indicators of impairment, we use the projected undiscounted cash flow method to determine whether an impairment exists, and then measure the impairment using discounted cash flows. To measure impairment for goodwill, we compare the fair value of our reporting units by measuring discounted cash flows to the book value of the reporting units. Goodwill would be impaired if the resulting implied fair value was less than the recorded book value of the goodwill.

The estimation of useful lives and expected cash flows require us to make significant judgments regarding future periods that are subject to some factors outside of our control. Changes in these estimates can result in significant revisions to the carrying value of these assets and may result in material charges to the results of operations.

We have elected to perform our annual goodwill impairment test as of October 31 of each year, or more often if events or circumstances indicate that there may be impairment. Goodwill is the amount by which the cost of acquired net assets exceeded the fair value of those net assets on the date of acquisition. We allocate goodwill to reporting units at the time of acquisition or when there is a change in the reporting structure and base that allocation on which reporting units will benefit from the acquired assets and liabilities. Reporting units are defined as operating segments or one level below an operating segment, referred to as a component. The estimated fair value of our reporting units was based on discounted cash flow models derived from internal earnings and internal and external market forecasts. Determining fair value requires the exercise of significant judgment, including judgments about appropriate discount rates, perpetual growth rates and the amount and timing of expected future cash flows. Discount rates are based on a weighted average cost of capital ("WACC"), which represents the average rate a business must pay its providers of debt and equity. The WACC used to test goodwill is derived from a group of comparable companies. Assumptions in estimating future cash flows are subject to a high degree of judgment and complexity. We make every effort to forecast these future cash flows as accurately as possible with the information available at the time the forecast is developed.

We have the option of first assessing qualitative factors to determine whether it is necessary to perform the current two-step impairment test or we can perform the two-step impairment test without performing the qualitative assessment. For the reporting units that did not experience any significant adverse changes in their business or reporting structures or any other adverse changes, and the reporting unit's fair value substantially exceeded its amount from the prior year assessment, we performed the qualitative "Step 0" assessment. In performing the qualitative Step 0 assessment, we considered certain events and circumstances specific to the reporting unit and to the entity as a whole, such as macroeconomic conditions, industry and market considerations, overall financial performance and cost factors when evaluating whether it is more likely than not that the fair value of the reporting unit is less than its carrying amount. For the remaining reporting units that did not meet these criteria we performed the two-step goodwill impairment test. Under the two-step goodwill impairment test, we compared the fair value of each reporting unit to its respective carrying amount, including goodwill. If the fair value of the reporting unit exceeds the fair value, the second step of the goodwill impairment test must be completed to measure the amount of impairment loss, if any. The second step compares the implied fair value of goodwill with the carrying value of goodwill. The implied fair value is determined by allocating the fair value of the reporting unit to all of the assets and liabilities of that unit, the excess of the fair value over amounts assigned to its assets and liabilities is the implied fair value of goodwill. If the implied fair value of goodwill is less than the carrying value of goodwill, an impairment loss is recognized equal to the difference.

As of October 31, 2013, we performed our annual impairment assessment of goodwill and determined that it is more likely than not that the fair values of the reporting units exceed their carrying amount. We will continue to monitor and evaluate the carrying value of goodwill. If market and economic conditions or business performance deteriorate, this could increase the likelihood of us recording an impairment charge. However, management believes it is not reasonably likely that an impairment will occur at any of its reporting units over the next twelve months.

In-Process Research and Development. We value tangible and intangible assets acquired through our business acquisitions, including in-process research and development ("IPR&D"), at fair value. We determine IPR&D through established valuation techniques for various projects for the development of new products and technologies and capitalize IPR&D as an intangible asset. If the projects are completed, the intangible asset will be amortized to earnings over the expected life of the completed product. If the R&D projects are abandoned, we will write-off the related intangible asset.

The value of IPR&D is determined using the income approach, which discounts expected future cash flows from projects under development to their net present value. Each project is analyzed and estimates and judgments are made to determine the technological innovations included in the utilization of core technology, the complexity, cost, time to complete development, any alternative future use or current technological feasibility and the stage of completion.

Income Taxes. We evaluate the realizability of our net deferred tax assets and assess the need for a valuation allowance on a quarterly basis. The future benefit to be derived from our deferred tax assets is dependent upon our ability to generate sufficient future taxable income to realize the assets. We record a valuation allowance to reduce our net deferred tax assets to the amount that may be more likely than not to be realized. To the extent we established a valuation allowance an expense is recorded within the provision for income taxes line in the consolidated statements of operations and comprehensive income. In future periods, if we were to determine that it was more likely than not that we would not be able to realize the recorded amount of our remaining net deferred tax assets, an adjustment to the valuation allowance would be recorded as an increase to income tax expense in the period such determination was made.

Accounting for income taxes requires a two-step approach to recognize and measure uncertain tax positions. The first step is to evaluate the tax position for recognition by determining if, based on the technical merits, it is more likely than not that the position will be sustained upon audit, including resolutions of related appeals or litigation processes, if any. The second step is to measure the tax benefit as the largest amount that is more than 50% likely of being realized upon ultimate settlement. We re-evaluate these uncertain tax positions on a quarterly basis. This evaluation is based on factors including, but not limited to, changes in facts or circumstances, changes in tax law, effectively settled issues under audit and new audit activity. Any change in these factors could result in the recognition of a tax benefit or an additional charge to the tax provision.

Results of Operations

The following table sets forth, for the periods indicated, the percentage of total net sales of certain line items included in our consolidated statements of operations and comprehensive income data:

	Years Ended December 31,		
	2013	2012	2011
Net revenues:			
Product	84.9%	83.4%	87.4%
Service	15.1	16.6	12.6
Total net revenues	100.0%	100.0%	100.0%
Cost of revenues:			
Product	50.4	48.2	47.1
Service	9.8	9.9	7.3
Total cost of revenues	60.2%	58.1%	54.4%
Gross profit	39.8%	41.9%	45.6%
Research and development	9.5	9.3	7.4
Selling, general and administrative	21.2	19.8	15.6
Litigation	—	0.8	—
Insurance reimbursement	(0.1)	—	—
Completed acquisition costs	—	0.2	—
Restructuring	0.2	0.1	—
Amortization of acquired intangible assets	0.3	0.1	0.1
Income from operations	8.7%	11.6%	22.5%
Interest income, net	0.1	0.1	0.1
Income before income taxes	8.8%	11.7%	22.6%
Provision for income taxes	3.5	4.2	6.8
Net income	5.3%	7.5%	15.8%

Year Ended December 31, 2013 Compared to 2012 and 2011

Net Revenues

(Dollars in millions)	Years Ended December 31, 2013	2012	2011	% Change in 2013	% Change in 2012
Product	$568.3	$536.8	$719.0	5.9%	(25.3)%
Service	101.1	106.7	103.5	(5.3)	3.1
Total net revenues	$669.4	$643.5	$822.5	4.0%	(21.8)%

Product revenues increased $31.5 million during 2013 compared to the prior year. Product revenues related to our semiconductor capital equipment manufacturer and semiconductor device manufacturer customers increased by $59.4 million, or 17.8%. The increase in the semiconductor markets we serve was mainly the result of volume increases in four consecutive quarters in 2013 in product revenues to the semiconductor markets. Our product revenues for other advanced markets, which exclude semiconductor capital equipment and semiconductor device product applications, decreased by $27.8 million, or 13.7%. The decrease in our non-semiconductor markets was primarily caused by volume decreases of $21.0 million in our solar market and $9.9 million in our general industrial market. The solar market has decreased over the past few years due to overcapacity. The industrial market decrease relates to specific projects.

Product revenues decreased $182.2 million during 2012 compared to 2011. Product revenues related to our semiconductor capital equipment manufacturer and semiconductor device manufacturer customers decreased by $101.3 million, or 23.3%, mainly the result of volume decreases throughout 2012. Our product revenues for other advanced markets, which exclude semiconductor capital equipment and semiconductor device product applications, decreased by $80.9 million, or 28.4%. We saw a significant decrease in the solar and LED markets, which decreased by an aggregate of 63.4%, as end market customers continued to utilize existing product shipments from 2010 and 2011.

Service revenues consisted mainly of fees for services related to the maintenance and repair of our products, software maintenance, installation services and training. Service revenues decreased $5.6 million during 2013 compared to the prior year. The decrease is primarily attributed to the timing and fulfillment of service orders as we transitioned and merged one of our service locations into an existing service site. Service revenues increased $3.2 million during 2012 compared to 2011. The increase related primarily to our foreign locations where we had made investments in our service organizations.

Total international net revenues, including product and service, were $305.5 million for 2013 or 45.6% of net sales, compared to $316.6 million for 2012, or 49.2% of net sales, and $431.4 million, or 52.5% of net sales, for 2011.

The following table sets forth our net revenues by reportable segment:

Net Revenues

(Dollars in millions)	Years Ended December 31, 2013	2012	2011	% Change in 2013	% Change in 2012
Advanced Manufacturing Capital Equipment	$ 528.0	$ 479.8	$ 647.9	10.1%	(26.0)%
Analytical Solutions Group	56.3	62.8	61.3	(10.3)	2.4
Europe Region Sales & Service	48.5	51.4	75.3	(5.7)	(31.6)
Asia Region Sales & Service	218.0	229.7	305.4	(5.1)	(24.8)
Corporate, Eliminations and Other	(181.4)	(180.2)	(267.4)	(0.7)	32.6
Total net revenues	$ 669.4	$ 643.5	$ 822.5	4.0%	(21.8)%

Net revenues for the Advanced Manufacturing Capital Equipment segment increased by 10.1% in 2013 compared to the prior year. This increase is mainly due to an increase of 23.8% in revenues from our top two customers who represented approximately 29% of our total revenues in 2013. These customers operate mainly in the semiconductor market, which increased by 14% in 2013 compared to 2012.

Net revenues for the Analytical Solutions Group segment decreased by 10.3% in 2013 compared to the prior year and increased by 2.4% in 2012 compared to the prior year. This segment sells more to our other advanced markets rather than to our semiconductor market. We saw an overall decrease in other advanced markets of 12.7% in 2013 compared to 2012, largely driven by decreases in our solar and general industrial markets. While we saw an overall decrease in in other advanced markets in 2012 of 24.3%, the overall increase in 2012 in the Analytical Solutions Group was primarily driven by an increase in sales in our general and industrial markets, which increased by 7.2% compared to the prior year.

The Europe Region Sales & Service segment decreased by 5.7% in 2013 compared to the prior year. The decrease in sales is primarily attributed to the timing of certain projects from a few customers in France.

The Asia Region Sales & Service segment revenues decreased by 5.1% in 2013 compared to the prior year. These decreases are primarily the result of decreases in sales to other advanced markets, mainly in the solar market which decreased by 80.1%. In addition, foreign exchange rates, primarily related to the Japanese Yen which decreased by approximately 22% in 2013, had an unfavorable impact on revenues for the Asia Region Sales & Service segment. Excluding the impact of solar and unfavorable foreign exchange revenues for the Asia Region Sales & Service segment increased by 2.9%.

Net revenues for the Advanced Manufacturing Capital Equipment segment, Europe Region Sales & Service segment and the Asia Region Sales & Service segment decreased by 26.0%, 31.6% and 24.8%, respectively, for 2012 compared to 2011. This was primarily caused by the decrease in our semiconductor capital equipment manufacturer and semiconductor device manufacturer customers which decreased 23.3% in the same period as noted above. The majority of our sales in these three reportable segments are sold to the semiconductor capital equipment and semiconductor device manufacturers. In addition, the decrease in the Europe Region Sales & Service segment was also impacted by a decrease related to the solar market.

The following is gross profit as a percentage of net revenues by product and service:

Gross Profit

(As a percentage of net revenues)	Years Ended December 31, 2013	2012	2011	% Points Change in 2013	% Points Change in 2012
Product	40.6%	42.2%	46.1%	(1.6)	(3.9)
Service	35.3	40.5	42.0	(5.2)	(1.5)
Total gross profit percentage	39.8%	41.9%	45.6%	(2.1)	(3.7)

Gross profit on product revenues decreased by 1.6 percentage points during 2013 compared to the prior year. The decrease was primarily due to a decrease of 2.7 percentage points due to unfavorable product mix, a decrease of 0.9 percentage points due to higher excess and obsolete inventory charges and 0.5 percentage points from unfavorable foreign exchange. These decreases were partially offset by an increase of 1.2 percentage points due to favorable revenue volumes and 1.1 percentage points due to lower overhead expenses.

Gross profit on product revenues decreased by 3.9 percentage points during 2012 compared to the prior year. The decrease was primarily due to a decrease of 3.7 percentage points due to unfavorable product revenue volume and overhead absorption from lower production and 0.3 percentage points due to higher excess and obsolete inventory charges. These decreases were partially offset by an increase of 0.2 percentage points due to lower compensation related expenses.

Cost of service revenues consists primarily of costs for providing services for repair and training which includes salaries, related expenses and other overhead costs. Service gross profit for 2013 decreased by 5.2 percentage points compared to the prior year. The decrease was primarily attributed to a decrease of 2.3 percentage points due to unfavorable product mix, a decrease of 1.1 percentage points due to unfavorable foreign exchange, a decrease of 0.6 percentage points due to higher overhead charges, a decrease of 0.5 percentage points due to unfavorable revenue volumes and a decrease of 0.4 percentage points due to higher warranty charges.

Service gross profit for 2012 decreased by 1.5 percentage points compared to the prior year. This decrease was mainly attributed to a decrease of 3.6 percentage points due to higher overhead spending. This decrease was partially offset by an increase of 1.9 percentage points due to favorable product mix and an increase of 0.5 percentage points due to favorable revenue volume.

The following is gross profit as a percentage of net revenues by reportable segment:

Gross Profit

	Years Ended December 31,			% Points Change in 2013	% Points Change in 2012
(As a percentage of net revenues)	**2013**	**2012**	**2011**		
Advanced Manufacturing Capital Equipment	35.5%	35.7%	40.7%	(0.2)	(5.0)
Analytical Solutions Group	52.3	52.2	51.9	0.1	0.3
Europe Region Sales & Service	28.0	29.5	28.3	(1.5)	1.2
Asia Region Sales & Service	19.7	16.1	14.8	3.6	1.3
Corporate, Eliminations and Other	3.9	(7.4)	(4.8)	11.3	(2.6)
Total net revenues	39.8%	41.9%	45.6%	(2.1)	(3.7)

Gross profit for the Advanced Manufacturing Capital Equipment segment decreased 0.2 percentage points and 5.0 percentage points in 2013 and 2012, respectively, compared to the prior year. The decrease of 0.2 percentage points in 2013 is primarily due to higher excess and obsolete inventory charges and unfavorable product mix, partially offset by an increase in revenue volume. The decrease of 5.0 percentage points in 2012 is primarily due to a decline in revenue volume.

Gross profit for the Analytical Solutions Group increased 0.1 percentage points and 0.3 percentage points in 2013 and 2012, respectively, compared to the prior year. The slight increase of 0.1 percentage points in 2013 is primarily attributed to favorable product mix, partially offset by unfavorable revenue volume. The increase of 0.3 percentage points in 2012 is primarily attributed to product mix, favorable revenue volume and lower warranty charges, partially offset by lower overhead spending.

Gross profit for the Europe Region Sales & Service segment decreased 1.5 percentage points in 2013 as compared to 2012 and increased 1.2 percentage points in 2012 as compared to 2011. The decrease of 1.5 percentage points in 2013 is primarily related to unfavorable product mix. The increase of 1.2 percentage points in 2012 is primarily related to favorable product mix, partially offset by a decline in revenue volume.

Gross profit for the Asia Region Sales & Service segment increased 3.6 percentage points and 1.3 percentage points in 2013 and 2012, respectively, compared to the prior year. The increase of 3.6 percentage points in 2013 is primarily related to favorable product mix, lower excess and obsolete inventory charges and lower overhead spending, partially offset by unfavorable foreign exchange. The increase of 1.3 percentage points in 2012 is primarily related to favorable product mix, partially offset by lower revenue volume.

Research and Development

(Dollars in millions)	Years Ended December 31, 2013	2012	2011	% Change in 2013	% Change in 2012
Research and development expenses	$63.6	$60.1	$61.0	5.7%	(1.5)%

Research and development expenses increased $3.5 million during 2013 compared to the prior year. The increase is primarily attributed to an increase of $3.4 million in compensation-related costs, including variable compensation and an increase of $0.4 million in project materials. These increases are partially offset by a decrease of $0.6 million in consulting costs.

Research and development expenses decreased $0.9 million during 2012 compared to the prior year. The decrease resulted from additional cost control measures including a decrease of $0.9 million in consulting costs and a $0.5 million decrease in project materials. These decreases are partially offset by a $0.4 million increase in patent related costs.

Our research and development is primarily focused on developing and improving our instruments, components, subsystems and process control solutions to improve process performance and productivity.

We have thousands of products and our research and development efforts primarily consist of a large number of projects related to these products, none of which is individually material to us. Current projects typically have durations of 3 to 30 months depending upon whether the product is an enhancement of existing technology or a new product. Our current initiatives include projects to enhance the performance characteristics of older products, to develop new products and to integrate various technologies into subsystems. These projects support in large part, the transition in the semiconductor industry to smaller integrated circuit geometries and in the flat panel display and solar markets to larger substrate sizes, which require more advanced process control technology. Research and development expenses consist primarily of salaries and related expenses for personnel engaged in research and development, fees paid to consultants, material costs for prototypes and other expenses related to the design, development, testing and enhancement of our products.

We believe that the continued investment in research and development and ongoing development of new products are essential to the expansion of our markets, and we expect to continue to make significant investment in research and development activities. We are subject to risks if products are not developed in a timely manner, due to rapidly changing customer requirements and competitive threats from other companies and technologies. Our success primarily depends on our products being designed into new generations of equipment for the semiconductor industry and other advanced technology markets. We develop products that are technologically advanced so that they are positioned to be chosen for use in each successive generation of semiconductor capital equipment. If our products are not chosen to be designed into our customers' products, our net revenues may be reduced during the lifespan of those products.

Selling, General and Administrative

(Dollars in millions)	Years Ended December 31, 2013	2012	2011	% Change in 2013	% Change in 2012
Selling, general and administrative expenses	$142.0	$127.2	$128.0	11.7%	(0.6)%

Selling, general and administrative expenses increased $14.8 million during 2013 compared to the prior year. The increase is primarily attributed to a $10.0 million increase in compensation related costs primarily related to variable compensation and higher fringe benefit costs, a $2.6 million increase related to executive retirement costs recorded in the fourth quarter of 2013 as a result of the retirement of our Chief Executive Officer in December 2013 and a $1.6 million increase in consulting costs.

Selling, general and administrative expenses decreased $0.8 million during 2012 compared to the prior year. The decrease consists mainly of a $2.5 million favorable impact from foreign exchange fluctuations, a $0.5 million decrease in facilities related expenses, a $0.4 million decrease in recruiting and relocation expenses and a $0.3 million decrease in advertising and investor relations expenses. These decreases are partially offset by a $1.8 million increase in professional fees, primarily related to legal expenses, a $0.5 million increase in depreciation expense and a $0.5 million increase in bad debt expense.

Litigation

(Dollars in millions)	Years Ended December 31, 2013	2012	2011	% Change in 2013	% Change in 2012
Litigation	$—	$5.3	$—	(100.0)%	100.0%

Litigation with shareholders of one of our former subsidiaries was settled for $5.3 million during the third quarter of 2012. The complaint alleged certain claims against us including breach of contract, implied covenants, and statutory violations. The claims sought unspecified damages and equitable relief. This litigation was long standing and we made the decision to reach a settlement primarily to eliminate future legal expenses related to the suit.

Insurance Reimbursement

(Dollars in millions)	Years Ended December 31, 2013	2012	2011	% Change in 2013	% Change in 2012
Insurance reimbursement	$(1.1)	$—	$—	(100.0)%	—%

In the second quarter of 2013, we recovered $1.1 million from our insurance company relating to the 2012 litigation settlement with certain former shareholders that we settled in the third quarter of 2012.

Completed Acquisition Costs

(Dollars in millions)	Years Ended December 31, 2013	2012	2011	% Change in 2013	% Change in 2012
Completed acquisition costs	$0.2	$1.3	$—	(86.4)%	100.0%

We incurred $0.2 million of acquisition costs in 2013 related to our March 2013 acquisition of Alter. These costs are comprised of legal fees. We incurred $1.3 million of acquisition costs in 2012 related to our August 2012 acquisition of Plasmart. These costs consisted of investment banking fees, legal fees and due diligence costs.

Restructuring

(Dollars in millions)	Years Ended December 31, 2013	2012	2011	% Change in 2013	% Change in 2012
Restructuring	$1.4	$0.3	$—	297.1%	100.0%

During 2013, we incurred restructuring charges primarily related to the consolidation of certain facilities. The majority of these costs were related to severance expenses and these programs were substantially completed by December 31, 2013. The plans included a small reduction in headcount. During the fourth quarter of 2012, we implemented a workforce reduction plan as a result of a slowdown in our business. We reduced our worldwide workforce by 84 people and recorded a restructuring charge of $0.3 million. This restructuring was substantially complete at December 31, 2012.

Amortization of Acquired Intangible Assets

(Dollars in millions)	Years Ended December 31, 2013	2012	2011	% Change in 2013	% Change in 2012
Amortization of acquired intangible assets	$2.1	$1.0	$1.0	106.7%	2.1%

Amortization increased by $1.1 million during 2013 compared to the prior year. This increase is primarily attributed to an increase in intangible assets from our August 2012 acquisition of Plasmart and our March 2013 acquisition of Alter, offset by intangible assets that became fully amortized. Amortization expense remained relatively flat during 2012 compared to the prior year. Increased amortization expense from our August 2012 Plasmart acquisition was offset by intangible assets that became fully amortized during the year.

Interest Income, Net

(Dollars in millions)	Years Ended December 31, 2013	2012	2011	% Change in 2013	% Change in 2012
Interest income, net	$0.9	$0.9	$1.1	—%	(18.9)%

Net interest income for 2013 remained flat compared to the prior year. Net interest income decreased $0.2 million during 2012 compared to the prior year, partially due to higher interest expense related to the acquisition of Plasmart, which had debt when we acquired them in August 2012.

Provision for Income Taxes

(Dollars in millions)	Years Ended December 31, 2013	2012	2011	% Change in 2013	% Change in 2012
Provision for income taxes	$23.5	$27.1	$56.3	(13.2)%	(51.9)%

The provision for income taxes in 2013, 2012 and 2011 are comprised of U.S. federal, state and foreign income taxes.

Our effective tax rate for the years 2013, 2012 and 2011 was 39.7%, 36.1%, and 30.3%, respectively. The effective tax rate in 2013, and related income tax expense was higher than the U.S. statutory tax rate primarily due to a decision made during the quarter ended September 30, 2013 to pay currently, at a substantially reduced rate, taxes on certain accumulated earnings of its Israeli subsidiary relating to calendar year periods 2002-2011 covered under its tax holiday that expired on December 31, 2011. This additional charge was partially offset by additional U.S. tax incentives realized and recognized as discrete events during the quarter ended September 30, 2013, and the geographic mix of income and profits earned by our international subsidiaries being taxed at rates lower than the U.S. statutory rate. Additionally, certain tax incentives realized by the Company were recognized as discrete events during the quarter ended March 31, 2013. These incentives were reinstated under The American Taxpayer Relief Act of 2012 that was signed into law on January 2, 2013.

The effective tax rate in 2012 and related income tax expense is higher than the U.S. statutory tax rate primarily due to the expiration of certain tax incentives under U.S. tax law noted above, and non-deductible acquisition costs that were offset in part by geographic mix of income and profits earned by our international subsidiaries being taxed at rates lower than the U.S. statutory tax rate. Had the extension been enacted prior to January 1, 2013, our effective tax rate for 2012 would have been reduced by approximately 3%.

The effective tax rate in 2011 and related income tax expense was lower than the U.S. statutory tax rate primarily due to geographic mix of income and profits earned by our international subsidiaries being taxed at rates lower than the U.S. statutory tax rate.

At December 31, 2013, our total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately $47.7 million. At December 31, 2012, our total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately $40.7 million. The net increase at December 31, 2013 from December 31, 2012 was primarily attributable to an increase in new and existing reserves for uncertain tax positions in 2013. At December 31, 2013, there were $24.8 million, excluding interest and penalties, of net unrecognized tax benefits that, if recognized, would affect our annual effective tax rate. We accrued interest and, if applicable, penalties for any uncertain tax positions. Interest and penalties were classified as a component of income tax expense. At December 31, 2013, 2012 and 2011, we had accrued interest on unrecognized tax benefits of approximately $2.2 million, $1.6 million and $1.0 million, respectively.

Over the next 12 months it is reasonably possible that we may recognize approximately $12.6 million of previously net unrecognized tax benefits related to various U.S. federal, state and foreign tax positions as a result of the conclusion of various audits and the expiration of statutes of limitations. We are subject to examination by U.S. federal, state and foreign tax authorities. The Internal Revenue Service commenced an examination of our U.S. federal tax filings for tax years 2007 through 2009 during the quarter ended June 30, 2012. As a result, the U.S. statute of limitations remains open between tax years 2007 through present. The statute of limitations for our tax filings in other jurisdictions varies between fiscal years 2006 through present.

On a quarterly basis, we evaluate both positive and negative evidence that affect the realizability of net deferred tax assets and assess the need for a valuation allowance. The future benefit to be derived from our deferred tax assets is dependent upon our ability to generate sufficient future taxable income to realize the assets. During 2013, we decreased our valuation allowance by $0.4 million primarily related to the expiration of US capital loss carry forwards. In 2012, we increased our valuation allowance by $1.0 million primarily related to an increase in state tax credit carry forwards because we determined it is more likely than not that the deferred tax assets related to these attributes will not be realized. In 2011, we increased our valuation allowance by $1.2 million primarily related to capital losses incurred from our foreign affiliates because we determined it is more likely than not that the deferred tax assets related to these attributes will not be realized.

In 2013, we recorded a net benefit to income tax expense of $0.1 million, excluding interest and penalties, due to discrete reserve releases primarily related to the statutes of limitations expiring. In 2011, we recorded a net benefit to income tax expense of $2.1 million, excluding interest and penalties, due to discrete reserve releases primarily related to the effective settlement of a German tax audit for years 2001 through 2005.

During 2006, we received a notification letter from the Israeli Ministry of Industry Trade and Labor (“MITL”) indicating that our Israeli operations were in compliance with requirements relating to the tax holiday granted to our manufacturing operations in Israel in 2001. This tax holiday expired at December 31, 2011 and was subject to meeting continued investment, employment and other requirements under the guidelines of the MITL. This tax holiday resulted in income tax savings of approximately $1.0 million and $2.7 million for the years 2011 and 2010, respectively. Upon expiration of its tax holiday, we elected to be treated under a new preferential Israeli tax regime under which a tax rate of 10% applies for 2012, is reduced to 7% for 2013, and increased to 9% for 2014. Our Israeli subsidiary is currently under examination for tax years 2009 through 2011 and expects the audit to be effectively settled during the quarter ended March 31, 2014.

On September 13, 2013, the U.S. Department of the Treasury and Internal Revenue Service released final tangible property regulations that provide guidance on the tax treatment regarding the deduction and capitalization of expenditures related to tangible property. While early adoption is available, the effective date to implement these regulations is for tax years beginning on or after January 1, 2014. The Company is currently assessing these rules and the impact to its financial statements, if any, but believes adoption of these regulations will not have a material impact on its consolidated results of operations, cash flows or financial position.

Our future effective income tax rate depends on various factors, such as tax legislation and the geographic composition of our pre-tax income. We monitor these factors and timely adjust our effective tax rate accordingly.

Additionally, the effective tax rate could be adversely affected by changes in the valuation of deferred tax assets and liabilities. In particular, the carrying value of deferred tax assets, which are predominantly in the United States, is dependent on our ability to generate sufficient future taxable income in the United States. While we believe we have adequately provided for all tax positions, amounts asserted by taxing authorities could materially differ from our accrued positions as a result of uncertain and complex application of tax regulations. Additionally, the recognition and measurement of certain tax benefits include estimates and judgment by management and inherently includes subjectivity. Accordingly, we may record additional provisions due to U.S. federal, state, and foreign tax-related matters in the future as we revise estimates or settle or otherwise resolve the underlying matters.

Liquidity and Capital Resources

Cash, cash equivalents and short-term marketable investments totaled $589.6 million at December 31, 2013, a decrease of $25.6 million compared to $615.2 million at December 31, 2012. This decrease was mainly due to dividend payments to common stockholders and net purchases of long-term investments, partially offset by net income and non-cash net charges. The primary driver in our current and anticipated future cash flows is and will continue to be cash generated from operations, consisting mainly of our net income, excluding non-cash changes and changes in operating assets and liabilities. In periods when our sales are growing, higher sales to customers will result in increased trade receivables, and inventories will generally increase as we build products for future sales. This may result in lower cash generated from operations. Conversely, in periods when our sales are declining, our trade accounts receivable and inventory balances will generally decrease, resulting in increased cash from operations.

Net cash provided by operating activities was $76.1 million for 2013 and resulted mainly from net income of $35.8 million, which included non-cash net charges of $53.4 million, partially offset by an increase in working capital of $9.3 million. The increase in working capital consisted primarily of an increase in trade accounts receivable of $36.2 million and an increase in inventories of $29.8 million. These increases are partially offset by an increase in income taxes of $27.2 million, an increase in accounts payable of $23.2 million and an increase in accrued compensation and other liabilities of $7.7 million. The increase in trade accounts receivable and accounts payable was caused by an increase in our business in the fourth quarter of 2013 compared to the fourth quarter of 2012.

Net cash provided by operating activities was $137.2 million for 2012 and resulted mainly from net income of $48.0 million, which included non-cash net charges of $43.4 million and a decrease in working capital of $44.0 million. The decrease in working capital consisted primarily of a decrease in trade accounts receivable of $38.3 million, a decrease in other current assets of $7.7 million and a decrease in inventory of $5.3 million. These decreases are partially offset by a decrease in accounts payable of $8.3 million. The decrease in accounts payable and accounts receivable was caused by a slowdown in our business in the fourth quarter of 2012 compared to the fourth quarter of 2011.

Net cash used in investing activities was $36.5 million for 2013 and resulted primarily from the net purchases of investments of $21.6 million, $12.4 million used for the purchases of production related equipment and facility expansion and $2.3 million, primarily used for the acquisition of Alter. Net cash used in investing activities was $117.9 million for 2012 and resulted primarily from the net purchases of investments of $76.1 million, the acquisition of Plasmart of $22.6 million net of cash acquired and $17.7 million in purchases of production related equipment.

Net cash used in financing activities was $37.1 million for 2013 and consisted primarily of $34.0 million in dividend payments made to common stockholders and $2.9 million for the repurchase of Common Stock. Net cash used in financing activities was $47.0 million for 2012 and consisted primarily of $32.7 million in dividend payments made to common stockholders, $11.5 million for the repurchase of Common Stock, and $6.5 million of net payments made on short-term borrowings. These decreases were partially offset by $2.1 million of tax benefit from stock-based compensation.

Our Japanese subsidiary has lines of credit and short-term borrowing arrangements with two financial institutions, which generally expire and are renewed at three month intervals. These lines of credit provide for aggregate borrowings as of December 31, 2013 of up to an equivalent of $21.9 million U.S. dollars. There were no borrowings outstanding under these arrangements at December 31, 2013 and December 31, 2012

We also had various lines of credit and short and long-term borrowing arrangements as a result of our acquisition of Plasmart in 2012 and Alter in March 2013. All of these lines of credit and borrowing arrangements were paid off and terminated in 2013. There were no outstanding balances at December 31, 2013 and 2012.

We have provided financial guarantees for certain unsecured borrowings and have standby letters of credit, some of which do not have fixed expiration dates. At December 31, 2013, our maximum exposure as a result of these performance bonds and standby letters of credit was approximately $1.3 million.

On July 25, 2011, our board of directors approved a share repurchase program for the repurchase of up to an aggregate of $200 million of our Common Stock from time to time in open market purchases, privately negotiated transactions or through other appropriate means. The timing and quantity of any shares repurchased will depend upon a variety of factors, including business conditions, stock market conditions and business development activities, including, but not limited to, merger and acquisition opportunities. These repurchases may be commenced, suspended or discontinued at any time without prior notice. During 2013, we repurchased approximately 107,000 shares of our Common Stock for $2.9 million at an average price of $26.87 per share. During 2012, we repurchased approximately 434,000 shares of our Common Stock for $11.5 million at an average price of $26.46 per share.

Holders of our Common Stock are entitled to receive dividends when they are declared by our board of directors. For the year ended December 31, 2013, we paid cash dividends of $34.0 million in aggregate, or $0.64 per share. Future dividend declarations, if any, as well as the record and payment dates for such dividends, are subject to the final determination of our board of directors.

On February 10, 2014, our board of directors declared a quarterly cash dividend of $0.16 per share to be paid on March 14, 2014 to shareholders of record as of March 3, 2014.

Our total cash and cash equivalents and short-term marketable investments at December 31, 2013 consisted of $321.4 million held in the U.S. and $268.2 million held by our foreign subsidiaries, substantially all of which would be subject to tax in the U.S. if returned to the U.S. We believe our existing U.S. cash and short-term investment balances are adequate to meet domestic operating needs, including estimated working capital, planned capital expenditure requirements and any future cash dividends, if declared, or share repurchases in the next twelve months and foreseeable future.

Future payments due under debt, lease and purchase commitment obligations as of December 31, 2013 are as follows:

	Payment Due By Period					
Contractual Obligations (In thousands)	**Total**	**Less than 1 Year**	**1-3 years**	**3-5 years**	**After 5 years**	**Other (1)**
Operating lease obligations	$ 28,045	$ 7,484	$ 9,916	$6,790	$ 3,855	$ —
Purchase obligations(2)	132,018	125,453	6,565	—	—	—
Other long-term liabilities reflected on the Balance Sheet under U.S. GAAP(3)	63,073	—	—	—	16,328	46,745
Total	$223,136	$132,937	$16,481	$6,790	$20,183	$46,745

(1) This balance relates to our reserve for uncertain tax positions.

(2) As of December 31, 2013, we have entered into purchase commitments for certain inventory components and other equipment and services used in our normal operations. The majority of these purchase commitments covered by these arrangements are for periods of less than one year and aggregate to approximately $132 million.

(3) The majority of this balance relates to reserve for uncertain tax positions and accrued compensation for certain executives related to supplemental retirement benefits.

We believe that our current cash and investments position and available borrowing capacity, together with the cash anticipated to be generated from operations, will be sufficient to satisfy our estimated working capital, planned capital expenditure requirements, and any future cash dividends declared by our board of directors or share repurchases through at least the next 12 months and the foreseeable future.

Derivatives

We enter into derivative instruments for risk management purposes only, including derivatives designated as hedging instruments and those utilized as economic hedges. We operate internationally, and in the normal course of business, are exposed to fluctuations in interest rates and foreign exchange rates. These fluctuations can increase the costs of financing, investing and operating the business. We have used derivative instruments, such as forward contracts, to manage certain foreign currency exposure.

By nature, all financial instruments involve market and credit risks. We enter into derivative instruments with major investment grade financial institutions and no collateral is required. We have policies to monitor the credit risk of these counterparties. While there can be no assurance, we do not anticipate any material non-performance by any of these counterparties.

We hedge a portion of our forecasted foreign currency denominated intercompany sales of inventory, over a maximum period of eighteen months, using forward foreign exchange contracts accounted for as cash-flow hedges related to Japanese, South Korean, British and Euro currencies. To the extent these derivatives are effective in offsetting the variability of the hedged cash flows, and otherwise meet the hedge accounting criteria, changes in the derivatives' fair value are not included in current earnings but are included in accumulated other comprehensive income in stockholders' equity. These changes in fair value will subsequently be reclassified into earnings, as applicable, when the forecasted transaction occurs. To the extent that a previously designated hedging transaction is no longer an effective hedge, any ineffectiveness measured in the hedging relationship is recorded currently in earnings in the period it occurs. The cash flows resulting from forward exchange contracts are classified in the consolidated statements of cash flows as part of cash flows from operating activities. We do not enter into derivative instruments for trading or speculative purposes.

To the extent that hedge accounting criteria is not met, the foreign currency forward contracts are considered economic hedges and changes in the fair value of these contracts are recorded immediately in earnings in the period in which they occur. These include hedges that are used to reduce exchange rate risks arising from the change in fair value of certain foreign currency denominated assets and liabilities (i.e., payables, receivables) and other economic hedges where the hedge accounting criteria were not met.

We had forward exchange contracts with notional amounts totaling $21.0 million outstanding at December 31, 2013 of which $9.3 million were outstanding to exchange Korean Won to U.S. dollars. We had forward exchange contracts with notional amounts totaling $41.4 million outstanding at December 31, 2012 of which $19.4 million were outstanding to exchange Korean won to U.S. dollars.

As of December 31, 2013, the unrealized gain that will be reclassified from accumulated other comprehensive income to earnings over the next twelve months is immaterial. The ineffective portions of the derivatives are recorded in selling, general and administrative costs and were immaterial in 2013, 2012 and 2011.

We sometimes hedge certain intercompany and other payables with forward exchange contracts. Typically, as these derivatives hedge existing amounts that are denominated in foreign currencies, the derivatives do not qualify for hedge accounting. The foreign exchange loss on these derivatives was a $0.2 million in 2013, $1.6 million in 2012 and zero in 2011.

Realized and unrealized gains and losses on forward exchange contracts that do not qualify for hedge accounting are recognized currently in earnings. The cash flows resulting from forward exchange contracts are classified in our consolidated statements of cash flows as part of cash flows from operating activities. We do not hold or issue derivative financial instruments for trading purposes.

Gains and losses on forward exchange contracts that qualify for hedge accounting are classified in cost of products in 2013 and totaled a gain of $1.1 million. In 2012 and 2011, these gains and losses were classified in selling, general and administrative and totaled a loss of $0.9 million and gain of $4.0 million, respectively.

Off-Balance Sheet Arrangements

We do not have any financial partnerships with unconsolidated entities, such as entities often referred to as structured finance, special purpose entities or variable interest entities which are often established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes. Accordingly, we are not exposed to any financing, liquidity, market or credit risk that could arise if we had such relationships.

Recently Issued Accounting Pronouncements

On July 18, 2013, the Financial Accounting Standards Board issued Accounting Standards Update ("ASU") 2013-11, "*Income Taxes (Topic 740): Presentation of an Unrecognized Tax Benefit When a Net Operating Loss Carry-forward, a Similar Tax Loss, or a Tax Credit Carry-forward Exists.*" Under the new standard, unrecognized tax benefits will be netted against all available same-jurisdiction loss or other tax carry-forwards that would be utilized, rather than only against carry-forwards that are created by unrecognized tax benefits. The provisions of this ASU are effective for interim and annual periods beginning on or after December 15, 2013. We do not expect the adoption of ASU No. 2013-11 to have a material effect on our consolidated financial statements.

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

Market Risk and Sensitivity Analysis

Our primary exposures to market risks include fluctuations in interest rates on our investment portfolio, short-term debt as well as fluctuations in foreign currency exchange rates.

Foreign Exchange Rate Risk

We mainly enter into forward exchange contracts to reduce currency exposure arising from intercompany sales of inventory. We sometimes also enter into forward exchange contracts to reduce foreign exchange risks arising from the change in fair value of certain foreign currency denominated assets and liabilities.

We had forward exchange contracts with notional amounts totaling $21.8 million outstanding and a net fair value asset of $0.3 million at December 31, 2013. We had forward exchange contracts with notional amounts totaling $41.4 million outstanding and a net fair value liability of $0.3 million at December 31, 2012. The potential fair value loss for a hypothetical 10% adverse change in the currency exchange rate on our forward exchange contracts at December 31, 2013 and 2012 would be immaterial.

Interest Rate Risk

Due to its short-term duration, the fair value of our cash and investment portfolio at December 31, 2013 and 2012 approximated its carrying value. Interest rate risk was estimated as the potential decrease in fair value resulting from a hypothetical 10% increase in interest rates for securities contained in the investment portfolio. The resulting hypothetical fair value was not materially different from the year-end carrying values.

From time to time, we have outstanding lines of credit and short-term borrowings with variable interest rates, primarily denominated in Japanese yen. There were no borrowings outstanding under these arrangements at December 31, 2013 or December 31, 2012.

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

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Shareholders of
MKS Instruments, Inc.:

In our opinion, the accompanying consolidated balance sheets and the related consolidated statements of operations and comprehensive income, of stockholders' equity, and of cash flows present fairly, in all material respects, the financial position of MKS Instruments, Inc. and its subsidiaries at December 31, 2013 and December 31, 2012, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2013 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2013, based on criteria established in *Internal Control — Integrated Framework (1992)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). The Company's management is responsible for these financial statements, for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Report on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on these financial statements and on the Company's internal control over financial reporting based on our integrated audits. We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether effective internal control over financial reporting was maintained in all material respects. Our audits of the financial statements included examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

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

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

As described in Management's Report on Internal Control over Financial Reporting, management has excluded Alter S.r.l. ("Alter") from its assessment of internal control over financial reporting as of December 31, 2013 because Alter was acquired by the Company in a purchase business combination during 2013. We have also excluded Alter from our audit of internal control over financial reporting. Alter is a wholly-owned subsidiary whose total assets and total revenues represent less than 1%, respectively, of the related consolidated financial statement amounts as of and for the year ended December 31, 2013.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts
February 26, 2014

MKS Instruments, Inc.

Consolidated Balance Sheets

	December 31, 2013	December 31, 2012
	(in thousands, except share data)	
ASSETS		
Current assets:		
Cash and cash equivalents	$ 288,902	$ 287,588
Short-term investments	300,715	327,653
Trade accounts receivable, net of allowances of $2,751 and $2,879 at December 31, 2013 and 2012, respectively	116,744	82,060
Inventories	142,727	134,639
Deferred income taxes	13,428	8,194
Other current assets	16,715	28,048
Total current assets	879,231	868,182
Property, plant and equipment, net	77,536	80,516
Long-term investments	60,405	12,158
Goodwill	150,909	150,733
Intangible assets, net	13,090	11,561
Other assets	31,847	29,412
Total assets	$1,213,018	$1,152,562
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 40,074	$ 16,803
Accrued compensation	43,662	20,955
Income taxes payable	10,444	4,148
Other current liabilities	34,242	37,405
Total current liabilities	128,422	79,311
Other liabilities	63,073	61,095
Commitments and contingencies (Note 23)		
Stockholders' equity:		
Preferred Stock, $0.01 par value, 2,000,000 shares authorized; none issued and outstanding	—	—
Common Stock, no par value, 200,000,000 shares authorized; 53,363,450 and 52,748,849 shares issued and outstanding at December 31, 2013 and 2012, respectively	113	113
Additional paid-in capital	730,571	718,005
Retained earnings	278,966	278,583
Accumulated other comprehensive income	11,873	15,455
Total stockholders' equity	1,021,523	1,012,156
Total liabilities and stockholders' equity	$1,213,018	$1,152,562

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

MKS Instruments, Inc.

Consolidated Statements of Operations and Comprehensive Income

	Years Ended December 31,		
	2013	2012	2011
	(in thousands, except per share data)		
Net Revenues:			
Products	$568,317	$536,774	$719,002
Services	101,103	106,734	103,515
Total net revenues	669,420	643,508	822,517
Cost of revenues:			
Cost of products	337,464	310,485	387,445
Cost of service	65,382	63,544	60,084
Total cost of revenues	402,846	374,029	447,529
Gross profit	266,574	269,479	374,988
Research and development	63,570	60,118	61,033
Selling, general and administrative	142,014	127,185	128,015
Litigation	—	5,316	—
Insurance reimbursement	(1,071)	—	—
Completed acquisition costs	171	1,258	—
Restructuring	1,364	343	—
Amortization of acquired intangible assets	2,139	1,036	1,015
Income from operations	58,387	74,223	184,925
Interest income	999	1,059	1,159
Interest expense	85	146	32
Income before income taxes	59,301	75,136	186,052
Provision for income taxes	23,525	27,107	56,321
Net income	$ 35,776	$ 48,029	$129,731
Other comprehensive income:			
Changes in value of financial instruments designated as cash flow hedges, net of tax expense (1)	$ 62	$ 150	$ 1,570
Foreign currency translation adjustments, net of tax of $0 for 2013, 2012 and 2011	(3,604)	1,664	129
Unrealized (loss) gain on investments, net of tax (benefit) expense (2)	(40)	31	133
Total comprehensive income	$ 32,194	$ 49,874	$131,563
Net income per share:			
Basic	$ 0.67	$ 0.91	$ 2.49
Diluted	$ 0.67	$ 0.90	$ 2.45
Cash dividends paid per common share	$ 0.64	$ 0.62	$ 0.60
Weighted average common shares outstanding:			
Basic	53,061	52,686	52,169
Diluted	53,481	53,234	52,847

(1) Tax expense was $551, $88 and $937 for the years ended December 31, 2013, 2012 and 2011, respectively.

(2) Tax (benefit) expense was $(355), $19 and $79 for the years ended December 31, 2013, 2012 and 2011, respectively.

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

MKS Instruments, Inc.

Consolidated Statements of Stockholders' Equity

	Common Stock Shares	Common Stock Amount	Additional Paid-In Capital	Retained Earnings	Accumulated Other Comprehensive Income	Total Stockholders' Equity
Balance at December 31, 2010	50,648,601	$113	$663,792	$171,356	$11,778	$ 847,039
Net issuance under stock-based plans	1,929,135		28,546			28,546
Stock-based compensation			11,225			11,225
Tax effect from stock-based plans			5,019			5,019
Stock repurchase	(85,788)		(1,163)	(844)		(2,007)
Cash dividend				(31,373)		(31,373)
Comprehensive income (net of tax):						
Net income				129,731		129,731
Other comprehensive income					1,832	1,832
Balance at December 31, 2011	52,491,948	$113	$707,419	$268,870	$13,610	$ 990,012
Net issuance under stock-based plans	691,501		1,564			1,564
Stock-based compensation			13,031			13,031
Tax effect from stock-based plans			1,862			1,862
Stock repurchase	(434,600)		(5,871)	(5,630)		(11,501)
Cash dividend				(32,686)		(32,686)
Comprehensive income (net of tax):						
Net income				48,029		48,029
Other comprehensive income					1,845	1,845
Balance at December 31, 2012	52,748,849	$113	$718,005	$278,583	$15,455	$1,012,156
Net issuance under stock-based plans	721,601		(464)			(464)
Stock-based compensation			13,992			13,992
Tax effect from stock-based plans			495			495
Stock repurchase	(107,000)		(1,457)	(1,418)		(2,875)
Cash dividend				(33,975)		(33,975)
Comprehensive income (net of tax):						
Net income				35,776		35,776
Other comprehensive income					(3,582)	(3,582)
Balance at December 31, 2013	53,363,450	$113	$730,571	$278,966	$11,873	$1,021,523

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

MKS Instruments, Inc.

Consolidated Statements of Cash Flows

	Years Ended December 31,		
	2013	2012	2011
		(in thousands)	
Cash flows from operating activities:			
Net income	$ 35,776	$ 48,029	$ 129,731
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	17,102	14,442	12,980
Stock-based compensation	13,992	13,031	11,225
Provision for excess and obsolete inventory	21,671	15,028	14,857
Provision for doubtful accounts	631	888	449
Deferred income taxes	(3,089)	3,819	7,549
Excess tax benefits from stock-based compensation	(935)	(2,105)	(5,338)
Other	200	41	118
Changes in operating assets and liabilities:			
Trade accounts receivable	(36,153)	38,288	17,923
Inventories	(29,797)	5,341	(11,697)
Income taxes	27,237	(3,126)	(5,345)
Other current and non-current assets	(1,441)	7,689	(7,674)
Accrued compensation and other liabilities	7,721	4,083	2,904
Accounts payable	23,172	(8,281)	(11,646)
Net cash provided by operating activities	76,087	137,167	156,036
Cash flows from investing activities:			
Acquisition of business, net of cash acquired	(2,326)	(22,607)	—
Purchases of investments	(550,076)	(435,961)	(475,777)
Maturities of investments	417,566	313,298	385,613
Sales of investments	110,928	46,559	100,094
Purchases of property, plant and equipment	(12,410)	(17,705)	(15,567)
Other	(216)	(1,451)	(441)
Net cash used in investing activities	(36,534)	(117,867)	(6,078)
Cash flows from financing activities:			
Proceeds from short-term borrowings	6	2,896	41,802
Payments on short-term borrowings	(776)	(9,348)	(39,915)
Repurchases of common stock	(2,875)	(11,501)	(2,007)
Net proceeds related to employee stock awards	(464)	1,564	28,546
Dividend payments	(33,975)	(32,686)	(31,373)
Excess tax benefit from stock-based compensation	935	2,105	5,338
Net cash (used in) provided by financing activities	(37,149)	(46,970)	2,391
Effect of exchange rate changes on cash and cash equivalents	(1,090)	2,342	(1,909)
Increase (decrease) in cash and cash equivalents	1,314	(25,328)	150,440
Cash and cash equivalents at beginning of year	287,588	312,916	162,476
Cash and cash equivalents at end of year	$ 288,902	$ 287,588	$ 312,916
Supplemental disclosure of cash flow information:			
Cash paid during the period for:			
Interest	$ 60	$ 212	$ 19
Income taxes	$ 5,974	$ 18,033	$ 52,561

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

MKS INSTRUMENTS, INC.

NOTES TO UNAUDITED CONSOLIDATED FINANCIAL STATEMENTS
(in thousands, except share and per share data)

1) Business Description

MKS Instruments, Inc. ("MKS" or the "Company") was founded in 1961 and is a global provider of instruments, subsystems and process control solutions that measure, control, power, monitor and analyze critical parameters of advanced manufacturing processes to improve process performance and productivity of advanced manufacturing processes. MKS groups its products into four product groups based upon the similarity of the product function, type of product and manufacturing processes. These four groups of products are: Instruments and Control Products, Power and Reactive Gas Products, Vacuum Products and Analytical Solutions Group Products. MKS' products are derived from its core competencies in pressure measurement and control, materials delivery, gas composition analysis, control and information technology, power and reactive gas generation and vacuum technology.

The Company has four reportable segments: Advanced Manufacturing Capital Equipment, Analytical Solutions Group, Europe Region Sales & Service, and Asia Region Sales & Service.

2) Basis of Presentation

The consolidated financial statements include the accounts of MKS Instruments, Inc. and its wholly owned subsidiaries. All intercompany accounts and transactions have been eliminated in consolidation.

Use of Estimates

The consolidated financial statements have been prepared in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP"). The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. On an on-going basis, management evaluates its estimates and judgments, including those related to revenue recognition and allowance for doubtful accounts, inventory, warranty costs, stock-based compensation, intangible assets, goodwill, other long-lived assets, in process research and development and other acquisition expenses and income taxes. Management bases its estimates and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

Revision of prior period financial statements

During the three months ended September 30, 2013, the Company identified a prior period error which affected the previous balance sheets of all interim periods in 2013 and all interim and annual periods in 2012 and 2011 and certain footnote disclosures for annual periods in 2012, 2011 and 2010. The Company previously reported the amounts of its uncertain tax positions on the balance sheets net instead of gross. The Company considered the guidance in Accounting Standards Codification ("ASC") Topic 740-10-45, Other Presentation Matters and ASC Topic 210-20, Offsetting with respect to this matter. The error had no impact to the income statement, statements of cash flows or the statements of stockholders' equity of any previously reported periods. In evaluating whether our previously issued consolidated financial statements were materially misstated, the Company considered the guidance in ASC Topic 250, Accounting Changes and Error Corrections, ASC Topic 250-10-S99-1, Assessing Materiality, and ASC Topic 250-10-S99-2, Considering the Effects of Prior Year Misstatements when Quantifying Misstatements in Current Year Financial Statements. The Company concluded this error was not material to the prior reporting periods, or to the 2013 results, and therefore, amendments of previously filed reports were not required. Accordingly, during the three months ended September 30, 2013, the Company recorded these prior period adjustments to correct this error. The revisions for these corrections to the applicable prior periods are reflected in the financial information herein and will be reflected in future filings containing such financial information.

(in thousands, except share and per share data)

The tables below reflect the revisions in the balance sheet line items for the periods ended December 31, 2012.

	December 31, 2012		
	As previously reported	Adjustment	As revised
Other assets	$11,692	$17,720	$29,412
Other liabilities	$43,375	$17,720	$61,095

The tables below reflect the sections in certain footnotes that were affected by the revision for the periods ended December 31, 2012.

	December 31, 2012		
Other Assets	As previously reported	Adjustment	As revised
Deferred tax assets, net	$ 9,497	$ —	$ 9,497
Long-term income tax receivable	—	17,720	17,720
Other	2,195	—	2,195
	$11,692	$17,720	$29,412

	December 31, 2012		
Other Liabilities	As previously reported	Adjustment	As revised
Long-term income tax payable	$20,880	$17,720	$38,600
Accrued compensation	18,750	—	18,750
Other	3,745	—	3,745
	$43,375	$17,720	$61,095

	December 31, 2012		
Income Taxes	As previously reported	Adjustment	As revised
Current taxes:			
United States	$10,431	$ 4,314	$14,745
State	783	—	783
Foreign	12,074	(4,314)	7,760
	$23,288	$ —	$23,288

(in thousands, except share and per share data)

	December 31, 2011		
	As previously reported	Adjustment	As revised
Current taxes:			
United States	$25,824	$ 15,032	$40,856
State	2,602	—	2,602
Foreign	20,346	(15,032)	5,314
	$48,772	$ —	$48,772

Segment Note

A reconciliation of segment assets to consolidated total assets is as follows:

	December 31, 2012		
	As previously reported	Adjustment	As revised
Total segment assets	$ 216,699	$ —	$ 216,699
Cash and cash equivalents and investments	627,399	—	627,399
Other current assets	36,242	—	36,242
Property, plant and equipment, net	80,516	—	80,516
Goodwill and intangible assets, net	162,294	—	162,294
Other assets	11,692	17,720	29,412
Consolidated total assets	$1,134,842	$17,720	$1,152,562

3) Summary of Significant Accounting Policies

Revenue Recognition and Accounts Receivable Allowances

Revenue from product sales is recorded upon transfer of title and risk of loss to the customer provided that there is evidence of an arrangement, the sales price is fixed or determinable, and collection of the related receivable is reasonably assured. In most transactions, the Company has no obligations to customers after the date products are shipped other than pursuant to warranty obligations. In some instances, the Company provides installation, training, support and services to customers after the product has been shipped. The Company does not frequently enter into arrangements with multiple deliverables however, for those revenue arrangements with multiple deliverables, the Company allocates revenue to each element based upon their relative selling price using vendor-specific objective evidence (“VSOE”), or third-party evidence (“TPE”) or based upon the relative selling price using estimated prices if VSOE or TPE does not exist. The Company then recognizes revenue on each deliverable in accordance with its policies for product and service revenue recognition. The Company provides for the estimated costs to fulfill customer warranty obligations upon the recognition of the related revenue. Shipping and handling fees, if any, billed to customers are recognized as revenue. The related shipping and handling costs are recognized in cost of sales. Accounts receivable allowances include sales returns and bad debt allowances. The Company monitors and tracks the amount of product returns and reduces revenue at the time of shipment for the estimated amount of such future returns, based on historical experience. The Company makes estimates evaluating its allowance for doubtful accounts. The Company continuously monitors collections and payments from its customers and maintains a provision for estimated credit losses based upon its historical experience and any specific customer collection issues that it has identified.

Research and Development

Research and development costs are expensed as incurred and consist mainly of compensation related expenses and project materials. The Company's research and development efforts include numerous projects, which generally have a duration of 3 to 30 months. Acquired in-process research and development ("IPR&D") expenses, which are capitalized at fair value as an intangible asset until the related project is completed, are then amortized over the estimated useful life of the product. The Company monitors projects and if they are abandoned, the Company immediately writes them off.

Advertising Costs

Advertising costs are expensed as incurred and were immaterial in 2013, 2012 and 2011.

Stock-Based Compensation

The accounting for share-based compensation expense requires the measurement and recognition of compensation expense for all share-based payment awards made to employees and directors based on estimated fair values. For restricted stock units ("RSUs"), the fair value is the fair value on the date of grant. The Company also provides employees the opportunity to purchase shares through an employee stock purchase plan. For shares issued under its employee stock purchase plan, the Company has estimated the fair value on the date of grant using the Black Scholes pricing model, which is affected by the Company's stock price as well as assumptions regarding a number of complex and subjective variables. These variables include the Company's expected stock price volatility over the term of the awards, expected life, risk free interest rate and expected dividends. The Company is also required to estimate forfeitures at the time of grant and revise those estimates in subsequent periods if actual forfeitures differ from those estimates.

Management determined that blended volatility, a combination of historical and implied volatility, is more reflective of market conditions and a better indicator of expected volatility than historical or implied volatility alone. The assumptions used in calculating the fair value of share-based payment awards represent management's best estimates, but these estimates involve inherent uncertainties and the application of management judgment. As a result, if factors change and the Company uses different assumptions, its stock-based compensation expense could be materially different in the future.

Other Comprehensive Income

For foreign subsidiaries where the functional currency is the local currency, assets and liabilities are translated into U.S. dollars at the current exchange rate on the balance sheet date. Revenue and expenses are translated at average rates of exchange prevailing during the year. Translation adjustments resulting from this process are recorded to Other Comprehensive Income ("OCI").

Unrealized gains and losses on securities classified as available-for-sale are included in accumulated other comprehensive income in consolidated stockholders' equity.

For derivative instruments designated as cash-flow hedges, the effective portion of the derivative's gain (loss) is initially reported as a component of OCI and is subsequently recognized in earnings when the hedged exposure is recognized in earnings.

Net Income Per Share

Basic net income per share is based on the weighted average number of common shares outstanding, and diluted net income per share is based on the weighted average number of common shares outstanding and all potential dilutive common equivalent shares outstanding. The dilutive effect of options is determined under the treasury stock method using the average market price for the period. Common equivalent shares are included in the per share calculations when the effect of their inclusion would be dilutive.

Cash and Cash Equivalents and Investments

All highly liquid investments with a maturity date of three months or less at the date of purchase are considered to be cash equivalents. The appropriate classification of investments in securities is determined at the time of purchase. Debt securities that the Company does not have the intent and ability to hold to maturity are classified as "available-for-sale" and are carried at fair value. Mutual funds that are bought and held principally for the purpose of selling them in the near term are classified as "trading" and are carried at fair value.

The Company reviews its investment portfolio on a monthly basis to identify and evaluate individual investments that have indications of possible impairment. The factors considered in determining whether a loss is other-than-temporary include: the length of time and extent to which fair market value has been below the cost basis, the financial condition and near-term prospects of the issuer, credit quality, and the Company's ability to hold the investment for a period of time sufficient to allow for any anticipated recovery in fair value.

Concentrations of Credit Risk

The Company's significant concentrations of credit risk consist principally of cash and cash equivalents, investments, forward exchange contracts and trade accounts receivable. The Company maintains cash and cash equivalents with financial institutions including some banks with which it had borrowings. The Company maintains investments primarily in U.S. Treasury and government agency securities and corporate debt securities. The Company enters into forward currency contracts with high credit-quality financial institutions in order to minimize credit risk exposure. The Company's customers are primarily concentrated in the semiconductor industry, and a limited number of customers account for a significant portion of the Company's revenues. The Company regularly monitors the creditworthiness of its customers and believes it has adequately provided for potential credit loss exposures. Credit is extended for all customers based primarily on financial condition, and collateral is not required.

The Company had one customer comprising 17%, 14% and 14% of net sales for 2013, 2012 and 2011, respectively and another customer comprising 12%, 10% and 7% of net sales for 2013, 2012 and 2011. During the years 2013, 2012 and 2011, approximately 68%, 62% and 61% of the Company's net sales, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. There were two customers comprising 10% or more of the Company's accounts receivable balance as of December 31, 2013.

Inventories

Inventories are stated at the lower of cost or market, cost being determined using a standard costing system which approximates cost based on a first-in, first-out method. The Company regularly reviews inventory quantities on hand and records a provision to write-down excess and obsolete inventory to its estimated net realizable value, if less than cost, based primarily on its estimated forecast of product demand.

Property, Plant and Equipment

Property, plant and equipment are stated at cost. Expenditures for major renewals and betterments that extend the useful lives of property, plant and equipment are capitalized. Expenditures for maintenance and repairs are charged to expense as incurred. When assets are sold or otherwise disposed of, the cost and related accumulated depreciation are eliminated from the accounts and any resulting gain or loss is recognized in earnings.

Depreciation is provided on the straight-line method over the estimated useful lives of twenty to thirty-one and one-half years for buildings and three to seven years for machinery and equipment, furniture and fixtures and office equipment, which includes enterprise resource planning software. Leasehold improvements are amortized over the shorter of the lease term or the estimated useful life of the leased asset.

Intangible Assets

Intangible assets resulting from the acquisitions of businesses are estimated by management based on the fair value of assets acquired. These include acquired customer lists, technology, patents, trade names, covenants not to compete and IPR&D. Intangible assets are amortized from two to ten years on a straight-line basis which represents the estimated periods of benefit and the expected pattern of consumption.

Goodwill

Goodwill is the amount by which the cost of acquired net assets exceeded the fair value of those net assets on the date of acquisition. The Company allocates goodwill to reporting units at the time of acquisition or when there is a change in the reporting structure and bases that allocation on which reporting units will benefit from the acquired assets and liabilities. Reporting units are defined as operating segments or one level below an operating segment, referred to as a component. The Company assesses goodwill for impairment on an annual basis as of October 31 or more frequently when events and circumstances occur indicating that the recorded goodwill may be impaired.

The estimated fair value of the Company's reporting units were based on discounted cash flow models derived from internal earnings and internal and external market forecasts. Determining fair value requires the exercise of significant judgment, including judgments about appropriate discount rates, perpetual growth rates and the amount and timing of expected future cash flows. Discount rates are based on a weighted average cost of capital ("WACC"), which represents the average rate a business must pay its providers of debt and equity. The WACC used to test goodwill is derived from a group of comparable companies. Assumptions in estimating future cash flows are subject to a high degree of judgment and complexity. The Company makes every effort to forecast these future cash flows as accurately as possible with the information available at the time the forecast is developed.

The Company has the option of first assessing qualitative factors to determine whether it is necessary to perform the current two-step impairment test or the Company can perform the two-step impairment test without performing the qualitative assessment. For the reporting units that did not experience any significant adverse changes in their business or reporting structures or any other adverse changes, and the reporting unit's fair value substantially exceeded its amount from the prior year assessment, the Company performed the qualitative "Step 0" assessment. In performing the qualitative Step 0 assessment, the Company considered certain events and circumstances specific to the reporting unit and to the entity as a whole, such as macroeconomic conditions, industry and market considerations, overall financial performance and cost factors when evaluating whether it is more likely than not that the fair value of the reporting unit is less than its carrying amount. For the remaining reporting units that did not meet these criteria, the Company performed the two-step goodwill impairment test. Under the two-step goodwill impairment test, the Company compared the fair value of each reporting unit to its respective carrying amount, including goodwill. If the fair value of the reporting unit exceeds the fair value, the second step of the goodwill impairment test must be completed to measure the amount of impairment loss, if any. The second step compares the implied fair value of goodwill with the carrying value of goodwill. The implied fair value is determined by allocating the fair value of the reporting unit to all of the assets and liabilities of that unit, the excess of the fair value of the amounts assigned to its assets and liabilities it the implied fair value of goodwill. If the implied fair value of goodwill is less than the carrying amount of goodwill, an impairment loss is recognized equal to the difference.

As of October 31, 2013, the Company performed its annual impairment assessment of goodwill and determined that it is more likely than not that the fair values of the reporting units exceed their carrying amount.

Impairment of Long-Lived Assets

The Company evaluates the recoverability of its long-lived assets whenever events and changes in circumstances indicate that the carrying amount of an asset may not be fully recoverable. This periodic review may result in an adjustment of estimated depreciable lives or asset impairment. When indicators of impairment are present, the carrying values of the asset are evaluated in relation to their operating performance and future undiscounted cash flows of the underlying business. If the future undiscounted cash flows are less than their carrying value, impairment exists. The impairment is measured as the difference between the carrying value and the fair value of the underlying asset. Fair values are based on estimates of market prices and assumptions concerning the amount and timing of estimated future cash flows and assumed discount rates, reflecting varying degrees of perceived risk.

Foreign Exchange

The functional currency of the majority of the Company’s foreign subsidiaries is the applicable local currency. For those subsidiaries, assets and liabilities are translated to U.S. dollars at year-end exchange rates. Income and expense accounts are translated at the average exchange rates prevailing during the year. The resulting translation adjustments are included in accumulated other comprehensive income in consolidated stockholders’ equity. Foreign exchange transaction gains and losses, which arise from transaction activity, are reflected in selling, general and administrative expenses in the statement of operations.

Net foreign exchange gains and losses resulting from re-measurement are included in selling general and administrative expense and were a loss of $1,937, a gain of $301 and a loss of $126, respectively, for the years ended December 31, 2013, 2012 and 2011. These amounts do not reflect the corresponding gain (loss) from foreign exchange contracts. See Note 7 “Derivatives” regarding foreign exchange contracts.

Income Taxes

The Company records income taxes using the asset and liability method. Deferred income 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 income tax bases, and operating loss and tax credit carry forwards. On a quarterly basis, the Company evaluates both the positive and negative evidence that affects the realizability of net deferred tax assets and assesses the need for a valuation allowance. The future benefit to be derived from its deferred tax assets is dependent upon its ability to generate sufficient future taxable income to realize the assets. The Company records a valuation allowance to reduce its net deferred tax assets to the amount that is more likely than not to be realized. To the extent the Company establishes a valuation allowance an expense will be recorded as a component of the provision for income taxes on the statement of operations. As of December 31, 2011, the Company had a valuation allowance of $26,475 primarily related to capital losses incurred from its divested operations, and state tax credit carry forwards. During 2012, the Company increased its valuation allowance by $1,022 primarily related to an increase in state tax credit carry forwards as management determined it is more likely than not that the deferred tax assets related to these attributes will not be realized. As a result, the valuation allowance was $27,497 at December 31, 2012. During 2013, the Company decreased its valuation allowance by $395 primarily related to the expiration of US capital loss carry forwards. As a result, the valuation allowance was $27,102 at December 31, 2013.

(in thousands, except share and per share data)

Accounting for income taxes requires a two-step approach to recognize and measure uncertain tax positions. The first step is to evaluate the tax position for recognition by determining if, based on the technical merits, it is more likely than not that the position will be sustained upon audit, including resolutions of related appeals or litigation processes, if any. The second step is to measure the tax benefit as the largest amount that is more than 50% likely of being realized upon ultimate settlement. The Company re-evaluates these uncertain tax positions on a quarterly basis. This evaluation is based on factors including, but not limited to, changes in facts or circumstances, changes in tax law, effectively settled issues under audit and new audit activity. Any change in these factors could result in the recognition of a tax benefit or an additional charge to the tax provision.

4) Recently Issued Accounting Pronouncements

On July 18, 2013, the Financial Accounting Standards Board issued Accounting Standards Update (“ASU”) 2013-11, “*Income Taxes (Topic 740): Presentation of an Unrecognized Tax Benefit When a Net Operating Loss Carry-forward, a Similar Tax Loss, or a Tax Credit Carry-forward Exists.*” Under the new standard, unrecognized tax benefits will be netted against all available same-jurisdiction loss or other tax carry-forwards that would be utilized, rather than only against carry-forwards that are created by unrecognized tax benefits. The provisions of this ASU are effective for interim and annual periods beginning on or after December 15, 2013. The adoption of ASU No. 2013-11 is not expected to have a material effect on the Company’s consolidated financial statements.

5) Investments

The fair value of short-term investments with maturities or estimated lives of less than one year consists of the following:

	Years Ended December 31, 2013	Years Ended December 31, 2012
Available-for-sale investments:		
Time deposits	$ 3,439	$ 52
Bankers acceptance drafts	491	242
Commercial paper and certificates of deposit	114,984	—
Corporate obligations	18,351	—
U.S. treasury obligations	—	13,054
U.S. agency obligations	162,450	313,514
	299,715	326,862
Trading investments:		
Mutual funds (1)	1,000	791
	$300,715	$327,653

(1) The mutual funds are associated with the Company’s supplemental defined contribution retirement obligations.

(in thousands, except share and per share data)

The fair value of long-term available-for-sale investments with maturities or estimated lives of more than one year consists of the following:

	Years Ended December 31, 2013	2012
Time deposits	$ 54	$ —
U.S. agency obligations	60,351	12,158
	$60,405	$12,158

The following table shows the gross unrealized gains and (losses) aggregated by investment category for short-term and long-term available-for-sale investments:

	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
As of December 31, 2013:				
Short-term investments:				
Available-for-sale investments:				
Time deposits	$ 3,439	$—	$ —	$ 3,439
Bankers acceptance drafts	491	—	—	491
Commercial paper and certificates of deposit	114,973	15	(4)	114,984
Corporate obligations	18,360	—	(9)	18,351
U.S. agency obligations	162,430	22	(2)	162,450
	$299,693	$37	$(15)	$299,715
Long-term investments:				
Time deposits	$ 54	$—	$ —	$ 54
U.S. agency obligations	60,374	9	(32)	60,351
	$ 60,428	$ 9	$(32)	$ 60,405

	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
As of December 31, 2012:				
Short-term investments:				
Available-for-sale investments:				
Time deposits	$ 52	$ —	$ —	$ 52
Bankers acceptance drafts	242	—	—	242
U.S. treasury obligations	13,045	9	—	13,054
U.S. agency obligations	313,262	258	(6)	313,514
	$326,601	$267	$ (6)	$326,862
Long-term investments:				
U.S. agency obligations	$ 12,156	$ 2	$ —	$ 12,158

Interest income is accrued as earned. Dividend income is recognized as income on the date the stock trades "ex-dividend." The cost of marketable securities sold is determined by the specific identification method and realized gains or losses are reflected in income and was not material in 2013, 2012 and 2011.

The unrealized gains and losses for trading investments were immaterial in 2013.

6) Fair Value Measurements

In accordance with the provisions of fair value accounting, a fair value measurement assumes that the transaction to sell an asset or transfer a liability occurs in the principal market for the asset or liability or, in the absence of a principal market, the most advantageous market for the asset or liability and defines fair value based upon an exit price model.

The fair value measurement guidance establishes a fair value hierarchy which requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The guidance describes three levels of inputs that may be used to measure fair value:

Level 1	Quoted prices in active markets for identical assets or liabilities as of the reporting date. Active markets are those in which transactions for the asset or liability occur in sufficient frequency and volume to provide pricing information on an ongoing basis.
Level 2	Observable inputs other than Level 1 prices, such as quoted prices for similar assets or liabilities; quoted prices in markets that are not active; or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities. Level 2 assets and liabilities include debt securities with quoted prices that are traded less frequently than exchange-traded instruments or securities or derivative contracts that are valued using a pricing model with inputs that are observable in the market or can be derived principally from or corroborated by observable market data.
Level 3	Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities. Level 3 assets and liabilities include financial instruments whose value is determined using pricing models, discounted cash flow methodologies, or similar techniques, as well as instruments for which the determination of fair value requires significant management judgment or estimation.

In certain cases, the inputs used to measure fair value may fall into different levels of the fair value hierarchy. In such cases, we categorize such assets and liabilities based on the lowest level input that is significant to the fair value measurement in its entirety. Our assessment of the significance of a particular input to the fair value measurement in its entirety requires judgment and considers factors specific to the asset.

(in thousands, except share and per share data)

Assets and liabilities of the Company measured at fair value on a recurring basis as of December 31, 2013, are summarized as follows:

		Fair Value Measurements at Reporting Date Using		
Description	December 31, 2013	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Cash equivalents:				
Money market funds	$ 38,166	$38,166	$ —	$—
Bankers acceptance drafts	32	—	32	—
Commercial paper and certificates of deposit	10,400	—	10,400	—
Trading securities:				
Mutual funds	1,000	1,000	—	—
Available-for-sale securities:				
Time deposits	3,493	—	3,493	—
Bankers acceptance drafts	491	—	491	—
Commercial paper and certificates of deposit	114,984	—	114,984	—
Corporate obligations	18,351	—	18,351	—
U.S. agency obligations	222,801	—	222,801	—
Derivatives — currency forward contracts	920	—	920	—
Total assets	$410,638	$39,166	$371,472	$—
Liabilities:				
Derivatives — currency forward contracts	$ 656	$ —	$ 656	$—
Reported as follows:				
Assets:				
Cash and cash equivalents (1)	$ 48,598	$38,166	$ 10,432	$—
Short-term investments	300,715	1,000	299,715	—
Other current assets	920	—	920	—
	$350,233	$39,166	$311,067	$—
Long-term investments	$ 60,405	$ —	$ 60,405	$—
Liabilities:				
Other current liabilities	$ 656	$ —	$ 656	$—

(1) The cash and cash equivalent amounts presented in the table above do not include cash of $234,675 and non-negotiable time deposits of $5,629 as of December 31, 2013.

(in thousands, except share and per share data)

Assets and liabilities of the Company measured at fair value on a recurring basis as of December 31, 2012, are summarized as follows:

		Fair Value Measurements at Reporting Date Using		
Description	December 31, 2012	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Cash equivalents:				
Money market funds	$ 51,291	$ 51,291	$ —	$—
Bankers acceptance drafts	16	—	16	—
Trading securities:				
Mutual funds	791	791	—	—
Available-for-sale securities:				
Bankers acceptance drafts	242	—	242	—
U.S. treasury obligations	13,054	—	13,054	—
U.S. agency obligations	325,672	295,665	30,007	—
Derivatives — currency forward contracts	961	—	961	—
Total assets	$392,027	$347,747	$44,280	$—
Liabilities:				
Derivatives — currency forward contracts	$ 1,310	$ —	$ 1,310	$—
Reported as follows:				
Assets:				
Cash and cash equivalents (1)	$ 51,307	$ 51,291	$ 16	$—
Short-term investments (2)	327,601	284,298	43,303	—
Other current assets	961	—	961	—
	$379,869	$335,589	$44,280	$—
Long-term investments	$ 12,158	$ 12,158	$ —	$—
Liabilities:				
Other current liabilities	$ 1,310	$ —	$ 1,310	$—

(1) The cash and cash equivalent amounts presented in the table above do not include cash of $185,143 and non-negotiable time deposits of $51,138 as of December 31, 2012.

(2) The short-term investments presented in the table above do not include non-negotiable time deposits of $52 as of December 31, 2012.

Money Market Funds

Money market funds are cash and cash equivalents, and are classified within Level 1 of the fair value hierarchy.

Trading Mutual Fund Investments

As of December 31, 2013, trading investments consisted of certain U.S. and international equity mutual funds and government agency fixed income mutual funds.

Available-For-Sale Investments

As of December 31, 2013 and 2012, available-for-sale investments consisted of time deposits and drafts denominated in the Euro currency, commercial paper, certificates of deposit, corporate obligations, U.S. treasury obligations and U.S. agency obligations.

The Company measures its debt and equity investments at fair value. The Company's available-for-sale investments are classified within Level 1 and Level 2 of the fair value hierarchy.

Derivatives

As a result of the Company's global operating activities, the Company is exposed to market risks from changes in foreign currency exchange rates, which may adversely affect its operating results and financial position. When deemed appropriate, the Company minimizes its risks from foreign currency exchange rate fluctuations through the use of derivative financial instruments. The principal market in which the Company executes its foreign currency contracts is the institutional market in an over-the-counter environment with a relatively high level of price transparency. The market participants usually are large commercial banks. The forward foreign currency exchange contracts are valued using broker quotations, or market transactions and are classified within Level 2 of the fair value hierarchy.

7) Derivatives

The Company enters into derivative instruments for risk management purposes only, including derivatives designated as hedging instruments and those utilized as economic hedges. The Company operates internationally and, in the normal course of business, is exposed to fluctuations in interest rates and foreign exchange rates. These fluctuations can increase the costs of financing, investing and operating the business. The Company has used derivative instruments, such as forward contracts, to manage certain foreign currency exposure.

By nature, all financial instruments involve market and credit risks. The Company enters into derivative instruments with major investment grade financial institutions and no collateral is required. The Company has policies to monitor the credit risk of these counterparties. While there can be no assurance, the Company does not anticipate any material non-performance by any of these counterparties.

The Company hedges a portion of its forecasted foreign currency denominated intercompany sales of inventory, over a maximum period of eighteen months, using forward foreign exchange contracts accounted for as cash-flow hedges related to Japanese, South Korean, British and Euro currencies. To the extent these derivatives are effective in off-setting the variability of the hedged cash flows, and otherwise meet the hedge accounting criteria, changes in the derivatives' fair value are not included in current earnings but are included in OCI in stockholders' equity. These changes in fair value will subsequently be reclassified into earnings, as applicable, when the forecasted transaction occurs. To the extent that a previously designated hedging transaction is no longer an effective hedge, any ineffectiveness measured in the hedging relationship is recorded currently in earnings in the period it occurs. The cash flows resulting from forward exchange contracts are classified in the consolidated statements of cash flows as part of cash flows from operating activities. The Company does not enter into derivative instruments for trading or speculative purposes.

(in thousands, except share and per share data)

To the extent the hedge accounting criteria is not met, the related foreign currency forward contracts are considered as economic hedges and changes in the fair value of these contracts are recorded immediately in earnings in the period in which they occur. These include hedges that are used to reduce exchange rate risks arising from the change in fair value of certain foreign currency denominated assets and liabilities (i.e., payables, receivables) and other economic hedges where the hedge accounting criteria were not met.

As of December 31, 2013 and 2012, the Company had outstanding forward foreign exchange contracts with gross notional values of $21,018 and $41,448, respectively. The following tables provide a summary of the primary net hedging positions and corresponding fair values held as of December 31, 2013 and 2012:

	December 31, 2013	
Currency Hedged (Buy/Sell)	Gross Notional Value	Fair Value (1)
U.S. Dollar/Japanese Yen	$ 7,191	$ 920
U.S. Dollar/South Korean Won	9,254	(521)
U.S. Dollar/Euro	2,806	(85)
U.S. Dollar/U.K. Pound Sterling	1,767	(50)
Total	$21,018	$ 264

	December 31, 2012	
Currency Hedged (Buy/Sell)	Gross Notional Value	Fair Value (1)
U.S. Dollar/Japanese Yen	$13,992	$ 961
U.S. Dollar/South Korean Won	19,374	(1,180)
U.S. Dollar/Euro	4,217	(57)
U.S. Dollar/U.K. Pound Sterling	3,865	(73)
Total	$41,448	$ (349)

(1) Represents the net receivable (payable) amount included in the consolidated balance sheet.

The following table provides a summary of the fair value amounts of the Company's derivative instruments:

	Years Ended December 31,	
Derivatives Designated as Hedging Instruments	2013	2012
Derivative assets:		
Forward exchange contracts	$ 920	$ 961
Derivative liabilities:		
Forward exchange contracts	(656)	(1,310)
Total net derivative asset (liability) designated as hedging instruments (1)	$ 264	$ (349)

(1) The derivative asset of $920 and derivative liability of $656 are classified in other current assets and other current liabilities, respectively, in the consolidated balance sheet as of December 31, 2013. The derivative asset of $961 and derivative liability of $1,310 are classified in other current assets and other current liabilities, respectively, in the consolidated balance sheet as of December 31, 2012

(in thousands, except share and per share data)

The net amount of existing losses as of December 31, 2013 that is expected to be reclassified from accumulated OCI into earnings within the next twelve months is not immaterial.

The following table provides a summary of the gains (losses) on derivatives designated as hedging instruments:

Derivatives Designated as Cash Flow Hedging Relationships	Years Ended December 31, 2013	2012	2011
Forward exchange contracts:			
Net (loss) gain recognized in OCI (1)	$ (48)	$ 936	$ 4,311
Net gain (loss) reclassified from accumulated OCI into income (2)	$1,086	$(930)	$(4,021)

(1) Net change in the fair value of the effective portion classified in OCI.

(2) Effective portion classified as cost of products in 2013 and selling, general and administrative in 2012 and 2011.

The following table provides a summary of (losses) on derivatives not designated as hedging instruments:

Derivatives Not Designated as Hedging Instruments	Years Ended December 31, 2013	2012	2011
Forward exchange contracts:			
Net (loss) recognized in income (1)	$(215)	$(1,606)	$—

(1) The Company has a forward foreign exchange contract that hedges an intercompany loan with its Korean subsidiary. This hedge does not qualify for hedge accounting and any gains (losses) are recorded immediately in selling, general and administrative expenses.

8) Inventories

Inventories consist of the following:

	Years Ended December 31, 2013	2012
Raw material	$ 75,687	$ 76,610
Work-in-process	24,304	19,708
Finished goods	42,736	38,321
	$142,727	$134,639

Inventory related excess and obsolete charges of $21,671, $15,028 and $14,857 were recorded in cost of products in the years ended December 31, 2013, 2012 and 2011, respectively. Included in excess and obsolete charges for 2013 is $6,423 of special charges for obsolete inventory related to a unique product in a solar application as a result of slowing market conditions, which provided uncertainty as to the net realizable value of this inventory.

(in thousands, except share and per share data)

9) Property, Plant and Equipment

Property, plant and equipment consist of the following:

	Years Ended December 31, 2013	2012
Land	$ 9,225	$ 9,188
Buildings	68,569	68,831
Machinery and equipment	116,475	115,032
Furniture and fixtures, office equipment and software	59,068	51,669
Leasehold improvements	20,590	18,003
Construction in progress	3,702	9,227
	277,629	271,950
Less: accumulated depreciation	200,093	191,434
	$ 77,536	$ 80,516

Depreciation of property, plant and equipment totaled $14,964, $13,406 and $11,965 for the years ended 2013, 2012 and 2011, respectively.

10) Acquisitions

Alter S.r.l

On March 12, 2013, the Company acquired Alter S.r.l. ("Alter"), located in Reggio Emilia, Italy. The aggregate purchase price, net of cash acquired and after final debt and working capital adjustments was $2,426. Total cash paid as of June 30, 2013, net of cash acquired of $21 was $2,058. During June 2013, one of two holdback provisions was met and the Company released $123. The Company will pay the remaining $368 subject to a final holdback provision being met. Alter develops advanced microwave power generators, components and systems for industrial microwave heating, microwave plasma coating and semiconductor applications. This acquisition strengthens the Company's existing microwave plasma expertise and product portfolio, and extends its opportunity into high growth, non-plasma microwave applications for industrial processes, food and beverage manufacturing and other markets.

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

Current assets	$1,053
Property and equipment	211
Intangible assets	2,806
Other assets	67
Total assets acquired	4,137
Debt (Note 15)	770
Deferred taxes and other liabilities	920
Total liabilities assumed	1,690
Total purchase price	2,447
Cash acquired	(21)
Total purchase price, net of cash acquired	$2,426

(in thousands, except share and per share data)

The intangible assets associated with the acquisition are not deductible for tax purposes. The following table reflects the allocation of the acquired intangible assets and related estimates of useful lives. These acquired intangibles will be amortized on a straight-line basis.

Current developed technology	$2,208	9 year useful life
Trademarks and trade names	598	3 year useful life
	$2,806	

The results of this acquisition were included in the Company's consolidated operations beginning on March 12, 2013. The pro forma consolidated statements reflecting the operating results of Alter, had it been acquired as of January 1, 2013, would not differ materially from the operating results of the Company as reported for the year ended December 31, 2013. Alter is included in the Company's Power and Reactive Gas Products group and the Advanced Manufacturing Capital Equipment reportable segment.

Plasmart, Inc.

On August 29, 2012, the Company acquired Plasmart, Inc. ("Plasmart"), located in Daejeon, Korea. Plasmart develops radio frequency (RF) plasma generation and monitoring systems for the semiconductor, flat panel display, active matrix organic light emitting diodes and solar photovoltaic industries. Plasmart's expertise in RF systems and access to the important Korean market were key drivers in the selection of Plasmart for acquisition. The aggregate purchase price, net of cash acquired, consisted of $22,607, subject to final working capital adjustments in the fourth quarter of 2012 of $1,778. Acquisition related costs of $1,258 and step-up inventory of $303 were expensed as incurred.

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

Current assets	$ 5,536
Property, plant and equipment	3,565
Other assets	554
Intangible assets	10,745
Goodwill	9,989
Total assets acquired	$30,389
Debt (Note 15)	4,561
Deferred taxes and other liabilities	3,128
Total liabilities assumed	$ 7,689
Total purchase price	$22,700
Cash acquired	(93)
Total purchase price, net of cash acquired	$22,607

(in thousands, except share and per share data)

The goodwill and other intangible assets associated with the acquisition are not deductible for tax purposes. The following table reflects the allocation of the acquired intangible assets and related estimates of useful lives. These acquired intangibles will be amortized on a straight-line basis.

Current developed technology	$ 5,029	7.5 – 9.5 years useful life
Trade names	335	7 year useful life
Customer relationships	5,381	10 year useful life
	$10,745	

This transaction resulted in an amount of purchase price that exceeded the estimated fair value of tangible and intangible assets, which was allocated to goodwill. The Company believes that the amount of goodwill relative to identifiable intangible assets relates to several factors including: (1) potential buyer-specific synergies related to market opportunities for a combined product offering and (2) potential to leverage the Company's sales force and intellectual property to attract new customers and revenue.

The results of this acquisition were included in the Company's consolidated operations beginning on August 29, 2012. The pro forma consolidated statements reflecting the operating results of Plasmart, had they been acquired as of January 1, 2012, would not differ materially from the operating results of the Company as reported for the year ended December 31, 2012. Plasmart is included in the Power and Reactive Gas Products group and the Advanced Manufacturing Capital Equipment reportable segment.

11) Goodwill and Intangible Assets

Goodwill

The changes in the carrying amount of goodwill and accumulated impairment losses were as follows:

	2013			2012		
	Gross Carrying Amount	Accumulated Impairment Loss	Net	Gross Carrying Amount	Accumulated Impairment Loss	Net
Beginning balance at January 1	$290,147	$(139,414)	$150,733	$279,498	$(139,414)	$140,084
Acquired goodwill(1)	—	—	—	9,989	—	9,989
Foreign currency translation	176	—	176	660	—	660
Ending balance at December 31	$290,323	$(139,414)	$150,909	$290,147	$(139,414)	$150,733

(1) On August 29, 2012, the Company purchased Plasmart, Inc. for $22,607, net of cash acquired. The Company recorded $9,989 of goodwill in connection with the acquisition.

(in thousands, except share and per share data)

Goodwill associated with each of our reportable segments is as follows:

	Years Ended December 31, 2013	2012
Reportable segment:		
Advanced Manufacturing Capital Equipment	$142,241	$142,065
Analytical Solutions Group	8,668	8,668
Europe Region Sales & Service	—	—
Asia Region Sales & Service	—	—
Total goodwill	$150,909	$150,733

Intangible Assets

The Company is required to test certain long-lived assets when indicators of impairment are present. For the purposes of the impairment test, long-lived assets are grouped with other assets and liabilities at the lowest level for which identifiable cash flows are largely independent of the cash flows of other assets and liabilities. There were no intangible asset impairment charges in 2013, 2012 or 2011.

Components of the Company's acquired intangible assets are comprised of the following:

As of December 31, 2013	Gross	Accumulated Amortization	Foreign Currency Translation	Net
Completed technology(1)	$ 84,680	$ (78,072)	$ 519	$ 7,127
Customer relationships	14,571	(9,831)	454	5,194
Patents, trademarks, trade names and other(1)	25,636	(24,951)	84	769
	$124,887	$(112,854)	$1,057	$13,090

(1) In August 2013, the Company purchased $268 of net assets of which $388 was completed technology. In March 2013, the Company purchased Alter for $2,426, net of cash acquired. The Company recorded $2,806 of separately identified intangible assets, of which $2,208 was completed technology and $598 was trademarks and trade names.

As of December 31, 2012	Gross	Accumulated Amortization	Foreign Currency Translation	Net
Completed technology(1)	$ 82,084	$ (77,243)	$254	$ 5,095
Customer relationships(1)	14,571	(8,886)	312	5,997
Patents, trademarks, trade names and other(1)	25,038	(24,587)	18	469
	$121,693	$(110,716)	$584	$11,561

(1) On August 29, 2012, the Company purchased Plasmart for $22,607, net of cash acquired. The Company recorded $10,745 of separately identified intangible assets, of which $5,029 was completed technology, $5,381 was customer relationships and $335 was trade names

(in thousands, except share and per share data)

Aggregate amortization expense related to acquired intangible assets for the years 2013, 2012 and 2011 was $2,139, $1,036 and $1,015, respectively.

Year	Amount
2014	$1,800
2015	1,784
2016	1,601
2017	1,570
2018	1,561
Thereafter	4,774

12) Other Assets

	Years Ended December 31,	
	2013	2012
Other Current Assets:		
Income tax receivable	$ 39	$12,768
Other	16,676	15,280
Total other current assets	$16,715	$28,048
Other Assets:		
Deferred tax assets, net	$ 9,208	$ 9,497
Long-term income tax receivable	20,516	17,720
Other	2,123	2,195
Total other assets	$31,847	$29,412

13) Other Liabilities

	Years Ended December 31,	
	2013	2012
Other Current Liabilities:		
Product warranties	$ 6,956	$ 8,266
Deferred revenue	5,556	9,280
Other	21,730	19,859
Total other current liabilities	$34,242	$37,405
Other Liabilities:		
Long-term income tax payable	$46,745	$38,600
Accrued compensation	9,646	18,750
Other	6,682	3,745
Total other liabilities	$63,073	$61,095

(in thousands, except share and per share data)

14) Product Warranties

The Company provides for the estimated costs to fulfill customer warranty obligations upon the recognition of the related revenue. While the Company engages in extensive product quality programs and processes, including actively monitoring and evaluating the quality of its component suppliers, the Company's warranty obligation is affected by shipment volume, product failure rates, utilization levels, material usage and supplier warranties on parts delivered to the Company. Should actual product failure rates, utilization levels, material usage, or supplier warranties on parts differ from the Company's estimates, revisions to the estimated warranty liability would be required. The product warranty liability is included in other current liabilities in the consolidated balance sheets.

Product warranty activities were as follows:

	Years Ended December 31,	
	2013	2012
Beginning balance	$ 8,266	$ 8,315
Provisions for product warranties	2,755	4,514
Direct charges to warranty liability	(3,987)	(4,985)
Foreign currency translation	(78)	422
Ending balance	$ 6,956	$ 8,266

15) Debt

Credit Agreements and Short-Term Borrowings

The Company's Japanese subsidiary has lines of credit and short-term borrowing arrangements with two financial institutions which generally expire and are renewed at three month intervals. The lines of credit provide for aggregate borrowings as of December 31, 2013 of up to an equivalent of $21,878 U.S. dollars. One of the borrowing arrangements has an interest rate based on the Tokyo Interbank Offer Rate at the time of borrowing and the other has an interest rate based on the Japanese Short-term Prime Lending Rate. There were no borrowings outstanding under these arrangements at December 31, 2013 and 2012.

The Company also had various lines of credit and short and long-term borrowing arrangements as a result of its acquisitions of Plasmart in 2012 and Alter in March 2013. All of these lines of credit and borrowing arrangements were paid off and terminated in 2013. There were no outstanding balances at December 31, 2013 and 2012.

(in thousands, except share and per share data)

16) Income Taxes

A reconciliation of the Company's effective tax rate to the U.S. federal statutory rate is as follows:

	Years Ended December 31,		
	2013	2012	2011
U.S. Federal income tax statutory rate	35.0%	35.0%	35.0%
Federal tax credits	(1.8)	—	(0.7)
State income taxes, net of federal benefit	1.3	1.3	1.1
Effect of foreign operations taxed at various rates	0.3	(2.6)	(4.1)
Qualified production activity tax benefit	(1.4)	(0.5)	(1.1)
Deferred tax asset valuation allowance	(0.7)	1.4	0.6
Income tax charges on accumulated foreign earnings	10.9	—	—
Tax benefit related to reinstatement of tax incentives	(4.0)	—	—
Other	0.1	1.5	(0.5)
	39.7%	36.1%	30.3%

The components of income from continuing operations before income taxes and the related provision for income taxes consist of the following:

	Years Ended December 31,		
	2013	2012	2011
Income from continuing operations before income taxes:			
United States	$29,546	$28,652	$108,474
Foreign	29,755	46,484	77,578
	$59,301	$75,136	$186,052
Current taxes:			
United States	$11,338	$14,745	$ 40,856
State	1,159	783	2,602
Foreign	14,117	7,760	5,314
	26,614	23,288	48,772
Deferred taxes:			
United States	(1,730)	2,019	7,795
State and Foreign	(1,359)	1,800	(246)
	(3,089)	3,819	7,549
Provision for income taxes	$23,525	$27,107	$ 56,321

(in thousands, except share and per share data)

The significant components of the deferred tax assets and deferred tax liabilities are as follows:

	Years Ended December 31,	
	2013	2012
Deferred tax assets:		
Loss carry-forwards and credits	$ 28,138	$ 29,032
Inventory and warranty reserves	10,890	10,959
Accounts receivable and other accruals	2,615	2,647
Stock-based compensation	3,581	5,032
Executive supplemental retirement benefits	8,026	6,132
Other	63	—
Total deferred tax assets	$ 53,313	$ 53,802
Deferred tax liabilities:		
Acquired intangible assets	(2,782)	(5,857)
Depreciation and amortization	(5,085)	(4,461)
Other	(1,202)	(1,145)
Total deferred tax liabilities	(9,069)	(11,463)
Valuation allowance	(27,102)	(27,497)
Net deferred tax assets	$ 17,142	$ 14,842

At December 31, 2013, the Company had gross Massachusetts research and other tax credit carry forwards of $8,689. These credit carry forwards will expire at various dates through 2028. In addition, at December 31, 2013, the Company had U.S. federal capital loss carry forwards of $59,275 that will expire in 2015.

Although the Company believes that its tax positions are consistent with applicable U.S. federal, state and international laws, it maintains certain tax reserves at December 31, 2013 in the event its tax positions were to be challenged by the applicable tax authority and additional tax assessed on audit.

A reconciliation of the beginning and ending amount of gross unrecognized tax benefits is as follows:

	Years Ended December 31,		
	2013	2012	2011
Balance at beginning of year	$40,674	$36,540	$22,028
Decreases for prior years	—	—	(3)
Increases for the current year	7,308	4,134	16,663
Reductions related to settlements with taxing authorities	—	—	(2,148)
Reductions related to expiration of statute of limitations	(298)	—	—
Balance at end of year	$47,684	$40,674	$36,540

At December 31, 2013, the total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately $47,684. The net increase from December 31, 2012 was primarily attributable to a current year increase in reserves for new and existing uncertain tax positions. At December 31, 2013, there are $24,758, excluding interest and penalties, of net unrecognized tax benefits that, if recognized, would affect our annual effective tax rate. In 2013, the Company recorded a net benefit to income tax expense of $140, excluding interest and penalties, due to discrete reserve releases primarily related to statutes of limitations expiring. In 2011, the Company recorded a net benefit to income tax expense of $2,148, excluding interest and penalties, due to discrete reserve releases primarily related to the effective settlement of a German tax audit for years 2001 through 2005.

The Company accrues interest and, if applicable, penalties for any uncertain tax positions. Interest and penalties are classified as a component of income tax expense. At December 31, 2013, 2012 and 2011, the Company had accrued interest on unrecognized tax benefits of approximately $2,159, $1,571 and $973, respectively.

Over the next 12 months it is reasonably possible that the Company may recognize approximately $12,614 of previously net unrecognized tax benefits related to various U.S. federal, state and foreign tax positions as a result of the conclusion of various audits and the expiration of the statute of limitations. The Company is subject to examination by U.S. federal, state and foreign tax authorities. The Internal Revenue Service commenced an examination of its U.S. federal tax filings for open tax years 2007 through present during the quarter ended June 30, 2012. As a result, the U.S. statute of limitations remains open between tax years 2007 through present. The statute of limitations for the Company's tax filings in other jurisdictions varies between fiscal years 2006 through present.

On a quarterly basis, the Company evaluates both positive and negative evidence that affects the realizability of net deferred tax assets and assesses the need for a valuation allowance. The future benefit to be derived from its deferred tax assets is dependent upon its ability to generate sufficient future taxable income to realize the assets. During 2013, the Company decreased its valuation allowance by $395 primarily related to the expiration of US capital loss carry forwards. In 2012 we increased our valuation allowance by $1,022 primarily related to an increase in state tax credit carry forwards because the Company determined it is more likely than not that the deferred tax assets related to these attributes will not be realized. In 2011, the Company increased its valuation allowance by $1,208 primarily related to capital losses incurred from our foreign affiliates because we determined it is more likely than not that the deferred tax assets related to these attributes will not be realized.

Through December 31, 2013, the Company has not provided deferred income taxes on the undistributed earnings of its foreign subsidiaries because such earnings were intended to be permanently reinvested outside the U.S. Determination of the potential deferred income tax liability on these undistributed earnings is not practicable because such liability, if any, is dependent on circumstances existing if and when remittance occurs. At December 31, 2013, the Company had $440,841 of undistributed earnings in its foreign subsidiaries.

During 2006, the Company received a notification letter from the Israeli Ministry of Industry Trade and Labor ("MITL") indicating that its Israeli operations were in compliance with requirements relating to the tax holiday granted to its manufacturing operations in Israel in 2001. This tax holiday expired at December 31, 2011 and was subject to meeting continued investment, employment and other requirements under the guidelines of the MITL. This tax holiday resulted in income tax savings of approximately $1,000 and $2,700 for the years 2011 and 2010, respectively. Upon expiration of its tax holiday, the Company elected to be treated under a new preferential Israeli tax regime under which a tax rate of 10% applies for 2012, is reduced to 7% for 2013, and increased to 9% for 2014. The Company's Israeli subsidiary is currently under examination for tax years 2009 through 2011 and expects the audit to be effectively settled during the quarter ended March 31, 2014.

On September 13, 2013, the U.S. Department of the Treasury and Internal Revenue Service released final tangible property regulations that provide guidance on the tax treatment regarding the deduction and capitalization of expenditures related to tangible property. While early adoption is available, the effective date to implement these regulations is for tax years beginning on or after January 1, 2014. The Company is currently assessing these rules and the impact to its financial statements, if any, but believes adoption of these regulations will not have a material impact on its consolidated results of operations, cash flows or financial position.

On January 2, 2013, the American Taxpayer Relief Act of 2012 reinstated certain tax incentives with retroactive application to January 1, 2012, the tax effect of which was recognized as a discrete event in the first quarter of 2013. Had the extension been enacted prior to January 1, 2013, our effective tax rate for 2012 would have been reduced by approximately 3%.

17) Stockholders' Equity

Stock Repurchase

On July 25, 2011, the Company's board of directors approved a share repurchase program for the repurchase of up to an aggregate of $200,000 of its outstanding Common Stock from time to time in open market purchases, privately negotiated transactions or through other appropriate means. The timing and quantity of any shares repurchased will depend upon a variety of factors, including business conditions, stock market conditions and business development activities, including, but not limited to, merger and acquisition opportunities. These repurchases may be commenced, suspended or discontinued at any time without prior notice.

During 2013, the Company repurchased 107,000 shares of its Common Stock for $2,875 at an average price of $26.87 per share. During 2012, the Company repurchased 434,600 shares of its Common Stock for $11,501 at an average price of $26.46 per share.

Dividends

Holders of the Company's Common Stock are entitled to receive dividends when they are declared by the Company's board of directors. During 2013, the board of directors authorized four quarterly dividends, of $0.16 per share, which totaled $33,975. Future dividend declarations, if any, as well as the record and payment dates for such dividends, are subject to the final determination of the Company's board of directors.

On February 10, 2014, the Company's board of directors declared a quarterly cash dividend of $0.16 per share to be paid on March 14, 2014 to shareholders of record as of March 3, 2014.

18) Stock-Based Compensation

Employee Stock Purchase Plans

The Company's Fourth Restated 1999 Employee Stock Purchase Plan (the "Purchase Plan") authorizes the issuance of up to an aggregate of 1,950,000 shares of Common Stock to participating employees. Offerings under the Purchase Plan commence on June 1 and December 1 and terminate, respectively, on November 30 and May 31. Under the Purchase Plan, eligible employees may purchase shares of Common Stock through payroll deductions of up to 10% of their compensation or up to an annual maximum amount of $21,250. The price at which an employee's purchase option is exercised is the lower of (1) 85% of the closing price of the Common Stock on the NASDAQ Global Select Market on the day that each offering commences, or (2) 85% of the closing price on the day that each offering terminates. During 2013 and 2012, the Company issued 138,674 and 141,975 shares, respectively, of Common Stock to employees who participated in the Purchase Plan at an exercise price of $20.42 and $23.96 per share in 2013 and $22.40 and $22.01 per share in 2012. As of December 31, 2013, there were 212,074 shares reserved for future issuance under the Purchase Plan.

The Company's Third Amended and Restated International Employee Stock Purchase Plan (the "Foreign Purchase Plan") authorizes the issuance of up to an aggregate of 400,000 shares of Common Stock to participating employees. Offerings under the Foreign Purchase Plan commence on June 1 and December 1 and terminate, respectively, on November 30 and May 31. Under the Foreign Purchase Plan, eligible employees may purchase shares of Common Stock through payroll deductions of up to 10% of their compensation or up to an annual maximum amount of $21,250. The price at which an employee's purchase option is exercised is the lower of (1) 85% of the closing price of the Common Stock on the NASDAQ Global Select Market on the day that each offering commences, or (2) 85% of the closing price on the day that each offering terminates. During 2013 and 2012, the Company issued 33,929 and 29,954 shares, respectively, of Common Stock to employees who participated in the Foreign Purchase Plan at an exercise price of $20.42 and $23.96 per share in 2013 and $22.40 and $22.01 per share in 2012. As of December 31, 2013, there were 62,541 shares reserved for future issuance under the Foreign Purchase Plan.

Equity Incentive Plans

The Company has granted options to employees under the 2004 Stock Incentive Plan (the "2004 Plan") and under the Second Restated 1995 Stock Incentive Plan (the "1995 Plan"), and to directors under the 1997 Director Stock Plan (the "1997 Director Plan") (collectively, the "Plans"). The Company has also granted restricted stock units ("RSU"s) to employees and directors under the 2004 Plan. The Plans are administered by the Compensation Committee of the Company's board of directors.

The Company's equity incentive Plans are intended to attract and retain employees and to provide an incentive for them to assist the Company to achieve long-range performance goals and to enable them to participate in the long-term growth of the Company. Employees may be granted RSUs, options to purchase shares of the Company's stock and other equity incentives under the Plans.

The Company's 2004 Plan was adopted by the board of directors on March 4, 2004 and approved by the stockholders on May 13, 2004. As of December 31, 2013, there were 15,000,000 shares authorized for issuance under the 2004 Plan. The Company may grant options, RSUs, stock appreciation rights and other stock-based awards to employees, officers, directors, consultants and advisors under the 2004 Plan. As of December 31, 2013, there were 10,916,285 shares available for future grants under the 2004 Plan.

The Company's 1995 Plan expired in November 2005 and no further awards may be granted under the 1995 Plan, although there are still outstanding options which may be exercised under this plan.

The Company's 1997 Director Plan expired in February 2007 and no further awards may be granted under the 1997 Director Plan, although there are still outstanding options which may be exercised under this plan.

Stock options were granted at an exercise price equal to 100% of the fair value of the Company's Common Stock at the date of grant. Generally, stock options granted to employees under the Plans in 2001 and after, vested 25% after one year and 6.25% per quarter thereafter, and expire 10 years after the grant date. Options granted to directors generally vested at the earliest of (1) one day prior to the next annual meeting, (2) 13 months from date of grant, or (3) the effective date of an acquisition. All stock options are fully vested as of December 31, 2013. RSUs granted in 2013 and 2012 generally vest 33.3% per year after the date of grant. RSUs granted in 2010 and prior, generally vest three years from the date of grant. RSUs granted to employees who are at least 60 years old and have a combined years of age plus years of service (as defined) equal to 70 years or more, are expensed immediately. RSUs granted to directors generally vest at the earliest of (1) one day prior to the next annual meeting, (2) 13 months from date of grant, or (3) the effective date of an acquisition. Certain equity incentive awards involve RSUs that are subject to performance conditions ("performance shares") under the Company's stock incentive plans. Such performance shares are available, subject to time-based vesting conditions if, and to the extent that, financial or operational performance criteria for the applicable period are achieved. Accordingly, the number of performance shares earned will vary based on the level of achievement of financial or operational performance objectives for the applicable period.

The following table presents the activity for RSUs under the Plans:

	Years Ended December 31,					
	2013		2012		2011	
	Non-vested RSUs	Weighted Average Grant Date Fair Value	Non-vested RSUs	Weighted Average Grant Date Fair Value	Non-vested RSUs	Weighted Average Grant Date Fair Value
Non-vested RSUs — beginning of period	942,203	$26.58	1,115,005	$21.50	1,327,306	$18.34
Granted	501,954	$26.81	426,583	$29.14	397,492	$30.27
Vested	(688,376)	$25.09	(557,314)	$19.01	(569,891)	$20.42
Forfeited or expired	(23,747)	$27.17	(42,071)	$22.36	(39,902)	$18.36
Non-vested RSUs — end of period	732,034	$28.08	942,203	$26.58	1,115,005	$21.50

The following table presents the activity for options under the Plans:

	Years Ended December 31,					
	2013		2012		2011	
	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price
Outstanding — beginning of period	255,649	$21.74	420,712	$21.97	1,793,214	$22.38
Exercised	(88,336)	$21.15	(123,650)	$18.78	(1,351,684)	$22.46
Forfeited or expired	(31,580)	$27.04	(41,413)	$32.32	(20,818)	$22.66
Outstanding — end of period	135,733	$20.88	255,649	$21.74	420,712	$21.97
Exercisable at end of period	135,733	$20.88	255,649	$21.74	420,712	$21.97

The following table summarizes information with respect to options outstanding and exercisable under the Plans at December 31, 2013:

	Options Outstanding and Exercisable			
	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life (In Years)	Aggregate Intrinsic Value (In Thousands)
$14.45 – $29.93	135,733	$20.88	0.95	$1,227

(in thousands, except share and per share data)

The weighted average remaining contractual life of options exercisable was 0.95 years at December 31, 2013.

The aggregate intrinsic value in the table above represents the total pre-tax intrinsic value, based on the Company's closing stock price of $29.92 as of December 31, 2013, which would have been received by the option holders had all option holders exercised their options as of that date. The total number of in-the-money options exercisable as of December 31, 2013 was 105,873.

The total cash received from employees as a result of employee stock option exercises during the years 2013 and 2012 was approximately $1,869 and $2,322, respectively. In connection with these exercises, the tax benefit realized by the Company for the years 2013 and 2012 were approximately $94 and $299, respectively.

The Company settles employee stock option exercises and restricted stock vesting with newly issued common shares.

Stock-Based Compensation Expense

The Company recognized the full impact of its share-based payment plans in the consolidated statements of operations and comprehensive income for the years 2013, 2012 and 2011. As of December 31, 2013 and 2012, the Company capitalized $471 of such cost on its consolidated balance sheet. The following table reflects the effect of recording stock-based compensation for the years 2013, 2012 and 2011:

	Years Ended December 31,		
	2013	2012	2011
Stock-based compensation expense by type of award:			
Restricted stock	$12,982	$11,836	$10,126
Employee stock purchase plan	1,010	1,195	1,099
Total stock-based compensation	13,992	13,031	11,225
Tax effect on stock-based compensation	(495)	(1,862)	(5,019)
Net effect on net income	$13,497	$11,169	$ 6,206
Effect on net earnings per share:			
Basic	$ 0.25	$ 0.21	$ 0.12
Diluted	$ 0.25	$ 0.21	$ 0.12

The pre-tax effect within the consolidated statements of operations and comprehensive income of recording stock-based compensation for the years 2013, 2012 and 2011 was as follows:

	Years Ended December 31,		
	2013	2012	2011
Cost of sales	$ 2,038	$ 1,867	$ 1,511
Research and development expense	1,902	2,278	2,197
Selling, general and administrative expense	10,052	8,886	7,517
Total pre-tax stock-based compensation expense	$13,992	$13,031	$11,225

(in thousands, except share and per share data)

Valuation Assumptions

The Company determines the fair value of restricted stock based on the closing market price of the Company's Common Stock on the date of the award, and estimates the fair value of stock options and employee stock purchase rights using the Black-Scholes valuation model. Such values are recognized as expense on a straight-line basis over the requisite service periods, net of estimated forfeitures except for retirement eligible employees in which the Company expenses the fair value of the grant in the period the grant is issued. The estimation of stock-based awards that will ultimately vest requires significant judgment. The Company considers many factors when estimating expected forfeitures, including types of awards and historical experience. Actual results, and future changes in estimates, may differ substantially from the Company's current estimates.

There were no options granted during 2013, 2012 and 2011. The total intrinsic value of options exercised during 2013, 2012 and 2011 was approximately $684, $1,228 and $9,458, respectively.

The weighted average fair value per share of employee stock purchase rights granted in 2013, 2012 and 2011 was $5.76, $7.24 and $5.87, respectively. The fair value of the employees' purchase rights was estimated using the Black-Scholes option-pricing model with the following weighted average assumptions:

	Years Ended December 31,		
	2013	2012	2011
Employee stock purchase rights:			
Expected life (years)	0.5	0.5	0.5
Risk-free interest rate	0.1%	0.1%	0.2%
Expected volatility	27.7%	32.2%	31.9%
Expected annual dividends per share	$0.64	$0.62	$0.60

Expected volatilities for 2013, 2012 and 2011 are based on a combination of implied and historical volatilities of the Company's Common Stock; the expected life represents the weighted average period of time that options granted are expected to be outstanding giving consideration to vesting schedules and the Company's historical exercise patterns; and the risk-free interest rate is based on the U.S. Treasury yield curve in effect at the time of grant for periods corresponding with the expected life of the option.

The total intrinsic value of options exercised and the total fair value of shares vested during 2013, 2012 and 2011 was approximately $19,221, $16,498 and $27,199, respectively. As of December 31, 2013, the unrecognized compensation cost related to restricted stock was approximately $10,934, and will be recognized over an estimated weighted average amortization period of 1.33 years.

19) Employee Benefit Plans

The Company has a 401(k) profit-sharing plan for U.S. employees meeting certain requirements in which eligible employees may contribute between 1% and 50% of their annual compensation to this plan, and, with respect to employees who are age 50 and older, certain specified additional amounts, limited by an annual maximum amount determined by the Internal Revenue Service. The Company, at its discretion, may provide a matching contribution of 50% of each participant's contributions up to 6% of eligible salary. At the discretion of the board of directors, the Company may also make additional contributions for the benefit of all eligible employees. The Company's contributions were $2,334, $2,245 and $2,276 for 2013, 2012 and 2011, respectively.

The Company has one foreign defined benefit plan which is frozen for Company contributions. The total accrual and projected benefit obligation is not material for this plan.

(in thousands, except share and per share data)

The Company maintains a bonus plan which provides cash awards to key employees, at the discretion of the compensation committee of the board of directors, based upon operating results and employee performance. The bonus expense was $12,258, $6,248 and $7,559 in 2013, 2012 and 2011, respectively.

The Company provides supplemental retirement benefits for certain of its officers and executive officers. The total cost of these benefits was $4,988, $3,454 and $3,931 for 2013, 2012 and 2011, respectively. The accumulated benefit obligation was $21,403 at December 31, 2013 of which $14,517 was included in other current liabilities and $6,886 was included in other long-term liabilities. The accumulated benefit obligation was $16,353 at December 31, 2012 and was included in other long-term liabilities.

In the fourth quarter of 2013, the Company's Chief Executive Officer ("CEO") retired. In June of 2014, the Company will make a payment of approximately $13,718 to its former CEO related to these accrued supplemental retirement benefits.

20) Net Income Per Share

Basic earnings per share ("EPS"), is computed by dividing income available to common stockholders by the weighted-average number of common shares outstanding during the period. The computation of diluted EPS is similar to the computation of basic EPS except that the denominator is increased to include the number of additional common shares that would have been outstanding (using the treasury stock method), if securities containing potentially dilutive common shares (stock options and restricted stock units) had been converted to such common shares, and if such assumed conversion is dilutive.

The following is a reconciliation of basic to diluted net income per share:

	Years Ended December 31,		
	2013	2012	2011
Numerator:			
Net income	$ 35,776	$ 48,029	$ 129,731
Denominator:			
Shares used in net income per common share — basic	53,061,000	52,686,000	52,169,000
Effect of dilutive securities:			
Stock options, restricted stock and employee stock purchase plan	420,000	548,000	678,000
Shares used in net income per common share — diluted	53,481,000	53,234,000	52,847,000
Net income per common share:			
Basic	$ 0.67	$ 0.91	$ 2.49
Diluted	$ 0.67	$ 0.90	$ 2.45

As of December 31, 2013, 2012 and 2011, stock options and restricted stock units relating to an aggregate of approximately 868,000, 1,198,000 and 1,536,000 shares, respectively, were outstanding. In 2013, 2012 and 2011, the potential dilutive effect of 83,000, 204,000 and 259,000 weighted average shares, respectively, of stock options were excluded from the computation of diluted weighted-average shares outstanding as the shares would have an anti-dilutive effect on EPS.

(in thousands, except share and per share data)

21) Business Segment, Geographic Area, Product and Significant Customer Information

The Company develops, manufactures, sells and services products that measure, control, power and monitor critical parameters of advanced manufacturing processes. The Company's Chief Operating Decision Maker ("CODM") utilizes consolidated financial information to make decisions about allocating resources and assessing performance for the entire Company. In addition, certain disaggregated financial information is also provided to the CODM. Based upon the information provided to the CODM, the Company has determined it has eight operating segments and four reportable segments.

The eight operating segments are PFMC Products, Controls Products, ASTeX Products, ENI Products, HPS Products (Vacuum Products), Analytical Solutions Group, Europe Region Sales & Service and Asia Region Sales & Service.

PFMC Products, Controls Products, ASTeX Products, ENI Products and HPS Products comprise a single reportable segment due to the similarities of the segments. This reportable segment, Advanced Manufacturing Capital Equipment, includes the development, manufacturing, sales and servicing of instruments and control products, power and reactive gas products and vacuum products, all of which are utilized in semiconductor processing and other similar advanced manufacturing processes. Sales in this segment include both external sales and intercompany sales (which are stated at agreed upon transfer prices). External sales of these products made in Europe or Asia are reported as sales in the Europe Region Sales & Service or Asia Region Sales & Service segments.

Analytical Solutions Group, Europe Region Sales & Service and Asia Region Sales & Service are each separate reportable segments. The Company has reported corporate expenses and certain intercompany pricing transactions in a Corporate, Eliminations and Other reconciling column. The Analytical Solutions Group includes gas composition analysis and information technology products and custom fabrication services. The Europe and Asia sales and service segments mainly resell and service the Advanced Manufacturing Capital Equipment and Analytical Solutions Group products sold in their respective regions.

MKS derives the segment results directly from the manner in which results are reported in its management reporting system. The accounting policies MKS uses to derive reportable segment results are substantially the same as those used for external reporting purposes except that a substantial portion of the sales of the Advanced Manufacturing Capital Equipment and Analytical Solutions Group segments are intercompany sales to the regions at tax-based transfer prices and certain significant costs, including stock-based compensation and management incentive compensation, are not allocated to the segments and are included in Corporate, Eliminations and Other. The CODM reviews several metrics of each operating segment, including net revenues and gross profit (loss).

The following is net revenues by reportable segment:

	Years Ended December 31,		
	2013	2012	2011
Advanced Manufacturing Capital Equipment	$ 528,001	$ 479,751	$ 647,908
Analytical Solutions Group	56,324	62,765	61,303
Europe Region Sales & Service(1)	48,518	51,440	75,253
Asia Region Sales & Service(1)	218,048	229,731	305,448
Corporate, Eliminations and Other	(181,471)	(180,179)	(267,395)
	$ 669,420	$ 643,508	$ 822,517

(in thousands, except share and per share data)

(1) The Europe and Asia foreign sales and service operations do not represent total geographical Europe and Asia financial information. These sales and service operations only represent the sales from the resale and service of Advanced Manufacturing Capital Equipment and Analytical Solutions Group products in their respective regions. The Advanced Manufacturing Capital Equipment and Analytical Solutions Group segments both have sales in each region. Accordingly, total geographical sales include sales from multiple reportable segments.

The following is gross profit by reportable segment:

	Years Ended December 31,		
	2013	2012	2011
Advanced Manufacturing Capital Equipment	$187,685	$171,308	$263,863
Analytical Solutions Group	29,431	32,741	31,800
Europe Region Sales & Service(1)	13,600	15,156	21,323
Asia Region Sales & Service(1)	42,948	36,962	45,267
Corporate, Eliminations and Other	(7,090)	13,312	12,735
	$266,574	$269,479	$374,988

(1) The Europe and Asia foreign sales and service operations do not represent total geographical Europe and Asia financial information. These sales and service operations only represent the sales from the resale and service of Advanced Manufacturing Capital Equipment and Analytical Solutions Group products in their respective regions. The Advanced Manufacturing Capital Equipment and Analytical Solutions Group segments both have sales in each region. Accordingly, total geographical sales include sales from multiple reportable segments.

The following is capital expenditures by reportable segment for the years ended December 31, 2013, 2012 and 2011:

	Product Groups		Foreign Sales & Service Operations			
	Advanced Manufacturing Capital Equipment	Analytical Solutions Group	Europe	Asia	Corporate, Eliminations and Other	Total
December 31, 2013:						
Capital expenditures	$ 8,729	$ 513	$250	$ 857	$2,061	$12,410
December 31, 2012:						
Capital expenditures	$11,817	$1,228	$132	$ 886	$3,642	$17,705
December 31, 2011:						
Capital expenditures	$11,947	$ 868	$362	$1,552	$ 838	$15,567

(in thousands, except share and per share data)

The following is depreciation and amortization expense by reportable segment for the years ended December 31, 2013, 2012 and 2011:

	Product Groups		Foreign Sales & Service Operations			
	Advanced Manufacturing Capital Equipment	Analytical Solutions Group	Europe	Asia	Corporate, Eliminations and Other	Total
December 31, 2013:						
Depreciation and amortization	$11,836	$1,252	$348	$1,177	$2,489	$17,102
December 31, 2012:						
Depreciation and amortization	$ 9,594	$1,176	$326	$1,711	$1,635	$14,442
December 31, 2011:						
Depreciation and amortization	$ 8,143	$1,470	$366	$1,539	$1,462	$12,980

Total income tax expense is impracticable to present by reportable segment because the necessary information is not available or used by the CODM.

The following is segment assets by reportable segment:

	Product Groups		Foreign Sales & Service Operations			
	Advanced Manufacturing Capital Equipment	Analytical Solutions Group	Europe	Asia	Corporate, Eliminations and Other	Total
December 31, 2013:						
Segment assets:						
Accounts receivable	$ 20,767	$5,603	$ 6,538	$44,207	$39,629	$116,744
Inventory	117,822	4,391	4,254	25,094	(8,834)	142,727
Total segment assets	$138,589	$9,994	$10,792	$69,301	$30,795	$259,471

	Product Groups		Foreign Sales & Service Operations			
	Advanced Manufacturing Capital Equipment	Analytical Solutions Group	Europe	Asia	Corporate, Eliminations and Other	Total
December 31, 2012:						
Segment assets:						
Accounts receivable	$ 9,644	$5,889	$5,813	$32,088	$ 28,626	$ 82,060
Inventory	108,397	3,841	3,691	29,534	(10,824)	134,639
Total segment assets	$118,041	$9,730	$9,504	$61,622	$ 17,802	$216,699

(in thousands, except share and per share data)

A reconciliation of segment assets to consolidated total assets is as follows:

	Years Ended December 31, 2013	2012
Total segment assets	$ 259,471	$ 216,699
Cash and cash equivalents and investments	650,022	627,399
Other current assets	30,143	36,242
Property, plant and equipment, net	77,536	80,516
Goodwill and intangible assets, net	163,999	162,294
Other assets	31,847	29,412
Consolidated total assets	$1,213,018	$1,152,562

Information about the Company's operations in different geographic regions is presented in the tables below. Net revenues to unaffiliated customers are based on the location in which the sale originated. Transfers between geographic areas are at negotiated transfer prices and have been eliminated from consolidated net revenues.

	Years Ended December 31, 2013	2012	2011
Net revenues:			
United States	$363,948	$326,894	$391,122
Korea	75,401	64,541	29,193
Japan	56,978	81,883	106,003
Europe	77,910	85,362	115,362
Asia (excluding Korea and Japan)	95,183	84,828	180,837
	$669,420	$643,508	$822,517

	Years Ended December 31, 2013	2012
Long-lived assets:(1)		
United States	$60,700	$62,203
Europe	5,484	5,844
Asia	13,475	14,664
	$79,659	$82,711

(1) Long-lived assets include property, plant and equipment, net and certain other assets, excluding long-term income tax receivable.

(in thousands, except share and per share data)

Worldwide Product Information

Because the reportable segment information above does not reflect worldwide sales of the Company's products, the Company groups its products into four groups of similar products based upon the similarity of product function. Worldwide net revenue for each group of products is as follows:

	Years Ended December 31,		
	2013	2012	2011
Instruments and Control Products	$266,838	$258,521	$348,735
Power and Reactive Gas Products	273,357	251,669	327,151
Vacuum Products	74,537	66,418	81,782
Analytical Solutions Group Products	54,688	66,900	64,849
	$669,420	$643,508	$822,517

Sales of Instruments and Control Products, Power and Reactive Gas Products and Vacuum Products are included in the Company's Advanced Manufacturing Capital Equipment Products segment as well as in the foreign sales and service operations because the products are sold through the foreign sales and service operations in their respective regions. Sales of the Analytical Solutions Group Products are included in the Analytical Solutions Group Products segment as well as in the foreign sales and service operations because the products are sold through the foreign sales and service operations in their respective regions.

Major Customers

The Company had two customers with net revenues greater than 10% of total net revenues in the periods shown as follows:

	Years Ended December 31,		
	2013	2012	2011
Customer A	17.0%	14.5%	13.6%
Customer B	12.3%	10.1%	6.5%

22) Restructurings

In the second and third quarters of 2013, the Company initiated restructuring plans to consolidate a small sales office and a small engineering facility into other MKS facilities. The plans included a small reduction in headcount. The Company recorded restructuring charges of $1,364 during 2013. The restructuring charges were primarily for severance and other charges associated with the reductions in workforce. The restructuring was substantially complete at December 31, 2013.

During the fourth quarter of 2012, the Company implemented a workforce reduction plan as a result of a continued slowdown in the business. The Company reduced its worldwide workforce by 84 people and recorded a restructuring charge of $343.

23) Commitments and Contingencies

During the third quarter of 2012, the Company settled litigation with shareholders of its former subsidiary for $5,316. The complaint alleged certain claims against the Company including breach of contract and implied covenants, and statutory violations. The claims sought unspecified damages and equitable relief. The Company believed that it had meritorious factual and legal defenses to the allegations raised, but reached a settlement primarily to eliminate future legal expenses related to the suit. In the second quarter of 2013, the Company recovered $1,071 from its insurance company relating to the 2012 litigation settlement.

(in thousands, except share and per share data)

The Company is subject to various other legal proceedings and claims, which have arisen in the ordinary course of business. In the opinion of management, the ultimate disposition of these matters will not have a material adverse effect on the Company's results of operations, financial condition or cash flows.

The Company leases certain of its facilities and machinery and equipment under operating leases expiring in various years through 2022. Generally, the facility leases require the Company to pay maintenance, insurance and real estate taxes. Rental expense under operating leases totaled $7,896, $8,219 and $7,747 for 2013, 2012 and 2011, respectively.

Minimum lease payments under operating leases are as follows:

	Operating Leases
Year ending December 31,	
2014	$ 7,484
2015	5,745
2016	4,171
2017	3,862
2018	2,928
Thereafter	3,855
Total minimum lease payments	$28,045

As of December 31, 2013, the Company has entered into purchase commitments for certain inventory components and other equipment and services used in its normal operations. The majority of these purchase commitments covered by these arrangements are for periods of less than one year and aggregate to approximately $132,018.

To the extent permitted by Massachusetts law, the Company's Restated Articles of Organization, as amended, require the Company to indemnify any of its current or former officers or directors or any person who has served or is serving in any capacity with respect to any of the Company's employee benefit plans. The Company believes that the estimated exposure for these indemnification obligations is currently not material. Accordingly, the Company has no material liabilities recorded for these requirements as of December 31, 2013.

The Company also enters into agreements in the ordinary course of business which include indemnification provisions. Pursuant to these agreements, the Company indemnifies, holds harmless and agrees to reimburse the indemnified party, generally its customers, for losses suffered or incurred by the indemnified party in connection with certain patent or other intellectual property infringement claims, and, in some instances, other claims, by any third party with respect to the Company's products. The term of these indemnification obligations is generally perpetual after execution of the agreement. The maximum potential amount of future payments the Company could be required to make under these indemnification agreements is, in some instances, not contractually limited. The Company has never incurred costs to defend lawsuits or settle claims related to these indemnification obligations. As a result, the Company believes the estimated fair value of these obligations is minimal. Accordingly, the Company has no liabilities recorded for these obligations as of December 31, 2013.

As part of past acquisitions and divestitures of businesses or assets, the Company has provided a variety of indemnifications to the sellers and purchasers for certain events or occurrences that took place prior to the date of the acquisition or divestiture. Typically, certain of the indemnifications expire after a defined period of time following the transaction, but certain indemnifications may survive indefinitely. The maximum potential amount of future payments the Company could be required to make for such obligations is undeterminable at this time. Other than obligations recorded as liabilities at the time of the acquisitions, historically the Company has not made significant payments for these indemnifications. Accordingly, no material liabilities have been recorded for these obligations.

In conjunction with certain asset sales, the Company may provide routine indemnifications whose terms range in duration and often are not explicitly defined. Where appropriate, an obligation for such indemnification is recorded as a liability. Because the amounts of liability under these types of indemnifications are not explicitly stated, the overall maximum amount of the obligation under such indemnifications cannot be reasonably estimated. Other than obligations recorded as liabilities at the time of the asset sale, historically the Company has not made significant payments for these indemnifications.

MKS Instruments, Inc.
Supplemental Financial Data

	Quarter Ended			
	March 31	June 30	Sept. 30	Dec. 31
	(Table in thousands, except per share data) (Unaudited)			
2013				
Statement of Operations Data				
Net sales	$141,645	$156,928	$166,453	$204,394
Gross profit	54,702	61,958	62,234	87,680
Income from operations	4,676	10,427	12,332	30,952
Net income	$ 5,761	$ 7,320	$ 2,458	$ 20,237
Net income per share:				
Basic	$ 0.11	$ 0.14	$ 0.05	$ 0.38
Diluted	$ 0.11	$ 0.14	$ 0.05	$ 0.38
Cash dividends paid per common share	$ 0.16	$ 0.16	$ 0.16	$ 0.16
2012				
Statement of Operations Data				
Net sales	$190,868	$177,397	$141,447	$133,796
Gross profit	83,791	76,516	56,571	52,601
Income from operations	33,369	27,847	6,392	6,615
Net income	$ 22,768	$ 18,572	$ 2,580	$ 4,109
Net income per share:				
Basic	$ 0.43	$ 0.35	$ 0.05	$ 0.08
Diluted	$ 0.43	$ 0.35	$ 0.05	$ 0.08
Cash dividends paid per common share	$ 0.15	$ 0.15	$ 0.16	$ 0.16

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

None.

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

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2013. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), means controls and other procedures of an issuer that are designed to ensure that information required to be disclosed by the issuer in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by an issuer in the reports that it files or submits under the Exchange Act is accumulated and communicated to the issuer's management, including its principal executive and principal financial officers, or persons performing similar functions as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of December 31, 2013, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level to ensure that information required to be disclosed by us in reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in Securities and Exchange Commission rules and forms and is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer as appropriate to allow timely decisions regarding required disclosure.

Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is defined in Rules 13a-15(f) and 15d-15(f) promulgated under the Exchange Act as a process designed by, or under the supervision of, the Company's Chief Executive Officer and Chief Financial Officer or persons performing similar functions and effected by the Company's board of directors, management and other personnel, 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 and includes those policies and procedures that:

- Pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of the assets of the Company;
- 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
- Provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. 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.

Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2013. In making this assessment, our management used the 1992 published criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in *Internal Control—Integrated Framework.*

Based on our assessment, management concluded that, as of December 31, 2013, our internal control over financial reporting was effective based on those criteria.

Management has excluded the operations of Alter S.r.l. ("Alter") from its assessment of internal control over financial reporting as of December 31, 2013 because this entity was acquired by the Company in a purchase business combination during the first half of fiscal year 2013. The total assets and total revenues of the acquired business of Alter represent less than 1% of the related consolidated financial statement amounts of the Company as of and for the year ended December 31, 2013.

Our internal controls over financial reporting as of December 31, 2013 have been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their attestation report which appears in Item 8 of this Annual Report on Form 10-K.

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during our fourth fiscal quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. ***Other Information***

None.

PART III

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

The information required by this item will be set forth under the captions “Election of Directors,” “Executive Officers,” “Code of Ethics,” “Directors — Audit Committee Financial Expert” and “Corporate Governance” in our definitive proxy statement for the 2013 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year, and is incorporated herein by reference.

We are also required under Item 405 of Regulation S-K to provide information concerning delinquent filers of reports under Section 16 of the Securities and Exchange Act of 1934, as amended. This information will be set forth under the caption “Section 16(a) Beneficial Ownership Reporting Compliance” in our definitive proxy statement for the 2014 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year, and is incorporated herein by reference.

Item 11. *Executive Compensation*

The information required by this item will be set forth under the captions “Executive Officers — Executive Compensation” and “Executive Officers — Compensation Discussion and Analysis” in our definitive proxy statement for the 2014 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year, and is incorporated herein by reference.

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

The information required by Item 403 of Regulation S-K will be set forth under the caption “Security Ownership of Certain Beneficial Owners and Management” in our definitive proxy statement for the 2014 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year, and is incorporated herein by reference.

The information required by Item 201(d) of Regulation S-K will be set forth under the caption “Executive Officers — Equity Compensation Plan Information” in our definitive proxy statement for the 2014 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year, and is incorporated herein by reference.

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

The information required by this item will be set forth under the caption “Executive Officers – Certain Relationships and Related Transactions” and “Corporate Governance” in our definitive proxy statement for the 2014 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year, and is incorporated herein by reference.

Item 14. *Principal Accountant Fees and Services*

The information required by this item will be set forth under the caption “Independent Registered Public Accounting Firm” in our definitive proxy statement for the 2014 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year, and is incorporated herein by reference.

PART IV

Item 15. ***Exhibits and Financial Statement Schedules***

(a) The following documents are filed as a part of this Report:

1. *Financial Statements*. The following Consolidated Financial Statements are included under Item 8 of this Annual Report on Form 10-K.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Financial Statements:

2. *Financial Statement Schedules.* The following consolidated financial statement schedule is included in this Annual Report on Form 10-K:

Schedule II — Valuation and Qualifying Accounts

Schedules other than those listed above have been omitted since they are either not required or information is otherwise included.

3. *Exhibits.* The following exhibits are filed as part of this Annual Report on Form 10-K.

Exhibit No.	Title
+3.1(1)	Restated Articles of Organization
+3.2(2)	Articles of Amendment to Articles of Organization, as filed with the Secretary of State of Massachusetts on May 18, 2001
+3.3(3)	Articles of Amendment to Articles of Organization, as filed with the Secretary of State of Massachusetts on May 16, 2002
+3.4(4)	Amended and Restated By-Laws
+4.1(4)	Specimen certificate representing the Common Stock
+10.1(5)*	Second Amended and Restated 1997 Director Stock Option Plan, and forms of option agreements thereto
+10.2(6)*	2004 Stock Incentive Plan, as amended (the "2004 Plan")
+10.3(7)*	Form of Nonstatutory Stock Option Agreement under the 2004 Plan
+10.4(8)*	Form of Restricted Stock Unit Agreement for Initial Grant to Non-Employee Directors under the 2004 Plan

Exhibit No.	Title
+10.5(8)*	Form of Restricted Stock Unit Agreement for Annual Grant to Non-Employee Directors under the 2004 Plan
+10.6(8)*	Form of Performance-Based Restricted Stock Unit Agreement under the 2004 Plan (grants from 2007 to 2011)
+10.7(8)*	Form of Time-Based Restricted Stock Unit Agreement under the 2004 Plan (grants from 2007 to 2011)
+10.8(6)*	Form of Time-Based Restricted Stock Unit Agreement and Form of Performance-Based Restricted Stock Unit Agreement under the 2004 Plan (grants from 2011 to 2013)
+10.9(16)*	Form of Restricted Stock Unit Agreement under the 2004 Plan (grants in 2013)
10.10*	Form of Restricted Stock Unit Agreement under the 2004 Plan (grants in 2014)
+10.11(9)*	Second Restated 1995 Stock Incentive Plan (the "1995 Plan")
+10.12(10)*	Form of Nonstatutory Stock Option Agreement under the 1995 Plan
+10.13(16)*	Form of 2013 Management Incentive Bonus Plan for Executive Officers
10.14*	Form of Management Incentive Bonus Plan for Executive Officers
+10.15(12)*	Employment Agreement, dated as of July 1, 2005, between John Bertucci and the Registrant
+10.16(13)*	Employment Agreement, dated July 1, 2005, between Leo Berlinghieri and the Registrant, as amended on November 13, 2007 (the "Berlinghieri Employment Agreement")
+10.17(14)*	Amendment, dated November 10, 2008, to the Berlinghieri Employment Agreement
+10.18(15)*	Amendment, dated October 19, 2009, to the Berlinghieri Employment Agreement
+10.19(16)*	Amendment, dated December 21, 2012, to the Berlinghieri Employment Agreement
+10.20(17)*	Separation Agreement, dated October 22, 2013, between Leo Berlinghieri and the Registrant
+10.21(17)*	Employment Agreement, dated October 22, 2013, between Gerald G. Colella and the Registrant
10.22*	Employment Agreement, dated February 24, 2014, between Seth Bagshaw and the Registrant
10.23*	Employment Agreement, dated February 24, 2014, between John Abrams and the Registrant
10.24*	Employment Agreement, dated February 24, 2014, between Paul Eyerman and the Registrant
10.25*	Employment Agreement, dated February 24, 2014, between John T.C. Lee and the Registrant
10.26*	Employment Agreement, dated February 24, 2014, between Paul Loomis and the Registrant
10.27*	Employment Agreement, dated February 24, 2014, between Brian Quirk and the Registrant
+10.28(11)	Global Supply Agreement, dated April 21, 2005, by and between the Registrant and Applied Materials, Inc.
+10.29(16)	Amendment, dated October 25, 2012, to Applied Materials, Inc. Global Supply Agreement
10.30	Amendment, dated October 23, 2013, to Applied Materials, Inc. Global Supply Agreement
21.1	Subsidiaries of the Registrant
23.1	Consent of PricewaterhouseCoopers LLP
31.1	Certification of Principal Executive Officer pursuant to Rule 13a-14(a)/Rule 15d-14(a) of the Securities Exchange Act of 1934.

Exhibit No.	Title
31.2	Certification of Principal Financial Officer pursuant to Rule 13a-14(a)/Rule 15d-14(a) of the Securities Exchange Act of 1934.
32.1	Certification of Chief Executive Officer and Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101.INS	XBRL Instance Document.
101.SCH	XBRL Taxonomy Extension Schema Document.
101.CAL	XBRL Taxonomy Calculation Linkbase.
101.LAB	XBRL Taxonomy Labels Linkbase Document.
101.PRE	XBRL Taxonomy Presentation Linkbase Document.
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document.

+ Previously filed

* Management contract or compensatory plan arrangement.

The following materials from MKS Instrument, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2013, are formatted in XBRL (Extensible Business Reporting Language): (i) the Consolidated Balance Sheets, (ii) the Consolidated Statements of Operations and Comprehensive Income, (iii) the Consolidated Statements of Stockholders' Equity, (iv) the Consolidated Statements of Cash Flows, (v) Notes to the Consolidated Financial Statements.

(1) Incorporated by reference to the Registration Statement on Form S-4 (File No. 333-49738) filed with the Securities and Exchange Commission on November 13, 2000.

(2) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2001.

(3) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2002.

(4) Incorporated by reference to the Registration Statement on Form S-1 filed with the Securities and Exchange Commission on March 2, 1999.

(5) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2004.

(6) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010.

(7) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2004.

(8) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2006.

(9) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2002.

(10) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on June 30, 2004.

(11) Incorporated by reference to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on April 27, 2005.

(12) Incorporated by reference to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on July 5, 2005.

(13) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2007.

(14) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2008.

(15) Incorporated by reference to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on October 23, 2009.

(16) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2012.

(17) Incorporated by reference to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on October 24, 2013.

(b) Exhibits

MKS hereby files as exhibits to our Annual Report on Form 10-K those exhibits listed in Item 15(a) above.

(c) Financial Statement Schedules

MKS INSTRUMENTS, INC.
SCHEDULE II—VALUATION AND QUALIFYING ACCOUNTS

Description	Balance at Beginning of Year	Additions: Charged to Costs and Expenses	Additions: Charged to Other Accounts	Deductions & Write-offs	Balance at End of Year
	(Dollars in thousands)				
Accounts receivable allowance:					
Years ended December 31,					
2013	$ 2,879	$2,564	$ (98)	$2,594	$ 2,751
2012	$ 2,516	$3,452	$ —	$3,089	$ 2,879
2011	$ 2,557	$3,390	$ —	$3,431	$ 2,516

Description	Balance at Beginning of Year	Additions: Charged to Costs and Expenses	Additions: Charged to Other Accounts	Deductions	Balance at End of Year
	(Dollars in thousands)				
Valuation allowance on deferred tax asset:					
Years ended December 31,					
2013	$27,497	$ —	$ —	$ (395)	$27,102
2012	$26,475	$ (44)	$1,066	—	$27,497
2011	$25,267	$ —	$1,208	$ —	$26,475

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this annual report on Form 10-K for the fiscal year ended December 31, 2013, to be signed on its behalf by the undersigned and the capacities indicated thereunto duly authorized in the town of Andover and State of Massachusetts on the 26th day of February 2014.

MKS INSTRUMENTS, INC.

By: /s/ Gerald G. Colella

Gerald G. Colella
Chief Executive Officer, President and Director
(Principal Executive Officer)

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

SIGNATURES	TITLE	DATE
/s/ John R. Bertucci John R. Bertucci	Chairman of the Board of Directors	February 18, 2014
/s/ Gerald G. Colella Gerald G. Colella	Chief Executive Officer, President and Director	February 26, 2014
/s/ Seth H. Bagshaw Seth H. Bagshaw	Vice President, Chief Financial Officer and Treasurer (Principal Financial and Accounting Officer)	February 26, 2014
/s/ Cristina H. Amon Cristina H. Amon	Director	February 14, 2014
/s/ Robert R. Anderson Robert R. Anderson	Director	February 18, 2014
/s/ Gregory R. Beecher Gregory R. Beecher	Director	February 15, 2014
/s/ Richard S. Chute Richard S. Chute	Director	February 18, 2014
/s/ Peter R. Hanley Peter R. Hanley	Director	February 15, 2014
/s/ Elizabeth A. Mora Elizabeth A. Mora	Director	February 18, 2014

BOARD OF DIRECTORS

John R. Bertucci
Chairman
MKS Instruments, Inc.

Dr. Cristina H. Amon
Dean
Faculty of Applied Science and Engineering
Alumni Chair Professor in Bioengineering of Mechanical and Industrial Engineering
University of Toronto

Robert R. Anderson
Former Chief Financial Officer and Chief Operating Officer
KLA Instruments Corp.

Gregory R. Beecher
Vice President and Chief Financial Officer
Teradyne, Inc.

Richard S. Chute, Esq.

Gerald G. Colella
Chief Executive Officer and President
MKS Instruments, Inc.

Dr. Peter R. Hanley
Former President
Novellus Systems, Inc.

Elizabeth A. Mora
Chief Financial Officer
The Charles Stark Draper Laboratory

MANAGEMENT

Gerald G. Colella
Chief Executive Officer and President

John R. Abrams
Senior Vice President
Global Sales

Seth H. Bagshaw
Vice President, Chief Financial Officer and Treasurer

Kathleen F. Burke
Vice President, General Counsel and Assistant Secretary

John F. Ippolito
Vice President
Corporate Development

Catherine M. Langtry
Vice President
Global Human Resources

John T. C. Lee
Senior Vice President
Business Units

Brian C. Quirk
Senior Vice President
Global Operations

Eric S. Snyder
Vice President
Quality and Reliability

SHAREHOLDER CONTACTS

Corporate Headquarters
MKS Instruments, Inc.
2 Tech Drive, Suite 201
Andover, MA 01810
Telephone: 978.645.5500

Outside Counsel
Wilmer Cutler Pickering Hale and Dorr LLP
Boston, MA

Independent Auditors
PricewaterhouseCoopers LLP
Boston, MA

Stock Listing
NASDAQ Global Select Market
Symbol: MKSI

Transfer Agent
American Stock Transfer & Trust Company
59 Maiden Lane
New York, NY 10038
Telephone: 800.937.5449
Fax: 718.236.2641
www.amstock.com

Shareholders may also direct inquiries to:
Seth H. Bagshaw
Vice President, Chief Financial Officer and Treasurer
MKS Instruments, Inc.
2 Tech Drive, Suite 201
Andover, MA 01810
Telephone: 978.645.5500
www.mksinst.com

Annual Meeting of Shareholders
May 5, 2014, 10:00 a.m.
Wyndham Boston Andover Hotel
123 Old River Road
Andover, MA 01810

mks

Technology for Productivity

MKS INSTRUMENTS, INC.
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