
**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**
Washington, DC 20549

FORM 10-Q

(MARK ONE)

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

For the quarterly period ended September 30, 2016

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
(State or other jurisdiction of
incorporation or organization)

04-2277512
(I.R.S. Employer
Identification No.)

2 Tech Drive, Suite 201, Andover, Massachusetts
(Address of principal executive offices)

01810
(Zip Code)

Registrant's telephone number, including area code (978) 645-5500

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 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

As of November 1, 2016 the registrant had 53,592,715 shares of common stock outstanding.

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PART I. FINANCIAL INFORMATION

ITEM 1. FINANCIAL STATEMENTS

MKS INSTRUMENTS, INC.
CONDENSED CONSOLIDATED BALANCE SHEETS
(in thousands, except share and per share data)
(Unaudited)

	September 30, 2016	December 31, 2015
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 366,874	\$ 227,574
Restricted cash	5,931	—
Short-term investments	53,104	430,663
Trade accounts receivable, net	243,853	101,883
Inventories, net	278,965	152,631
Other current assets	53,616	26,760
Total current assets	1,002,343	939,511
Property, plant and equipment, net	179,694	68,856
Goodwill	594,635	199,703
Intangible assets, net	419,811	44,027
Long-term investments	15,256	—
Other assets	29,926	21,250
Total assets	<u>\$ 2,241,665</u>	<u>\$ 1,273,347</u>
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Short-term borrowings and current portion of long-term debt	\$ 11,528	\$ —
Accounts payable	68,371	23,177
Accrued compensation	63,424	28,424
Income taxes payable	13,758	4,024
Other current liabilities	73,354	35,359
Total current liabilities	230,435	90,984
Long-term debt, net	639,068	—
Non-current deferred taxes	91,928	2,655
Non-current accrued compensation	44,739	13,395
Other liabilities	19,956	5,432
Total liabilities	1,026,126	112,466
Commitments and contingencies (Note 20)		
Stockholders' equity:		
Preferred Stock, \$0.01 par value per share, 2,000,000 shares authorized; none issued and outstanding	—	—
Common Stock, no par value, 200,000,000 shares authorized; 53,578,091 and 53,199,720 shares issued and outstanding at September 30, 2016 and December 31, 2015, respectively	113	113
Additional paid-in capital	770,444	744,725
Retained earnings	458,369	427,214
Accumulated other comprehensive loss	(13,387)	(11,171)
Total stockholders' equity	1,215,539	1,160,881
Total liabilities and stockholders' equity	<u>\$ 2,241,665</u>	<u>\$ 1,273,347</u>

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

MKS INSTRUMENTS, INC.
CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS
AND COMPREHENSIVE INCOME
(in thousands, except per share data)
(Unaudited)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Net revenues:				
Products	\$ 335,156	\$ 179,441	\$ 774,248	\$ 553,818
Services	45,504	29,891	115,954	87,319
Total net revenues	380,660	209,332	890,202	641,137
Cost of revenues:				
Cost of products	183,789	95,710	433,134	294,211
Cost of services	28,486	19,393	74,857	56,853
Total cost of revenues (exclusive of amortization shown separately below)	212,275	115,103	507,991	351,064
Gross profit	168,385	94,229	382,211	290,073
Research and development	32,268	17,217	77,709	51,464
Selling, general and administrative	70,424	33,396	175,803	97,532
Acquisition costs	233	—	10,932	30
Restructuring	—	562	24	1,569
Amortization of intangible assets	12,452	1,691	22,990	5,071
Income from operations	53,008	41,363	94,753	134,407
Interest and other (expense) income, net	(10,760)	721	(16,332)	2,015
Income before income taxes	42,248	42,084	78,421	136,422
Provision for income taxes	9,699	12,315	19,099	39,647
Net income	\$ 32,549	\$ 29,769	\$ 59,322	\$ 96,775
Other comprehensive income:				
Changes in value of financial instruments designated as cash flow hedges, net of tax (expense) benefit(1)	\$ (229)	\$ 939	\$ (2,104)	\$ 2
Foreign currency translation adjustments, net of tax of \$0	5,698	(3,623)	(536)	(6,217)
Unrealized (loss) gain on investments and minimum pension liability adjustment, net of tax (benefit) expense(2)	(31)	100	424	16
Total comprehensive income	\$ 37,987	\$ 27,185	\$ 57,106	\$ 90,576
Net income per share:				
Basic	\$ 0.61	\$ 0.56	\$ 1.11	\$ 1.82
Diluted	\$ 0.60	\$ 0.56	\$ 1.10	\$ 1.81
Cash dividends per common share	\$ 0.17	\$ 0.17	\$ 0.51	\$ 0.505
Weighted average common shares outstanding:				
Basic	53,574	53,314	53,423	53,304
Diluted	54,315	53,568	53,895	53,562

(1) Tax (benefit) expense was \$(117) and \$548 for the three months ended September 30, 2016 and 2015, respectively. Tax (benefit) expense was \$(1,357) and \$20 for the nine months ended September 30, 2016 and 2015, respectively.

(2) Tax (benefit) expense was \$(15) and \$59 for the three months ended September 30, 2016 and 2015, respectively. Tax expense was \$274 and \$221 for the nine months ended September 30, 2016 and 2015, respectively.

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

MKS INSTRUMENTS, INC.
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)
(Unaudited)

	Nine Months Ended September 30,	
	2016	2015
Cash flows provided by operating activities:		
Net income	\$ 59,322	\$ 96,775
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	43,757	16,606
Amortization of inventory step-up adjustment to fair value	15,090	—
Amortization of debt issuance cost and original issue discount	6,453	—
Stock-based compensation	19,826	10,025
Provision for excess and obsolete inventory	11,045	9,235
Provision for bad debt	167	(358)
Deferred income taxes	(9,567)	(2,153)
Excess tax benefits from stock-based compensation	(678)	(884)
Other	125	248
Changes in operating assets and liabilities:		
Trade accounts receivable	(44,508)	(11,424)
Inventories	(5,077)	(25,219)
Income taxes	20,418	10,461
Other current assets	(8,846)	(7,935)
Accrued compensation	4,460	3,619
Other current and non-current liabilities	4,568	4,557
Accounts payable	14,110	(7,542)
Other assets	(3,288)	(441)
Net cash provided by operating activities	<u>127,377</u>	<u>95,570</u>
Cash flows used in investing activities:		
Acquisition of businesses, net of cash acquired	(939,591)	(9,910)
Purchases of investments	(116,075)	(318,340)
Maturities of investments	148,606	131,004
Sales of investments	337,592	35,720
Proceeds from sale of property, plant and equipment	40	8
Purchases of property, plant and equipment	(11,959)	(8,831)
Net cash used in investing activities	<u>(581,387)</u>	<u>(170,349)</u>
Cash flows provided by (used in) financing activities:		
Restricted cash	(6,176)	—
Proceeds from short-term borrowings	15,434	2,020
Payments of short-term borrowings	(8,289)	(2,020)
Net proceeds from long-term borrowings	743,746	—
Payments of long-term borrowings	(111,825)	—
Repurchase of common stock	(1,545)	(8,866)
Net payments related to employee stock awards	(3,108)	(800)
Dividend payments to common stockholders	(27,249)	(26,928)
Excess tax benefits from stock-based compensation	678	884
Net cash provided by (used in) financing activities	<u>601,666</u>	<u>(35,710)</u>
Effect of exchange rate changes on cash and cash equivalents	<u>(8,356)</u>	<u>199</u>
Increase (decrease) in cash and cash equivalents	139,300	(110,290)
Cash and cash equivalents at beginning of period	227,574	305,437
Cash and cash equivalents at end of period	<u>\$ 366,874</u>	<u>\$ 195,147</u>

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

MKS INSTRUMENTS, INC.
NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(in thousands, except share and per share data)

1) Basis of Presentation

The terms “MKS” and the “Company” refer to MKS Instruments, Inc. and its subsidiaries. All intercompany accounts and transactions have been eliminated in consolidation. The interim financial data as of September 30, 2016 and for the three and nine months ended September 30, 2016 and 2015 are unaudited; however, in the opinion of MKS, the interim data includes all adjustments, consisting of normal recurring adjustments, necessary for a fair statement of the results for the interim periods. The condensed consolidated balance sheet presented as of December 31, 2015 has been derived from the consolidated audited financial statements as of that date. The unaudited condensed consolidated financial statements presented herein have been prepared in accordance with the instructions to Form 10-Q and do not include all of the information and note disclosures required by United States generally accepted accounting principles (“U.S. GAAP”). The unaudited condensed consolidated financial statements should be read in conjunction with the audited consolidated financial statements and notes thereto included in the MKS Annual Report on Form 10-K for the year ended December 31, 2015 filed with the Securities and Exchange Commission on February 26, 2016.

On April 29, 2016, the Company completed its acquisition of Newport Corporation which is more fully described in Note 3 below. This transaction was recorded using the purchase method of accounting; accordingly, the financial results of the acquisition are included in the accompanying unaudited condensed consolidated financial statements for the periods subsequent to the acquisition.

The preparation of these unaudited condensed consolidated 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 unaudited condensed consolidated 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, stock-based compensation, inventory, intangible assets, goodwill and other long-lived assets, warranty liabilities, pension liabilities, acquisition expenses, income taxes and investments. 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.

2) Recently Issued Accounting Pronouncements

In August 2016, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) 2016-15, “Statement of Cash Flows (Topic 230)-Classification of Certain Cash Receipts and Cash Payments.” This standard addresses eight specific cash flow issues with the objective of addressing the diversity in practice in how certain cash receipts and cash payments are presented and classified in the statement of cash flows under Topic 230. The provisions of this ASU are effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. The Company is currently evaluating the requirements of this ASU and has not yet determined its impact on the Company’s consolidated financial statements.

In March 2016, the FASB issued ASU 2016-09, “Compensation - Stock Compensation (Topic 718)—Improvements to Employee Share-Based Payment Accounting.” This standard simplifies several aspects of the accounting for share-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. The provisions of this ASU are effective for annual periods beginning after December 15, 2016, including interim periods within those fiscal years and early adoption is permitted. This ASU will be adopted in the first quarter of 2017 and could have a material impact on the Company’s consolidated financial statements

In February 2016, the FASB issued ASU 2016-02, “Leases (Topic 842).” This standard requires the recognition of lease assets and liabilities for all leases, with certain exceptions, on the balance sheet. In transition, lessees and lessors are required to recognize and measure leases at the beginning of the earliest period presented using a modified retrospective approach. This ASU is effective for annual periods beginning after December 15, 2018, including interim periods within those fiscal years. The Company is currently evaluating the requirements of this ASU and has not yet determined its impact on the Company’s consolidated financial statements.

In January 2016, the FASB issued ASU 2016-01, “Financial Instruments—Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities.” This ASU provides guidance for the recognition, measurement, presentation, and disclosure of financial instruments. The new pronouncement revises accounting related to equity investments and the presentation of certain fair value changes for financial assets and liabilities measured at fair value. Among other things, it amends the presentation and disclosure requirements of equity securities that do not result in consolidation and are not

MKS INSTRUMENTS, INC.

NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS—(continued)

(in thousands, except share and per share data)

accounted for under the equity method. Changes in the fair value of these equity securities will be recognized directly in net income. This pronouncement is effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. The Company does not expect adoption of this ASU to have a material impact on the Company's consolidated financial statements.

In July 2015, the FASB issued ASU 2015-11, "Inventory (Topic 330)—Simplifying the Measurement of Inventory." The amendments in this ASU apply to all inventory that is measured using first-in, first-out or average cost. This standard requires that an entity measure inventory within the scope of this update at the lower of cost and net realizable value. Net realizable value is the estimated selling prices in the ordinary course of business, less reasonably predictable costs of completion, disposal, and transportation. The amendments in this ASU are effective for annual periods beginning after December 15, 2016, including interim periods within those fiscal years. The Company does not expect adoption of this ASU to have a material impact on the Company's consolidated financial statements.

In August 2014, the FASB issued ASU 2014-15, "Presentation of Financial Statements—Going Concern (Subtopic 205-40): Disclosure of Uncertainties about an Entity's Ability to Continue as a Going Concern." Under this guidance, management will be required to assess an entity's ability to continue as a going concern, and to provide related footnote disclosures in certain circumstances. The provisions of this ASU are effective for annual periods beginning after December 15, 2016, including interim periods within those fiscal years. The Company does not expect the adoption of this ASU to have an impact on the Company's consolidated financial statements.

In May 2014, the FASB issued ASU 2014-09, "Revenue from Contracts with Customers (Topic 606)," which supersedes all existing revenue recognition requirements, including most industry-specific guidance. This standard requires a company to recognize revenue when it transfers goods and services to customers in an amount that reflects the consideration that the company expects to be entitled to in exchange for those goods or services. The ASU also requires additional disclosure about the nature, amount, timing and uncertainty of revenue and cash flows arising from customer contracts, including significant judgments and assets recognized from costs incurred to obtain or fulfill a contract. This pronouncement is effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. The two permitted transition methods under the new standard are the full retrospective method, in which case the standard would be applied to each prior reporting period presented, or the modified retrospective method, in which case the cumulative effect of applying the standard would be recognized at the date of initial application. The Company has not yet selected a transition method. The Company is currently evaluating the requirements of this ASU and has not yet determined its impact on the Company's consolidated financial statements.

3) Acquisitions

Newport Corporation

On April 29, 2016, the Company completed its acquisition of Newport Corporation ("Newport") pursuant to an Agreement and Plan of Merger, dated as of February 22, 2016 (the "Merger Agreement"), by and among the Company, PSI Equipment, Inc., a wholly owned subsidiary of the Company ("Merger Sub"), and Newport (the "Newport Merger"). At the effective time of the Newport Merger and pursuant to the terms and conditions of the Merger Agreement, each share of Newport's common stock that was issued and outstanding immediately prior to the effective time of the Newport Merger was converted into the right to receive \$23.00 in cash, without interest and subject to deduction for any required withholding tax.

Newport's innovative solutions leverage its expertise in advanced technologies, including lasers, photonics and precision motion equipment, and optical components and sub-systems, to enhance the capabilities and productivity of its customers' manufacturing, engineering and research applications. Newport is a global supplier of advanced-technology products and systems to customers in the scientific research and defense/security, microelectronics, life and health sciences and industrial manufacturing markets.

MKS INSTRUMENTS, INC.
NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS—(continued)
(in thousands, except share and per share data)

The purchase price of Newport consisted of the following:

Cash paid for outstanding shares (1)	\$ 905,254
Settlement of share-based compensation awards (2)	8,824
Cash paid for Newport debt (3)	93,200
Total purchase price	\$1,007,278
Less: Cash and cash equivalents acquired	(61,463)
Total purchase price, net of cash and cash equivalents acquired	\$ 945,815

- (1) Represents cash paid of \$23.00 per share for approximately 39,359,000 shares of Newport common stock, without interest and subject to a deduction for any required withholding tax.
- (2) Represents the vested but not issued portion of Newport share-based compensation awards as of the acquisition date of April 29, 2016.
- (3) Represents the cash paid for the outstanding balance of Newport's senior secured revolving credit agreement.

The Company funded the payment of the aggregate consideration with a combination of the Company's available cash on hand and the proceeds from the Company's senior secured term loan facility, as described in Note 11.

Under the acquisition method of accounting, the total estimated acquisition consideration is allocated to the acquired tangible and intangible assets and assumed liabilities of Newport based on their fair values as of the acquisition date. Any excess of the acquisition consideration over the fair value of assets acquired and liabilities assumed is allocated to goodwill. The Company expects that all such goodwill and intangible assets will not be deductible for tax purposes.

The following table summarizes the allocation of the preliminary purchase price to the fair values assigned to assets acquired and liabilities assumed at the date of the Newport Merger:

Current assets (including cash)	\$ 185,155
Inventory	142,714
Intangible assets	399,806
Goodwill	396,216
Property, plant and equipment	119,932
Long-term assets	22,725
Total assets acquired	1,266,548
Current liabilities	98,458
Other long-term liabilities	160,812
Total liabilities assumed	259,270
Fair value of assets acquired and liabilities assumed	1,007,278
Less: Cash and cash equivalents acquired	(61,463)
Total purchase price, net of cash and cash equivalents acquired	\$ 945,815

For the three and nine months ended September 30, 2016, the Company recorded \$4,971 and \$15,090 incremental cost of sales charges associated with the fair value write-up of inventory acquired in the merger with Newport.

The fair value write-up of acquired property, plant and equipment of \$36,242 will be amortized over the useful life of the asset. Property, plant and equipment is valued at its value-in-use, unless there was a known plan to dispose of the asset.

The acquired intangible assets are being amortized on a straight-line basis, which approximates the economic use of the asset.

MKS INSTRUMENTS, INC.
NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS—(continued)
(in thousands, except share and per share data)

The following table reflects the allocation of the acquired intangible assets and liabilities and related estimate of useful lives:

Order backlog	\$ 12,100	1 year
Customer relationships	243,093	6-18 years
Trademarks and trade names	55,900	Indefinite
Developed technology	75,386	4-8 years
In-process research and development	6,899	Undefined ⁽¹⁾
Leasehold interest, net ⁽²⁾	2,126	4-5 years
Total	<u>\$395,504</u>	

- (1) The useful lives of in-process research and development will be defined in the future upon further evaluation of the status of these programs.
(2) Leasehold interest is comprised of a favorable leasehold asset of \$6,428 and an unfavorable leasehold liability of \$4,302.

The fair value of the acquired intangibles was determined using the income approach. In performing these valuations, the key underlying probability-adjusted assumptions of the discounted cash flows were projected revenues, gross margin expectations and operating cost estimates. The valuations were based on the information that was available as of the acquisition date and the expectations and assumptions that have been deemed reasonable by the Company's management. There are inherent uncertainties and management judgment required in these determinations. This acquisition resulted in a purchase price that exceeded the estimated fair value of tangible and intangible assets, the excess amount of which was allocated to goodwill.

While the Company uses its best estimates and assumptions as part of the purchase price allocation process to value the assets acquired and liabilities assumed on the acquisition date, its estimates and assumptions are subject to refinement. Fair value estimates are based on a complex series of judgments about future events and uncertainties and rely heavily on estimates and assumptions. The judgments used to determine the estimated fair value assigned to each class of assets acquired and liabilities assumed, as well as asset lives, can materially impact the Company's results of operations. The finalization of the purchase accounting assessment will result in a change in the valuation of assets acquired and liabilities assumed and may have a material impact on the Company's results of operations and financial position. As a result, during the measurement period, which may be up to one year from the acquisition date, the Company will record adjustments to the assets acquired and liabilities assumed with a corresponding offset to goodwill to reflect additional information received about facts and circumstances which existed at the date of acquisition. The Company records adjustments to the assets acquired and liabilities assumed subsequent to the purchase price allocation period in the Company's operating results in the period in which the adjustments were determined. The size and breadth of the Newport Merger necessitates the use of this measurement period to adequately analyze and assess a number of the factors used in establishing the fair value of certain tangible and intangible assets acquired and liabilities assumed as of the acquisition date and the related tax impacts of any changes made. Any potential adjustments made could be material in relation to the preliminary values presented above.

The Company believes 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 to attract new customers and revenue and cross sell to existing customers.

The results of this acquisition were included in the Company's consolidated operations beginning on April 29, 2016. Newport constitutes the Company's Light & Motion Division reportable segment (see Note 19).

Certain executives from Newport have severance provisions in their respective Newport employment agreements. The agreements include terms that are accounted for as dual-trigger arrangements. Through the Company's acquisition accounting, the expense relating to these benefits was recognized in the combined entity's financial statements, however, the benefit itself will not be distributed until the final provision is met by each eligible executive. The Company recorded costs of \$6,631 and \$3,334 as compensation expense and stock-based compensation expense, respectively, for the nine months ended September 30, 2016 in connection with these severance provisions. The shares underlying the restricted stock units and stock appreciation rights that are eligible for accelerated vesting if the executive exercises his rights are not issued as of each reporting period-end and are excluded from the computation of basic earnings per share and included in the computation of diluted earnings per share for such reporting period.

MKS INSTRUMENTS, INC.
 NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS—(continued)
 (in thousands, except share and per share data)

Pro Forma Results

The following unaudited pro forma financial information presents the combined results of operations of the Company as if the Newport Merger had occurred on January 1, 2015. The unaudited pro forma financial information is not necessarily indicative of what the Company's condensed consolidated results of operations actually would have been had the acquisition occurred at the beginning of each year. In addition, the unaudited pro forma financial information does not attempt to project the future results of operations of the combined company.

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Total net revenues	\$ 380,660	\$ 355,955	\$ 1,070,471	\$ 1,090,641
Net income	\$ 35,915	\$ 23,725	\$ 65,313	\$ 48,239
Net income per share:				
Basic	\$ 0.67	\$ 0.45	\$ 1.22	\$ 0.90
Diluted	\$ 0.66	\$ 0.44	\$ 1.21	\$ 0.90

The unaudited pro forma financial information above gives effect primarily to the following:

- (1) Incremental amortization and depreciation expense related to the estimated fair value of identifiable intangible assets and property, plant and equipment from the purchase price allocation.
- (2) Revenue adjustments as a result of the reduction in deferred revenue related to its estimated fair value.
- (3) Incremental interest expense related to the Company's term loan credit agreement.
- (4) The exclusion of acquisition costs and inventory step-up amortization from the three and nine month periods ended September 30, 2016 and the addition of these items to the nine month period ended September 30, 2015.
- (5) The estimated tax impact of the above adjustments.

Investment in Reno Sub-Systems, Inc.

On April 27, 2016, the Company invested \$9,300 for a minority interest in Reno Sub-Systems, Inc., a Delaware corporation, which operates in the field of semiconductor process equipment instrumentation. The Company accounted for this investment using the cost method of accounting.

Precise, LLC

On March 17, 2015, the Company acquired Precise, LLC ("Precise") for \$12,085, net of cash acquired of \$435. The purchase price included a deferred payment amount of \$2,600 to cover any potential indemnification claims, which amount was paid to the sellers in the second quarter of 2016. Precise is an innovative developer of optical analyzers based on Tunable Filter Spectroscopy, which provide real-time gas analysis in the natural gas and hydrocarbon processing industries, including refineries, hydrocarbon processing plants, gas-to-power machines, biogas processes and fuel gas transportation and metering, while delivering customers a lower total cost of ownership.

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

Current assets	\$ 693
Non-current assets	18
Intangible assets	5,110
Goodwill	7,042
Total assets acquired	12,863
Total current liabilities assumed	(343)
Fair value of assets acquired and liabilities assumed	12,520
Less: cash acquired	(435)
Total purchase price, net of cash acquired	\$12,085

MKS INSTRUMENTS, INC.
 NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS—(continued)
 (in thousands, except share and per share data)

Substantially all of the purchase price is 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, which approximates the pattern of use.

Order backlog	\$ 50	18 months
Customer relationships	1,430	8 years
Exclusive patent license	2,600	10 years
Trade names	210	10 years
Developed technology	820	10 years
Total	<u>\$5,110</u>	

The fair value of the acquired intangibles was determined using the income approach. The Precise acquisition resulted in a purchase price that exceeded the estimated fair value of tangible and intangible assets, the excess amount of which was allocated to goodwill. The Company believes 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; (2) potential to leverage the Company's sales force and intellectual property to attract new customers and revenue; and (3) potential to strengthen and expand into new but complementary markets, including targeting new applications such as natural gas processing, hydrocarbon processing and other oil and gas segments.

The results of this acquisition were included in the Company's consolidated operations beginning on March 17, 2015. Precise is included in the Company's Instruments, Control and Vacuum Products group within the Vacuum & Analysis Division segment.

4) Investments

Investments classified as short-term consists of the following:

	<u>September 30, 2016</u>	<u>December 31, 2015</u>
Available-for-sale investments:		
Time deposits and certificates of deposit	\$ 1,395	\$ 11,892
Bankers' acceptance drafts	2,487	728
Asset-backed securities	18,326	124,997
Commercial paper	2,793	—
Corporate obligations	16,701	165,109
Municipal bonds	593	8,355
U.S. treasury obligations	1,152	—
U.S. agency obligations	9,657	119,582
	<u>\$ 53,104</u>	<u>\$ 430,663</u>

Investments classified as long-term consists of the following:

	<u>September 30, 2016</u>	<u>December 31, 2015</u>
Available-for-sale investments:		
Group insurance contracts	\$ 5,956	\$ —
Cost method investments:		
Minority interest in Reno Sub-Systems, Inc.	9,300	—
	<u>\$ 15,256</u>	<u>\$ —</u>

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NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS—(continued)
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The following tables show the gross unrealized gains and (losses) aggregated by investment category for short-term and long-term available-for-sale investments:

As of September 30, 2016:	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
Short-term investments:				
Available-for-sale investments:				
Time deposits and certificates of deposit	\$ 1,395	\$ —	\$ —	\$ 1,395
Bankers' acceptance drafts	2,487	—	—	2,487
Asset-backed securities	18,317	13	(4)	18,326
Commercial paper	2,794	—	(1)	2,793
Corporate obligations	16,699	15	(13)	16,701
Municipal bonds	592	1	—	593
U.S. treasury obligations	1,151	1	—	1,152
U.S. agency obligations	9,653	4	—	9,657
	<u>\$ 53,088</u>	<u>\$ 34</u>	<u>\$ (18)</u>	<u>\$ 53,104</u>

As of September 30, 2016:	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
Long-term investments:				
Available-for-sale investments:				
Group insurance contracts	<u>\$ 5,988</u>	<u>\$ —</u>	<u>\$ (32)</u>	<u>\$ 5,956</u>

As of December 31, 2015:	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
Short-term investments:				
Available-for-sale investments:				
Time deposits and certificates of deposit	\$ 11,893	\$ —	\$ (1)	\$ 11,892
Bankers' acceptance drafts	728	—	—	728
Asset-backed securities	125,271	—	(274)	124,997
Corporate obligations	165,445	5	(341)	165,109
Municipal bonds	8,346	13	(4)	8,355
U.S. agency obligations	119,699	3	(120)	119,582
	<u>\$ 431,382</u>	<u>\$ 21</u>	<u>\$ (740)</u>	<u>\$ 430,663</u>

The tables above, which show the gross unrealized gains and (losses) aggregated by investment category for available-for-sale investments as of September 30, 2016 and December 31, 2015, reflect the inclusion within short-term investments of investments with contractual maturities greater than one year from the date of purchase. Management has the ability, if necessary, to liquidate any of its investments in order to meet the Company's liquidity needs in the next 12 months. Accordingly, those investments with contractual maturities greater than one year from the date of purchase are classified as short-term investments on the accompanying balance sheet.

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. Realized gains or losses are reflected in income and were not material for the three and nine months ended September 30, 2016 and 2015.

5) 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.

MKS INSTRUMENTS, INC.
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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 assessed 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, the Company categorizes such assets and liabilities based on the lowest level input that is significant to the fair value measurement in its entirety. The Company's 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 or liability.

Assets and liabilities of the Company are measured at fair value on a recurring basis as of September 30, 2016 and are summarized as follows:

Description	September 30, 2016	Fair Value Measurements at Reporting Date Using		
		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	\$ 10,105	\$ 10,105	\$ —	\$ —
Time deposits and certificates of deposit	1,000	—	1,000	—
Bankers' acceptance drafts	936	—	936	—
Commercial paper	2,845	—	2,845	—
U.S. agency obligations	650	—	650	—
Restricted cash – money market funds	5,931	5,931	—	—
Available-for-sale investments:				
Time deposits and certificates of deposit	1,395	—	1,395	—
Bankers' acceptance drafts	2,487	—	2,487	—
Asset-backed securities	18,326	—	18,326	—
Commercial paper	2,793	—	2,793	—
Corporate obligations	16,701	—	16,701	—
Municipal bonds	593	—	593	—
U.S. treasury obligations	1,152	—	1,152	—
U.S. agency obligations	9,657	—	9,657	—
Group insurance contracts	5,956	—	5,956	—
Derivatives – currency forward contracts	250	—	250	—
Derivatives – option contracts	72	—	72	—
Funds in investments and other assets:				
Israeli pension assets	13,779	—	13,779	—
Restricted cash – non-current	245	245	—	—
Total assets	\$ 94,873	\$ 16,281	\$ 78,592	\$ —

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Description	September 30, 2016	Fair Value Measurements at Reporting Date Using		
		Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Liabilities:				
Derivatives – currency forward contracts	\$ 3,030	\$ —	\$ 3,030	\$ —
Derivatives – option contracts	17	—	17	—
Total liabilities	<u>\$ 3,047</u>	<u>\$ —</u>	<u>\$ 3,047</u>	<u>\$ —</u>
Reported as follows:				
Assets:				
Cash and cash equivalents ⁽¹⁾	\$ 15,536	\$ 10,105	\$ 5,431	\$ —
Restricted cash	5,931	5,931	—	—
Short-term investments	53,104	—	53,104	—
Other current assets	322	—	322	—
Total current assets	<u>\$ 74,893</u>	<u>\$ 16,036</u>	<u>\$ 58,857</u>	<u>\$ —</u>
Long-term investments ⁽²⁾	\$ 5,956	\$ —	\$ 5,956	\$ —
Other long-term assets	13,779	—	13,779	—
Restricted cash – non-current	245	245	—	—
Total long-term assets	<u>19,980</u>	<u>245</u>	<u>19,735</u>	<u>—</u>
Liabilities:				
Other current liabilities	<u>\$ 3,047</u>	<u>\$ —</u>	<u>\$ 3,047</u>	<u>\$ —</u>

- (1) The cash and cash equivalents amounts presented in the table above do not include cash of \$349,885 and non-negotiable time deposits of \$1,453 as of September 30, 2016.
- (2) The long-term investments presented in the table above do not include our investment in Reno Sub-Systems, Inc., which is accounted for under the cost method.

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Assets and liabilities of the Company are measured at fair value on a recurring basis as of December 31, 2015 and are summarized as follows:

Description	December 31, 2015	Fair Value Measurements at Reporting Date Using		
		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	\$ 106,099	\$ 106,099	\$ —	\$ —
Bankers' acceptance drafts	11	—	11	—
Corporate obligations	330	—	330	—
Available-for-sale investments:				
Time deposits and certificates of deposit	11,892	—	11,892	—
Bankers' acceptance drafts	728	—	728	—
Asset-backed securities	124,997	—	124,997	—
Corporate obligations	165,109	—	165,109	—
Municipal bonds	8,355	—	8,355	—
U.S. agency obligations	119,582	—	119,582	—
Derivatives – currency forward contracts	1,486	—	1,486	—
Total assets	<u>\$ 538,589</u>	<u>\$ 106,099</u>	<u>\$432,490</u>	<u>\$ —</u>
Liabilities:				
Derivatives – currency forward contracts	<u>\$ 263</u>	<u>\$ —</u>	<u>\$ 263</u>	<u>\$ —</u>
Reported as follows:				
Assets:				
Cash and cash equivalents ⁽¹⁾	\$ 106,440	\$ 106,099	\$ 341	\$ —
Short-term investments	430,663	—	430,663	—
Other current assets	1,486	—	1,486	—
Total current assets	<u>\$ 538,589</u>	<u>\$ 106,099</u>	<u>\$432,490</u>	<u>\$ —</u>
Liabilities:				
Other current liabilities	<u>\$ 263</u>	<u>\$ —</u>	<u>\$ 263</u>	<u>\$ —</u>

(1) The cash and cash equivalents amounts presented in the table above do not include cash of \$110,118 and non-negotiable time deposits of \$11,016 as of December 31, 2015.

Money Market Funds

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

Restricted Cash

The Company has letters of credit, which require it to maintain specified cash deposit balances, consisting mainly of money market funds, as collateral. Such amounts have been classified as restricted cash and are classified as Level 1.

Available-For-Sale Investments

As of September 30, 2016, available-for-sale investments consisted of time deposits and drafts denominated in the Euro currency, certificates of deposit, bankers' acceptance drafts, asset-backed securities (which include auto loans, credit card receivables and equipment trust receivables), corporate obligations, municipal bonds, U.S. treasury obligations, U.S. agency obligations and group insurance contracts.

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.

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NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS—(continued)
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Israeli Pension Assets

Israeli pension assets represent investments in mutual funds, government securities and other time deposits. These investments are set aside for the retirement benefit of the employees at the Company's Israeli subsidiaries. These funds are classified within 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 are usually large commercial banks. The forward foreign currency exchange and option contracts are valued using broker quotations, or market transactions and are classified within Level 2 of the fair value hierarchy.

6) Derivatives

The Company entered 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 and foreign currency option 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, for which 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.

Interest Rate Swap Agreement

On September 30, 2016, the Company entered into an interest rate swap agreement to fix the rate on approximately 50% of its remaining outstanding term loan balance, as described further in Note 11. This cash flow hedge fixes the interest rate paid on the hedged debt at 1.198% per annum plus the credit spread of 3.50% through September 30, 2020. The interest rate swap will be recorded at fair value on the balance sheet and changes in the fair value will be recognized in other comprehensive income (loss) ("OCI"). To the extent that this arrangement is no longer an effective hedge, any ineffectiveness measured in the hedging relationship is recorded currently in earnings in the period it occurs. The notional amount of this transaction was \$335,000 at September 30, 2016.

Foreign Exchange Contracts

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, Euro and Taiwanese 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 will be recorded currently in earnings in the period in which 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.

The Company also enters into forward exchange contracts to hedge certain balance sheet amounts and foreign currency option contracts related to the Israeli Shekel. To the extent the hedge accounting criteria is not met, the related foreign currency forward contracts and foreign currency option 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.

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As of September 30, 2016 and December 31, 2015, the Company had outstanding forward foreign exchange contracts with gross notional values of \$41,471 and \$89,989, respectively. The following tables provide a summary of the primary net hedging positions and corresponding fair values held as of September 30, 2016 and December 31, 2015:

Currency Hedged (Buy/Sell)	September 30, 2016	
	Gross Notional Value	Fair Value(1) (Liability)/Asset
U.S. Dollar/Japanese Yen	\$ 13,213	\$ (1,876)
U.S. Dollar/South Korean Won	18,150	(930)
U.S. Dollar/Euro	3,969	(14)
U.S. Dollar/U.K. Pound Sterling	1,461	207
U.S. Dollar/Taiwan Dollar	4,678	(167)
Total	<u>\$ 41,471</u>	<u>\$ (2,780)</u>

(1) Represents the fair value of the net (liability) asset amount included in the condensed consolidated balance sheet.

Currency Hedged (Buy/Sell)	December 31, 2015	
	Gross Notional Value	Fair Value(1) (Liability)/Asset
U.S. Dollar/Japanese Yen	\$ 26,848	\$ (136)
U.S. Dollar/South Korean Won	34,777	915
U.S. Dollar/Euro	10,987	19
U.S. Dollar/U.K. Pound Sterling	4,587	61
U.S. Dollar/Taiwan Dollar	12,790	364
Total	<u>\$ 89,989</u>	<u>\$ 1,223</u>

(1) Represents the fair value of the net asset (liability) amount included in the condensed consolidated balance sheet.

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

	September 30, 2016	December 31, 2015
Derivative assets:		
Forward exchange contracts	\$ 250	\$ 1,486
Foreign currency option contracts	72	—
Derivative liabilities:		
Forward exchange contracts	(3,030)	(263)
Foreign currency option contracts	(17)	—
Total net derivative (liabilities) assets(1)	<u>\$ (2,725)</u>	<u>\$ 1,223</u>

(1) The derivative asset of \$322 and derivative liability of \$3,047 are classified in other current assets and other current liabilities, respectively, in the condensed consolidated balance sheet as of September 30, 2016. The derivative asset of \$1,486 and derivative liability of \$263 are classified in other current assets and other current liabilities, respectively, in the condensed consolidated balance sheet as of December 31, 2015. These foreign exchange contracts are subject to a master netting agreement with one financial institution. However, the Company has elected to record these contracts on a gross basis in the balance sheet.

The net amount of existing gains as of September 30, 2016 that the Company expects to reclassify from OCI into earnings within the next twelve months is immaterial.

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

Derivatives Designated as Cash Flow Hedging Instruments	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Forward exchange contracts:				
Net gain (loss) recognized in OCI(1)	\$ 326	\$ 1,148	\$(3,107)	\$(2,372)
Net (loss) gain reclassified from accumulated OCI into income(2)	\$(764)	\$ 857	\$ (487)	\$ 2,766

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

(2) Effective portion classified in cost of products for the three and nine months ended September 30, 2016 and 2015. The tax effect of the gains or losses reclassified from accumulated OCI into income is immaterial.

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As of September 30, 2016, the Company had outstanding foreign currency option contracts related to the Israeli Shekel with gross notional values of \$(476) and a net fair value asset of \$55. These instruments do not qualify for hedge accounting.

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

Derivatives Not Designated as Hedging Instruments	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Forward exchange contracts:				
Net (loss) gain recognized in income ⁽¹⁾	\$ (339)	\$ 116	\$(1,283)	\$1,331
Foreign currency option contracts:				
Net (loss) gain recognized in income ⁽¹⁾	\$ (63)	\$ —	\$ 52	\$ —

(1) The Company enters into foreign exchange contracts to hedge against changes in the balance sheet for certain subsidiaries and also enters into foreign currency option contracts to mitigate the risk associated with certain foreign currency transactions in the ordinary course of business. These derivatives are not designated as hedging instruments and gains or losses from these derivatives are recorded immediately in selling, general and administrative expenses.

7) Inventories

Inventories consist of the following:

	September 30, 2016	December 31, 2015
Raw materials	\$ 100,691	\$ 78,352
Work-in-process	94,679	23,297
Finished goods	83,595	50,982
	<u>\$ 278,965</u>	<u>\$ 152,631</u>

8) Goodwill and Intangible Assets

Goodwill

The Company's methodology for allocating the purchase price relating to purchase acquisitions is determined through established and generally accepted valuation techniques. Goodwill is measured as the excess of the cost of the acquisition over the sum of the amounts assigned to tangible and identifiable intangible assets acquired less liabilities assumed. The Company assigns assets acquired (including goodwill) and liabilities assumed to one or more reporting units as of the date of acquisition. Typically acquisitions relate to a single reporting unit and thus do not require the allocation of goodwill to multiple reporting units. If the products obtained in an acquisition are assigned to multiple reporting units, the goodwill is distributed to the respective reporting units as part of the purchase price allocation process.

Goodwill and purchased intangible assets with indefinite useful lives are not amortized, but are reviewed for impairment annually during the fourth quarter of each fiscal year and whenever events or changes in circumstances indicate that the carrying value of an asset may not be recoverable. The process of evaluating the potential impairment of goodwill and intangible assets requires significant judgment. The Company regularly monitors current business conditions and other factors including, but not limited to, adverse industry or economic trends, restructuring actions and lower projections of profitability that may impact future operating results.

The changes in the carrying amount of goodwill and accumulated impairment (loss) during the nine months ended September 30, 2016 and year ended December 31, 2015 were as follows:

	Nine Months Ended September 30,			Twelve Months Ended December 31,		
	2016			2015		
	Gross Carrying Amount	Accumulated Impairment (Loss)	Net	Gross Carrying Amount	Accumulated Impairment (Loss)	Net
Beginning balance at January 1	\$339,117	\$(139,414)	\$199,703	\$331,795	\$(139,414)	\$192,381
Acquired goodwill ⁽¹⁾	396,216	—	396,216	8,017	—	8,017
Foreign currency translation	(1,284)	—	(1,284)	(695)	—	(695)
Ending balance at September 30, 2016 and December 31, 2015	<u>\$734,049</u>	<u>\$(139,414)</u>	<u>\$594,635</u>	<u>\$339,117</u>	<u>\$(139,414)</u>	<u>\$199,703</u>

(1) During 2016, the Company recorded \$396,216 of goodwill related to the Newport Merger. During 2015, the Company recorded \$7,042 of goodwill related to the acquisition of Precisive. During 2015, the Company recorded a purchase accounting adjustment of \$975 primarily related to an inventory valuation adjustment related to an acquisition that occurred in 2014.

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Intangible Assets

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

As of September 30, 2016:	Gross	Accumulated Amortization	Foreign Currency Translation	Net
Completed technology ⁽¹⁾	\$ 176,586	\$ (89,912)	\$ (290)	\$ 86,384
Customer relationships ⁽¹⁾	280,344	(25,742)	(954)	253,648
Patents, trademarks, trade names and other ⁽¹⁾	104,824	(31,899)	(26)	72,899
In-process research and development ⁽¹⁾	6,899	—	(19)	6,880
	<u>\$ 568,653</u>	<u>\$ (147,553)</u>	<u>\$ (1,289)</u>	<u>\$ 419,811</u>
As of December 31, 2015:	Gross	Accumulated Amortization	Foreign Currency Translation	Net
Completed technology ⁽²⁾	\$ 101,200	\$ (82,330)	\$ (272)	\$ 18,598
Customer relationships ⁽²⁾	37,251	(16,345)	10	20,916
Patents, trademarks, trade names and other ⁽²⁾	30,396	(25,888)	5	4,513
	<u>\$ 168,847</u>	<u>\$ (124,563)</u>	<u>\$ (257)</u>	<u>\$ 44,027</u>

- (1) During 2016, the Company recorded \$399,806 of separately identified intangible assets related to the Newport Merger, of which \$75,386 was completed technology, \$243,093 was customer relationships, \$74,428 was patents, trademarks, trade names and other, and \$6,899 was in-process research and development. The Company also recorded \$4,302 of unfavorable lease commitments, which is recorded in other liabilities in the balance sheet.
- (2) During 2015, the Company recorded \$5,110 of separately identified intangible assets related to the acquisition of Precisive, of which \$820 was completed technology, \$1,430 was customer relationships and \$2,860 was patents, trademarks, trade names and other.

Aggregate amortization expense related to acquired intangibles for the three and nine months ended September 30, 2016 was \$12,452 and \$22,990, respectively. Aggregate amortization expense related to acquired intangibles for the three and nine months ended September 30, 2015 was \$1,691 and \$5,071, respectively. Estimated amortization expense for each of the remaining fiscal years is as follows:

Year	Amount
2016 (remaining)	\$ 12,605
2017	42,335
2018	38,287
2019	38,244
2020	34,270
2021	27,276
Thereafter	170,894

9) Other Assets

	September 30, 2016	December 31, 2015
Other Current Assets:		
Income tax receivable	\$ 7,754	\$ 8,682
Prepaid income tax	10,825	4,755
Other	35,037	13,323
Total other current assets	<u>\$ 53,616</u>	<u>\$ 26,760</u>
Other Assets:		
Deferred tax assets, net	\$ 3,025	\$ 19,252
Other	26,901	1,998
Total other assets	<u>\$ 29,926</u>	<u>\$ 21,250</u>

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10) Other Liabilities

	September 30, 2016	December 31, 2015
Other Current Liabilities:		
VAT payable	\$ 6,004	\$ 3,075
Customer prepayments	4,349	1,741
Product warranties	8,083	5,205
Deferred revenue	14,704	7,189
Other	40,214	18,149
Total other current liabilities	\$ 73,354	\$ 35,359
Other Liabilities:		
Long-term income tax payable	\$ 14,140	\$ 4,483
Other	5,816	949
Total other liabilities	\$ 19,956	\$ 5,432

11) Debt

Term Loan Credit Agreement

In connection with the completion of the Newport Merger, the Company entered into a term loan credit agreement (the “Credit Agreement”) with Barclays Bank PLC, as administrative agent and collateral agent, and the lenders from time to time party thereto (the “Lenders”), that provided senior secured financing of \$780,000, subject to increase at the Company’s option in accordance with the Credit Agreement (the “Term Loan Facility”). Borrowings under the Term Loan Facility bear interest per annum at one of the following rates selected by the Company: (a) a base rate determined by reference to the highest of (1) the federal funds effective rate plus 0.50%, (2) the “prime rate” quoted in The Wall Street Journal, (3) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for an interest period of one month adjusted for certain additional costs, plus 1.00%, and (4) a floor of 1.75%, plus, in each case, an applicable margin of 3.00%; or (b) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for the interest period relevant to such borrowing adjusted for certain additional costs, subject to a LIBOR rate floor of 0.75%, plus an applicable margin of 4.00%. The Company has elected the interest rate as described in clause (b). The Term Loan Facility was issued with original issue discount of 1.00% of the principal amount thereof.

The term loans are prepayable in whole or in part from time to time, and were initially subject to a prepayment premium if a prepayment was to be made on or prior to October 29, 2016 and only in certain circumstances. The Company will be obligated to pay a prepayment fee equal to 1.00% of the amount of the term loans outstanding immediately prior to any amendment resulting in a repricing transaction.

On June 9, 2016, the Company entered into Amendment No. 1 (the “Repricing Amendment”) to the Credit Agreement by and among the Company, the Lenders and Barclays Bank PLC, as administrative agent and collateral agent for the Lenders. The Repricing Amendment decreased the applicable margin for borrowings under the Company’s Term Loan Facility to 2.50% for base rate borrowings and 3.50% for LIBOR borrowings and extended the period during which a prepayment premium may be required for a “Repricing Transaction” (as defined in the Credit Agreement) until six months after the effective date of the Repricing Amendment. In connection with the execution of the Repricing Amendment, the Company paid a prepayment premium of 1.00%, or \$7,300, as well as certain fees and expenses of the administrative agent and the Lenders, in accordance with the terms of the Credit Agreement. Immediately prior to the effectiveness of the Repricing Amendment, the Company prepaid \$50,000 of principal under the Credit Agreement. On September 29, 2016, the Company made another voluntary prepayment of \$60,000 of principal under the Credit Agreement. This prepayment was in addition to a scheduled principal payment of \$1,825. As a result, the outstanding principal amount of the term loan was \$668,175 as of September 30, 2016.

On September 30, 2016, the Company entered into an interest rate swap agreement, which has a maturity date of September 30, 2020, to fix the rate on \$335,000 of the outstanding balance of the Credit Agreement. The rate is fixed at 1.198% per annum plus the credit spread of 3.50%.

The Company incurred \$28,747 of deferred finance fees, original issue discount and a repricing fee related to the term loans, which are included in long-term debt in the accompanying consolidated balance sheets and will be amortized to interest expense over the estimated life of the term loans using the effective interest method.

Under the Credit Agreement, the Company is required to prepay outstanding term loans, subject to certain exceptions, with portions of its annual excess cash flow as well as with the net cash proceeds of certain asset sales, certain casualty and condemnation events and the incurrence or issuance of certain debt. The Company is also required to make scheduled quarterly

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payments each equal to 0.25% of the original principal amount of the term loans made on the closing date with such original principal amount reduced by any such prepayments (including the \$110,000 prepaid to date in 2016), with the balance due on the seventh anniversary of the closing date.

All obligations under the Term Loan Facility are guaranteed by certain of the Company's domestic subsidiaries, and are secured by substantially all of the Company's assets and the assets of such subsidiaries, subject to certain exceptions and exclusions.

The Credit Agreement contains customary representations and warranties, affirmative and negative covenants and provisions relating to events of default. If an event of default occurs, the Lenders under the Term Loan Facility will be entitled to take various actions, including the acceleration of amounts due under the Term Loan Facility and all actions generally permitted to be taken by a secured creditor. At September 30, 2016, the Company is in compliance with all covenants under the Credit Agreement.

Senior Secured Asset-Based Revolving Credit Facility

In connection with the completion of the Newport Merger, the Company also entered into an asset-based credit agreement with Deutsche Bank AG New York Branch, as administrative agent and collateral agent, the other borrowers from time to time party thereto, and the lenders and letters of credit issuers from time to time party thereto (the "ABL Facility"), that provides senior secured financing of up to \$50,000, subject to a borrowing base limitation. The borrowing base for the ABL Facility at any time equals the sum of: (a) 85% of certain eligible accounts; plus (b) subject to certain notice and field examination and appraisal requirements, the lesser of (i) the lesser of (A) 65% of the lower of cost or market value of certain eligible inventory and (B) 85% of the net orderly liquidation value of certain eligible inventory and (ii) 30% of the borrowing base; minus (c) reserves established by the administrative agent; provided that until the administrative agent's receipt of a field examination of accounts receivable the borrowing base shall be equal to 70% of the book value of certain eligible accounts. The ABL Facility includes borrowing capacity in the form of letters of credit up to \$15,000. The Company has not drawn against the ABL Facility.

Borrowings under the ABL Facility bear interest per annum at one of the following rates selected by the Company: (a) a base rate determined by reference to the highest of (1) the federal funds effective rate plus 0.50%, (2) the "prime rate" quoted in the The Wall Street Journal, and (3) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for an interest period of one month adjusted for certain additional costs, plus 1.00%, plus, in each case, an initial applicable margin of 0.75%; and (b) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for the interest period relevant to such borrowing adjusted for certain additional costs, plus an initial applicable margin of 1.75%. Commencing with the completion of the first fiscal quarter ending after the closing of the ABL Facility, the applicable margin for borrowings thereunder is subject to upward or downward adjustment each fiscal quarter, based on the average historical excess availability during the preceding quarter.

The Company incurred \$1,201 of costs in connection with the ABL Facility, which were capitalized and included in other assets in the accompanying consolidated balance sheets and will be amortized to interest expense using the straight-line method over the contractual term of five years of the ABL Facility.

In addition to paying interest on outstanding principal under the ABL Facility, the Company is required to pay a commitment fee in respect of the unutilized commitments thereunder. The initial commitment fee is 0.375% per annum. Commencing with the completion of the first fiscal quarter ending after the closing of the ABL Facility, the commitment fee is subject to downward adjustment based on the amount of average unutilized commitments for the three-month period immediately preceding such adjustment date. The Company must also pay customary letter of credit fees and agency fees.

Lines of Credit and Short-Term Borrowing Arrangements

One of the Company's Japanese subsidiaries has lines of credit and short-term borrowing arrangements with two financial institutions which arrangements generally expire and are renewed at three-month intervals. The lines of credit provided for aggregate borrowings as of September 30, 2016 of up to an equivalent of \$22,763 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 September 30, 2016 and December 31, 2015.

The Company assumed various revolving lines of credit and a financing facility with the completion of the Newport Merger. These revolving lines of credit and financing facility have no expiration date and provided for aggregate borrowings as of September 30, 2016 of up to an equivalent of \$9,897 U.S. dollars. These lines of credit have a base interest rate of 1.25% plus a Japanese Yen overnight LIBOR rate.

One of the Company's Austrian subsidiaries has four outstanding loans from the Austrian government to fund research and development. These loans are unsecured and do not require principal repayment as long as certain conditions are met. Interest on these loans is payable semi-annually. The interest rates associated with these loans range from 0.75% - 2.00%.

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Short-term debt:	September 30, 2016
Japanese lines of credit	\$ 3,958
Japanese receivables financing facility	252
Other debt	18
Current portion of Term Loan Facility	7,300
	<u>\$ 11,528</u>
Long-term debt:	September 30, 2016
Austrian loans due through March 2020	\$ 587
Term Loan Facility, net (1)	638,481
	<u>\$ 639,068</u>

(1) Net of deferred financing fees, original issuance discount and repricing fees of \$22,394.

For the three and nine months ended September 30, 2016, the Company recognized interest expense of \$8,461 and \$11,989, respectively, related to the Term Loan Facility.

Contractual maturities of the Company's debt obligations as of September 30, 2016 are as follows:

Year	Amount
2016 (remaining)	\$ 6,054
2017	7,404
2018	7,312
2019	7,726
2020	7,344
2021	7,300
Thereafter	629,850

12) Product Warranties

The Company records 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 condensed consolidated balance sheet.

Product warranty activities were as follows:

	Nine Months Ended September 30,	
	2016	2015
Beginning of period	\$ 5,205	\$ 6,266
Product warranty liability from Newport Merger	3,040	—
Provision for product warranties	5,067	3,527
Direct charges to warranty liability	(5,213)	(3,859)
Foreign currency translation	43	(97)
End of period (1)	<u>\$ 8,142</u>	<u>\$ 5,837</u>

(1) Short-term product warranty of \$8,083 and long-term product warranty of \$59 are included in other current liabilities and other liabilities, respectively, in the accompanying condensed consolidated balance sheet.

13) Pension Plans

As a result of the Newport Merger, the Company has assumed all assets and liabilities of Newport's defined benefit pension plans, which cover substantially all of its full-time employees in France, Germany, Israel and Japan. In addition, there are certain pension liabilities relating to former employees in the United Kingdom. The German plan is unfunded, as permitted under the plan and applicable laws.

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For financial reporting purposes, the calculation of net periodic pension costs was based upon a number of actuarial assumptions including a discount rate for plan obligations, an assumed rate of return on pension plan assets and an assumed rate of compensation increase for employees covered by the plan. All of these assumptions were based upon management's judgment, considering all known trends and uncertainties. Actual results that differ from these assumptions would impact future expense recognition and the cash funding requirements of the Company's pension plans.

The Company has included the net periodic benefit costs for the plans from the date of the acquisition on April 29, 2016 through September 30, 2016. The net periodic benefit costs included the following components:

	Three months ended September 30, 2016	Nine months ended September 30, 2016
Service cost	\$ 596	\$ 1,000
Interest cost on projected benefit obligation	121	201
Expected return on plan assets	(44)	(75)
	<u>\$ 673</u>	<u>\$ 1,126</u>

14) Income Taxes

The Company's effective tax rate for the three and nine months ended September 30, 2016 was 23.0% and 24.4%, respectively. The effective tax rate for the three and nine months ended September 30, 2016 was lower than the U.S. statutory tax rate primarily due to the geographic mix of income and profits earned by the Company's international subsidiaries being taxed at rates lower than the U.S. statutory tax rate, the federal research credit and the deduction for domestic production activities. These amounts were partially offset by taxes paid on the Company's reorganization of certain international subsidiaries and state income taxes. The Company's effective tax rate for the three and nine months ended September 30, 2015 was 29.3% and 29.1%, respectively. The effective tax rate for the three and nine months ended September 30, 2015 was lower than the U.S. statutory tax rate primarily due to the geographic mix of income and profits earned by the Company's international subsidiaries being taxed at rates lower than the U.S. statutory tax rate and the deduction for domestic production activities.

As of September 30, 2016, the total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately \$30,567. At December 31, 2015, the total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately \$4,332. The net increase from December 31, 2015 was primarily attributable to the addition of historical gross unrecognized tax benefits for Newport which were included as a result of the acquisition in April 2016. As of September 30, 2016, if these gross unrecognized tax benefits were recognized in a future period, the timing of which is not estimable, the net unrecognized tax benefit of \$19,399, excluding interest and penalties, would impact the Company's effective tax rate. The Company accrues interest expense, and if applicable, penalties, for any uncertain tax positions. Interest and penalties are classified as a component of income tax expense. As of September 30, 2016 and December 31, 2015, the Company had accrued interest on unrecognized tax benefits of approximately \$738 and \$157, respectively.

Over the next 12 months it is reasonably possible that the Company may recognize approximately \$3,370 of previously net unrecognized tax benefits, excluding interest and penalties, related to various U.S. federal, state and foreign tax positions primarily as a result of the expiration of certain statutes of limitations.

The Company and its subsidiaries are subject to examination by U.S. federal, state and foreign tax authorities. The United States Internal Revenue Service commenced an examination of the Company's U.S. federal tax filings for tax years 2011 through 2013 during the quarter ended March 31, 2015. The audit was effectively settled during the three months ended December 31, 2015 upon the Company's acceptance of the income tax examination changes. As part of the audit, the Company consented to extend the U.S. statute of limitations for tax year 2011 until September 30, 2016.

The U.S. statute of limitations remains open for tax years 2013 through present. The statute of limitations for the Company's tax filings in other jurisdictions varies between fiscal years 2007 through present. The Company also has certain federal credit carry-forwards and state tax loss and credit carry-forwards that are open for examination for tax years 2000 through present.

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15) Interest and Other (Expense) Income, Net

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Interest income	\$ 404	\$778	\$ 1,859	\$2,147
Other income	1,544	—	1,583	—
Interest expense	(12,007)	(57)	(20,527)	(132)
Impact of foreign exchange (expense) income	(701)	—	753	—
Interest and other (expense) income, net	<u>\$(10,760)</u>	<u>\$721</u>	<u>\$(16,332)</u>	<u>\$2,015</u>

In 2016, the Company reclassified the impact of foreign exchange income (expense) from selling, general and administrative expenses to interest and other (expense) income, net. The amount included in selling, general and administrative expenses for the three and nine months ended September 30, 2015 was expense of \$836 and \$288, respectively.

16) Net Income Per Share

The following table sets forth the computation of basic and diluted net income per share:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Numerator:				
Net income	\$ 32,549	\$ 29,769	\$ 59,322	\$ 96,775
Denominator:				
Shares used in net income per common share – basic	53,574,000	53,314,000	53,423,000	53,304,000
Effect of dilutive securities:				
Stock options, restricted stock, stock appreciation rights and employee stock purchase plan	741,000	254,000	472,000	258,000
Shares used in net income per common share – diluted	<u>54,315,000</u>	<u>53,568,000</u>	<u>53,895,000</u>	<u>53,562,000</u>
Net income per common share:				
Basic	\$ 0.61	\$ 0.56	\$ 1.11	\$ 1.82
Diluted	\$ 0.60	\$ 0.56	\$ 1.10	\$ 1.81

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, restricted stock units and stock appreciation rights) had been converted to such common shares, and if such assumed conversion is dilutive.

17) Stockholder’s Equity

Stock Repurchase Program

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 depends upon a variety of factors, including business conditions, stock market conditions, debt agreement limitations 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. We have repurchased approximately 1,770,000 shares of our common stock for approximately \$52,000 pursuant to the program since its adoption.

During the nine months ended September 30, 2016, the Company repurchased approximately 45,000 shares of its common stock for \$1,545, or an average price of \$34.50 per share. During the nine months ended September 30, 2015, the Company repurchased approximately 244,000 shares of its common stock for \$8,866, or an average price of \$36.32 per share.

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Cash 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 the nine months ended September 30, 2016, the Company’s Board of Directors declared a cash dividend of \$0.17 per share in the first, second and third quarters of 2016, which totaled \$27,249. During the nine months ended September 30, 2015, the Company’s Board of Directors declared a cash dividend of \$0.165 per share in the first quarter of 2015 and a cash dividend of \$0.17 per share in the second and third quarters of 2015, which dividends totaled \$26,928.

On October 24, 2016, the Company’s Board of Directors declared a quarterly cash dividend of \$0.17 per share to be paid on December 9, 2016 to shareholders of record as of November 28, 2016. 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.

18) Stock-Based Compensation

In connection with the completion of the Newport Merger, the Company assumed:

- all restricted stock units (“RSUs”) granted under any Newport equity plan that were outstanding immediately prior to the effective time of the Newport Merger, and as to which shares of Newport common stock were not fully distributed in connection with the closing of the Newport Merger, and
- all stock appreciation rights granted under any Newport equity plan, whether vested or unvested, that were outstanding immediately prior to the effective time of the Newport Merger.

As of the effective time of the Newport Merger, based on a formula provided in the Merger Agreement, (a) the Newport RSUs were converted automatically into RSUs with respect to 360,674 shares of the Company’s common stock (the “Assumed RSUs”), and (b) the Newport stock appreciation rights were converted automatically into stock appreciation rights with respect to 899,851 shares of the Company’s common stock (the “Assumed SARs”).

Included in the total number of Assumed RSUs were 36,599 RSUs for outside directors that were part of the Newport Deferred Compensation Plan (the “DC Plan”), from which 19,137 underlying shares were released in May 2016. As of September 30, 2016, 17,462 RSUs remained outstanding under the DC Plan, and an additional 136 shares were added to the DC Plan due to reinvested dividends. These Assumed RSUs will not become issued shares until their respective release dates.

The shares of the Company’s common stock that are subject to the Assumed SARs and the Assumed RSUs are issuable pursuant to the Company’s 2014 Stock Incentive Plan (the “Plan”).

The 1,260,525 shares of the Company’s common stock that are issuable pursuant to the Assumed RSUs and the Assumed SARs under the Plan were registered under the Securities Act of 1933, as amended (the “Securities Act”), on a registration statement on Form S-8. These shares are in addition to the 18,000,000 shares of the Company’s common stock reserved for issuance under the Plan and previously registered under the Securities Act on a registration statement on Form S-8.

During the nine months ended September 30, 2016, the Company granted 740,985 RSUs with a weighted average grant date fair value of \$35.51 and the Company did not grant any stock appreciation rights.

The total stock-based compensation expense included in the Company’s consolidated statements of income and comprehensive income was as follows:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Cost of revenues	\$ 666	\$ 432	\$ 1,996	\$ 1,489
Research and development expense	551	405	1,614	1,255
Selling, general and administrative expense	3,941	2,410	16,216	7,281
Total pre-tax stock-based compensation expense	<u>\$5,158</u>	<u>\$3,247</u>	<u>\$19,826</u>	<u>\$10,025</u>

At September 30, 2016, the total compensation expense related to unvested stock-based awards granted to employees, officers and directors under the Company’s stock-based compensation plan that had not been recognized was \$29,283, net of estimated forfeitures. The future compensation expense is recognized on a straight-line basis over the requisite service period, 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 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.

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

	Nine Months Ended September 30, 2016	
	Non-vested RSUs	Weighted Average Grant Date Fair value
Non-vested RSUs – beginning of period	733,162	\$ 30.94
Assumed RSUs from Newport Merger	360,674	35.01
Accrued dividend shares	136	43.64
Granted	740,985	35.51
Vested	(452,251)	31.18
Forfeited	(55,474)	33.74
Non-vested RSUs – end of period	1,327,232	\$ 34.40

For the three months ended September 30, 2016, there were approximately 529,000 and 213,000 weighted-average RSUs and stock appreciation rights, respectively, that would have an anti-dilutive effect on EPS, and would thus need to be excluded from the computation of diluted weighted-average shares. For the nine months ended September 30, 2016, there were approximately 401,000 and 181,000 weighted-average RSUs and stock appreciation rights, respectively, that would have an anti-dilutive effect on EPS, and would thus need to be excluded from the computation of diluted weighted-average shares.

As of September 30, 2015, stock options and RSUs related to an aggregate of approximately 752,000 shares were outstanding. For the three and nine months ended September 30, 2015, there were no RSUs or stock options that were excluded from the computation of diluted weighted-average shares outstanding that would have had an anti-dilutive effect on EPS.

At September 30, 2016, the Company’s outstanding and exercisable stock appreciation rights, the weighted-average base value, the weighted average remaining contractual life and the aggregate intrinsic value thereof, were as follows:

	Number of shares	Weighted Average Base Value	Weighted Average Remaining Contractual Life (years)	Aggregate Intrinsic Value
Stock appreciation rights outstanding	712,284	\$ 27.86	4.1	\$ 15,581
Stock appreciation rights exercisable	482,001	\$ 26.52	3.5	\$ 11,185

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

The Company 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. The Company also provides services relating to the maintenance and repair of products it sells, software maintenance, installation services and training.

The Company’s Chief Operating Decision Maker (“CODM”) utilizes financial information to make decisions about allocating resources and assessing performance for the entire Company, which is used in the decision making process to assess performance. Based upon the information provided to the CODM, the Company has determined it has two reportable segments.

Effective April 29, 2016, in conjunction with the Newport Merger, the Company changed its reportable segments based upon the organizational structure of the Company and how the CODM utilizes information provided to allocate resources and make decisions. The Company’s two reportable segments are the Vacuum & Analysis Division and the Light & Motion Division.

The Vacuum & Analysis Division provides a broad range of instruments, components, subsystems and software which are derived from the Company’s core competencies in pressure measurement and control, flow measurement and control, gas and vapor delivery, gas composition analysis, residual gas analysis, leak detection, control and information technology, ozone generation and delivery, RF & DC power, reactive gas generation and vacuum technology.

The Light & Motion Division provides a broad range of instruments, components and subsystems which are derived from the Company’s core competencies in lasers, photonics, sub-micron positioning, vibration isolation and optics.

The Company derives its segment results directly from the manner in which results are reported in its management reporting system. The accounting policies that the Company uses to derive reportable segment results are substantially the same as those used for external reporting purposes. The Company does not disclose external or intersegment revenues separately by reportable segment as this information is not presented to the CODM for decision making purposes.

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The following is net revenues by reportable segment:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Vacuum & Analysis Division	\$ 229,167	\$ 209,332	\$ 620,207	\$ 641,137
Light & Motion Division	151,493	—	269,995	—
	<u>\$ 380,660</u>	<u>\$ 209,332</u>	<u>\$ 890,202</u>	<u>\$ 641,137</u>

The following is a reconciliation of segment gross profit to consolidated net income:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Gross profit by reportable segment:				
Vacuum & Analysis Division	\$ 104,232	\$ 94,229	\$ 273,004	\$ 290,073
Light & Motion Division	64,153	—	109,207	—
Total gross profit by reportable segment	168,385	94,229	382,211	290,073
Operating expenses:				
Research and development	32,268	17,217	77,709	51,464
Selling, general and administrative	70,424	33,396	175,803	97,532
Acquisition costs	233	—	10,932	30
Restructuring	—	562	24	1,569
Amortization of intangible assets	12,452	1,691	22,990	5,071
Income from operations	53,008	41,363	94,753	134,407
Interest and other (expense) income, net	(10,760)	721	(16,332)	2,015
Income before income taxes	42,248	42,084	78,421	136,422
Provision for income taxes	9,699	12,315	19,099	39,647
Net income	<u>\$ 32,549</u>	<u>\$ 29,769</u>	<u>\$ 59,322</u>	<u>\$ 96,775</u>

The following is capital expenditures by reportable segment for the three and nine months ended September 30, 2016 and 2015:

	Vacuum & Analysis Division	Light & Motion Division	Total
Three Months Ended September 30, 2016:			
Capital expenditures	<u>\$ 2,772</u>	<u>\$ 1,923</u>	<u>\$ 4,695</u>
Nine Months Ended September 30, 2016:			
Capital expenditures	<u>\$ 7,964</u>	<u>\$ 3,995</u>	<u>\$11,959</u>
Three Months Ended September 30, 2015:			
Capital expenditures	<u>\$ 3,497</u>	<u>\$ —</u>	<u>\$ 3,497</u>
Nine Months Ended September 30, 2015:			
Capital expenditures	<u>\$ 8,831</u>	<u>\$ —</u>	<u>\$ 8,831</u>

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The following is depreciation and amortization by reportable segment for the three and nine months ended September 30, 2016 and 2015:

	Vacuum & Analysis Division	Light & Motion Division	Total
Three Months Ended September 30, 2016:			
Depreciation and amortization	\$ 5,142	\$ 16,907	\$22,049
Nine Months Ended September 30, 2016:			
Depreciation and amortization	\$ 15,628	\$ 28,129	\$43,757
Three Months Ended September 30, 2015:			
Depreciation and amortization	\$ 5,524	\$ —	\$ 5,524
Nine Months Ended September 30, 2015:			
Depreciation and amortization	\$ 16,606	\$ —	\$16,606

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

The following is segment assets by reportable segment:

	Vacuum & Analysis Division	Light & Motion Division	Corporate & Eliminations	Total
September 30, 2016				
Segment assets:				
Accounts receivable	\$ 136,654	\$ 128,401	\$ (21,202)	\$243,853
Inventory	161,219	117,746	—	278,965
Total segment assets	\$ 297,873	\$ 246,147	\$ (21,202)	\$522,818
December 31, 2015				
Segment assets:				
Accounts receivable	\$ 101,883	\$ —	\$ —	\$101,883
Inventory	152,631	—	—	152,631
Total segment assets	\$ 254,514	\$ —	\$ —	\$254,514

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

	September 30, 2016	December 31, 2015
Total segment assets	\$ 522,818	\$ 254,514
Cash and cash equivalents and investments	435,234	658,237
Other current assets, including restricted cash	59,547	26,760
Property, plant and equipment, net	179,694	68,856
Goodwill and intangible assets, net	1,014,446	243,730
Other assets	29,926	21,250
Consolidated total assets	\$ 2,241,665	\$ 1,273,347

Goodwill associated with the Company's reportable segments is as follows:

	September 30, 2016	December 31, 2015
Reportable segment:		
Vacuum & Analysis Division	\$ 200,368	\$ 199,703
Light & Motion Division	394,267	—
Total goodwill	\$ 594,635	\$ 199,703

MKS INSTRUMENTS, INC.
NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS—(continued)
(in thousands, except share and per share data)

Worldwide Product Information

The Company groups its products into six groups of similar products based upon the similarity of product function. Worldwide net revenue for each group of products is as follows:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Instruments, Control & Vacuum Products	\$ 114,491	\$ 98,614	\$ 317,141	\$ 319,491
Power & Reactive Gas Products	98,827	95,311	259,797	276,787
Analytical Solutions Products	15,907	15,407	43,334	44,859
Photonics Products	62,226	—	108,090	—
Optics Products	44,331	—	79,594	—
Lasers Products	44,878	—	82,246	—
	<u>\$ 380,660</u>	<u>\$ 209,332</u>	<u>\$ 890,202</u>	<u>\$ 641,137</u>

Sales of Instruments, Control & Vacuum Products, Power & Reactive Gas Products and Analytical Solutions Products are included in the Company's Vacuum & Analysis Division segment. Sales of Photonics Products, Optics Products and Lasers Products are included in the Light & Motion Division segment.

Geographic

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.

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Net revenues:				
North America	\$ 198,305	\$ 122,348	\$ 460,994	\$ 365,942
Korea	32,642	27,760	79,240	87,181
Japan	26,970	14,699	68,738	49,001
Asia (excluding Korea and Japan)	75,179	24,833	173,526	79,259
Europe	47,564	19,692	107,704	59,754
	<u>\$ 380,660</u>	<u>\$ 209,332</u>	<u>\$ 890,202</u>	<u>\$ 641,137</u>

	September 30, 2016	December 31, 2015
Long-lived assets:(1)		
North America	\$ 120,379	\$ 56,594
Europe	30,818	5,783
Asia	50,551	8,952
	<u>\$ 201,748</u>	<u>\$ 71,329</u>

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

MKS INSTRUMENTS, INC.
NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS—(continued)
(in thousands, except share and per share data)

Major Customers

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

	<u>Three Months Ended September 30,</u>		<u>Nine Months Ended September 30,</u>	
	<u>2016</u>	<u>2015</u>	<u>2016</u>	<u>2015</u>
Applied Materials, Inc.	12%	18%	14%	18%
LAM Research Corporation	9%	16%	11%	14%

20) Commitments and Contingencies

On March 9, 2016, a putative class action lawsuit captioned *Dixon Chung v. Newport Corp., et al*, Case No. A-16-733154-C, was filed in the District Court, Clark County, Nevada on behalf of a putative class of stockholders of Newport for claims related to the Merger Agreement between the Company, Newport, and Merger Sub. The complaint, filed on March 9, 2016, named as defendants the Company, Newport and Merger Sub, and certain then-current and former members of Newport's former board of directors. The complaint alleges that the named directors breached their fiduciary duties to Newport's stockholders by agreeing to sell Newport through an inadequate and unfair process, which led to inadequate and unfair consideration, and by agreeing to unfair deal protection devices. The complaint also alleges that the Company, Newport, and Merger Sub aided and abetted the named directors' alleged breaches of their fiduciary duties. The complaint seeks injunctive relief, including to enjoin or rescind the Merger Agreement, monetary damages, and an award of attorneys' and other fees and costs, among other relief. On March 25, 2016, the plaintiff in the Chung action filed an amended complaint, which adds certain allegations, including that the preliminary proxy statement filed by Newport on March 15, 2016 (the "Proxy") omitted material information. The amended complaint also names as defendants the Company, Newport, Merger Sub, and then-current members of Newport's board of directors.

Also on March 25, 2016, a second putative class action complaint captioned *Hubert C. Pincon v. Newport Corp., et al.*, Case No. A-16-734039-B, was filed in the District Court, Clark County, Nevada, on behalf of a putative class of the Newport's stockholders for claims related to the Merger Agreement. The complaint names as defendants the Company, Newport, and Merger Sub and the then-current members of Newport's former board of directors. It alleges that the named directors breached their fiduciary duties to Newport's stockholders by agreeing to sell Newport through an inadequate and unfair process, which led to inadequate and unfair consideration, by agreeing to unfair deal protection devices, and by omitting material information from the Proxy. The complaint also alleges that the Company, Newport, and Merger Sub aided and abetted the named directors' alleged breaches of their fiduciary duties. The complaint seeks injunctive relief, including to enjoin or rescind the Merger Agreement, and an award of attorneys' and other fees and costs, among other relief.

On April 14, 2016, the Court granted plaintiffs' motion to consolidate the Pincon and Chung actions and appointed counsel in the Pincon action as lead counsel. Also on April 14, 2016, the Court granted plaintiffs' motion for expedited discovery and scheduled a hearing on plaintiffs' anticipated motion for a preliminary injunction for April 25, 2016. On April 20, 2016, plaintiffs filed a motion to vacate the hearing on their anticipated motion for a preliminary injunction and notified the Court that they did not presently intend to file a motion for a preliminary injunction regarding the Merger Agreement. On April 22, 2016, the Court vacated the hearing on plaintiffs' anticipated motion for a preliminary injunction. In August, plaintiffs completed the expedited discovery that the Court ordered.

On October 24, 2016, plaintiffs filed an amended complaint captioned *In re Newport Corporation Shareholder Litigation*, Case No. A-16-733154-B, in the District Court, Clark County, Nevada, on behalf of a class of Newport's stockholders for claims related to the Merger Agreement. The complaint names as defendants the Company, Newport, and the then-current members of Newport's former board of directors. It alleges that the named directors breached their fiduciary duties to Newport's stockholders by agreeing to sell Newport through an inadequate and unfair process, which led to inadequate and unfair consideration, by agreeing to unfair deal protection devices, and by omitting material information from the Proxy. The complaint also alleges that the Company and Newport aided and abetted the named directors' alleged breaches of their fiduciary duties. The complaint seeks monetary damages, including pre- and post-judgment interest.

The Company believes that the claims asserted in the amended complaint have no merit and the Company, Newport and the named directors intend to defend vigorously against these claims.

The Company is subject to various other legal proceedings and claims, which have arisen in the ordinary course of business. In the Company's opinion, 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.

ITEM 2. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS.

This Quarterly Report on Form 10-Q 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 of 1934, as amended (the "Exchange Act"). When used herein, the words "believes," "anticipates," "plans," "expects," "estimates," "would," "will," "intends" 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 results to differ materially from those stated or implied. While we may elect to update forward looking statements in the future, we specifically disclaim any obligation to do so even if our estimates or expectations change. Risks and uncertainties include, but are not limited to those discussed in Part II, Item 1A "Risk Factors" of the Quarterly Report on Form 10-Q for the period ended June 30, 2016, filed with the Securities and Exchange Commission on August 3, 2016.

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, flow measurement and control, gas and vapor delivery, gas composition analysis, residual gas analysis, leak detection, control and information technology, ozone generation and delivery, RF & DC power, reactive gas generation, vacuum technology, lasers, photonics, sub-micron positioning, vibration isolation and optics. Our primary served markets include semiconductor capital equipment, general industrial, life sciences and research.

Acquisition of Newport Corporation

On April 29, 2016, we completed our acquisition of Newport Corporation ("Newport") pursuant to an Agreement and Plan of Merger dated as of February 22, 2016 (the "Newport Merger"). At the effective time of the Newport Merger, each share of Newport's common stock issued and outstanding as of immediately prior to the effective time of the Newport Merger was converted into the right to receive \$23.00 in cash, without interest and subject to deduction for any required withholding tax. We paid to the former Newport stockholders aggregate consideration of approximately \$905 million, excluding related transaction fees and expenses, and repaid approximately \$93 million of Newport's U.S. indebtedness outstanding as of immediately prior to the effective time of the Newport Merger. We funded the payment of the aggregate consideration with a combination of our available cash on hand of approximately \$240 million and the proceeds from the senior secured term loan facility of \$780 million described below.

Newport is a global supplier of advanced-technology products and systems to customers in the scientific research and defense/security, microelectronics, life and health sciences and industrial manufacturing markets.

Effective April 29, 2016, in conjunction with our acquisition of Newport, we changed the structure of our reportable segments based upon our organizational structure and how our Chief Operating Decision Maker utilizes information provided to allocate resources and make decisions. Our two reportable segments are the Vacuum & Analysis Division and the Light & Motion Division.

The Vacuum & Analysis Division provides a broad range of instruments, components, subsystems and software which are derived from our core competencies in pressure measurement and control, flow measurement and control, gas and vapor delivery, gas composition analysis, residual gas analysis, leak detection, control and information technology, ozone generation and delivery, RF & DC power, reactive gas generation and vacuum technology.

The Light & Motion Division provides a broad range of instruments, components and subsystems which are derived from our core competencies in lasers, photonics, sub-micron positioning, vibration isolation and optics.

For the nine months ended September 30, 2016 and 2015, approximately 58% and 70% of our net revenues, respectively, were from sales to semiconductor capital equipment manufacturers and semiconductor device manufacturers. As a result of our acquisition of Newport, we estimate that sales to semiconductor capital equipment manufacturers and semiconductor device manufacturers could account for approximately 50% of our total sales in future periods.

Net revenues from semiconductor capital equipment manufacture and semiconductor device manufacture customers increased by 47% and 16% for the three and nine months ended September 30, 2016, respectively, compared to the same periods in the prior year. These increases are primarily attributed to net semiconductor revenues from the Newport Merger of \$37.1 million and \$64.3 million for the three and nine months ended September 30, 2016, respectively. Net semiconductor revenues for the legacy MKS business (Vacuum & Analysis Division segment) increased \$29.9 million and \$6.4 million for the three and nine months ended

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September 30, 2016, respectively, compared to the same periods in the prior year. 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 from customers in other advanced markets, which exclude semiconductor capital equipment and semiconductor device manufacture customers, increased by 157% and 92% for the three and nine months ended September 30, 2016, respectively, compared to the same periods in the prior year. These increases are primarily attributed to net revenues from customers in other advanced markets resulting from the Newport Merger of \$114.3 million and \$205.6 million for the three and nine months ended September 30, 2016, respectively. These increases are offset by decreases in net revenues from customers in other advanced markets from the legacy MKS business (Vacuum & Analysis Division segment) of \$10.0 million and \$27.2 million for the three and nine months ended September 30, 2016, respectively, mainly related to the general industrial and solar markets. Revenues from customers in other advanced markets are made up of many different markets, including general industrial, life sciences, defense and research and solar. Some of these markets are project-based and our revenues can fluctuate quarter to quarter.

A significant portion of our net revenues is from sales to customers in international markets. For the nine months ended September 30, 2016 and 2015, international net revenues accounted for approximately 48% and 43% of our total net revenues, respectively. A significant portion of our international net revenues were in Korea, Japan and Israel. Following the Newport Merger, we expect that international net revenues will continue to represent a significant percentage of our total net revenues.

Recent Events

In connection with the completion of the Newport Merger, we entered into a term loan credit agreement dated as of April 29, 2016 (the “Credit Agreement”) with Barclays Bank PLC as administrative agent and collateral agent, that provided senior secured financing of \$780 million, subject to increase in accordance with the terms of the Credit Agreement.

In June 2016, we entered into an amendment to the Credit Agreement (the “Repricing Amendment”) where we decreased the applicable margin for borrowings by 0.50%. In connection with the Repricing Amendment we paid a prepayment premium of 1.0% or \$7.3 million, as well as certain fees and expenses. Immediately prior to the effectiveness of the Repricing Amendment, we prepaid \$50 million of principal under the Credit Agreement. In September 2016, we voluntarily prepaid an additional \$60 million of principal under the Credit Agreement. The total outstanding principal balance of the Credit Agreement as of September 30, 2016, which included a regularly scheduled principal payment of \$1.8 million during the third quarter of 2016, was \$668.2 million.

In September 2016, the Company also entered into an interest rate swap agreement to fix the rate on approximately 50% of the remaining outstanding term loan balance under the Credit Agreement. The swap converts the floating rate on \$335 million of the outstanding principal amount of the term loan to a fixed interest rate of 4.70% through September 2020.

In connection with the completion of the Newport Merger, we also entered into an asset-based credit agreement with Deutsche Bank AG New York Branch as administrative agent and collateral agent, that provides senior secured financing of up to \$50 million, subject to a borrowing base limitation, none of which has been drawn down to date.

Critical Accounting Policies and Estimates

The preparation of our consolidated financial statements and related disclosures in conformity with accounting principles generally accepted in the United States of America requires management to make judgments, assumptions and estimates that affect the amounts reported. There have been no material changes in our critical accounting policies since December 31, 2015. For further information, please see the discussion of critical accounting policies in our Annual Report on Form 10-K for the year ended December 31, 2015 in the section captioned “Management’s Discussion and Analysis of Financial Condition and Results of Operations – Critical Accounting Policies and Estimates.”

Results of Operations

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Net revenues:				
Product	88.0%	85.7%	87.0%	86.4%
Services	12.0	14.3	13.0	13.6
Total net revenues	100.0	100.0	100.0	100.0
Cost of revenues:				
Cost of product revenues	48.3	45.7	48.7	45.9
Cost of service revenues	7.5	9.3	8.4	8.9
Total cost of revenues (exclusive of amortization shown separately below)	55.8	55.0	57.1	54.8
Gross profit	44.2	45.0	42.9	45.2
Research and development	8.5	8.2	8.7	8.0
Selling, general and administrative	18.4	15.9	19.8	15.2
Acquisition costs	0.1	—	1.2	—
Restructuring	—	0.3	—	0.2
Amortization of intangible assets	3.3	0.8	2.6	0.8
Income from operations	13.9	19.8	10.6	21.0
Interest (expense) income, net	(2.8)	0.3	(1.8)	0.3
Income from operations before income taxes	11.1	20.1	8.8	21.3
Provision for income taxes	2.5	5.9	2.1	6.2
Net income	8.6%	14.2%	6.7%	15.1%

Net Revenues

(dollars in millions)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2016	2015	% Change	2016	2015	% Change
Product	\$335.2	\$179.4	86.8%	\$774.3	\$553.8	39.8%
Service	45.5	29.9	52.2	115.9	87.3	32.8
Total net revenues	\$380.7	\$209.3	81.8%	\$890.2	\$641.1	38.9%

Product revenues increased \$155.8 million and \$220.5 million during the three and nine months ended September 30, 2016, respectively, compared to the same periods in the prior year. These increases were primarily attributed to the Newport Merger, which accounted for product revenues of \$137.7 million and \$247.3 million for the three and nine months ended September 30, 2016, respectively. Product revenues increased for our legacy MKS business (Vacuum & Analysis Division segment) by \$18.0 million for the three months ended September 30, 2016, primarily due to an increase in product revenues from our semiconductor capital equipment manufacture and semiconductor device manufacture customers of \$26.6 million, primarily due to volume, offset by a decrease in product revenues from our other advanced markets of \$8.6 million, which include general industrial, life sciences, defense and research and solar. Product revenues decreased for our legacy MKS business (Vacuum & Analysis Division segment) by \$26.8 million for the nine months ended September 30, 2016, primarily due to decreases in revenue of \$24.6 million from our other advanced markets, mainly in the solar and general industrial markets.

Service revenues consisted mainly of fees for services related to the maintenance and repair of our products and software services, installation and training. Service revenues increased \$15.6 million and \$28.6 million during the three and nine months ended September 30, 2016, respectively, compared to the same periods in the prior year. These increases were primarily attributable to the Newport Merger, which accounted for service revenues of \$13.8 million and \$22.7 million for the three and nine months ended September 30, 2016, respectively.

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Total international net revenues, including product and service, were \$182.4 million and \$429.2 million for the three and nine months ended September 30, 2016, respectively, compared to \$87.0 million and \$275.2 million for the three and nine months ended September 30, 2015, respectively. These increases of \$95.4 million and \$154.0 million for the three and nine months ended September 30, 2016, respectively, compared to the same periods in the prior year, were primarily attributable to the Newport Merger, which had total international net revenues of \$64.8 million and \$115.2 million for the three and nine months ended September 30, 2016, respectively.

The following is our net revenues by reportable segment:

(dollars in millions)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2016	2015	% Change	2016	2015	% Change
Net revenues:						
Vacuum & Analysis Division	\$229.2	\$209.3	9.5%	\$620.2	\$641.1	(3.3)%
Light & Motion Division	151.5	—	100.0	270.0	—	100.0
Total net revenues	<u>\$380.7</u>	<u>\$209.3</u>	<u>81.8%</u>	<u>\$890.2</u>	<u>\$641.1</u>	<u>38.9%</u>

Net revenues for our Vacuum & Analysis Division segment increased \$19.9 million for the three months ended September 30, 2016 compared to the same period in the prior year, primarily due to an increase in net revenues from our semiconductor capital equipment manufacture and semiconductor device manufacture customers of \$29.9 million, offset by a decrease in revenues of \$10.0 million from our other advanced markets, including general industrial, life sciences, defense and research and solar markets. Net revenues for our Vacuum & Analysis Division segment decreased \$20.9 million for the nine months ended September 30, 2016 compared to the same period in the prior year, primarily due to a decrease in total net revenues from our other advanced markets of \$27.2 million. This segment represents the legacy MKS business.

Net revenues from our Light & Motion Division segment was \$151.5 million and \$270.0 for the three and nine months ended September 30, 2016. This segment represents the Newport business, which was acquired during the second quarter of 2016.

Gross Profit

	Three Months Ended September 30,			Nine Months Ended September 30,		
	2016	2015	% Points Change	2016	2015	% Points Change
Gross profit as a percentage of net revenues:						
Product	45.2%	46.7%	(1.5)%	44.1%	46.9%	(2.8)%
Service	37.4	35.1	2.3	35.4	34.9	0.5
Total gross profit	<u>44.2%</u>	<u>45.0%</u>	<u>(0.8)%</u>	<u>42.9%</u>	<u>45.2%</u>	<u>(2.3)%</u>

Gross profit as a percentage of net product revenues decreased by 1.5 percentage points for the three months ended September 30, 2016, compared to the same period in the prior year. The decrease was primarily attributed to higher material costs, mainly from the \$5.0 million of inventory step-up amortization from the Newport Merger, partially offset by an increase from higher revenue volumes.

Gross profit as a percentage of net product revenues decreased by 2.8 percentage points for the nine months ended September 30, 2016, compared to the same period in the prior year. The decrease was primarily attributed to a decrease of 4.2 percentage points due to higher material costs, mainly from the \$15.1 million of inventory step-up amortization from the Newport Merger and a decrease of 2.5 percentage points due to higher overhead costs, mainly from the Newport Merger, partially offset by an increase of 3.5 percentage points from higher revenue volumes.

Gross profit as a percentage of net service revenues increased by 2.3 percentage points for the three months ended September 30, 2016, compared to the same period in the prior year. The increase was primarily attributed to a net increase of 1.7 percentage points due to lower direct labor and overhead costs as a percentage of revenues. Cost of service revenues, including salaries and related expenses and other fixed costs, consists primarily of providing services for repair, software services and training.

Gross profit as a percentage of net service revenues remained relatively flat, for the nine months ended September 30, 2016, compared to the same period in the prior year.

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

	Three Months Ended September 30,			Nine Months Ended September 30,		
	2016	2015	% Points Change	2016	2015	% Points Change
Gross profit:						
Vacuum & Analysis Division	45.5%	45.0%	0.5%	44.0%	45.2%	(1.2)%
Light & Motion Division	42.3	—	42.3	40.4	—	40.4
Total gross profit	<u>44.2%</u>	<u>45.0%</u>	<u>(0.8)%</u>	<u>42.9%</u>	<u>45.2%</u>	<u>(2.3)%</u>

Gross profit for our Vacuum & Analysis Division segment increased by 0.5 percentage points for the three months ended September 30, 2016, compared to the same period in the prior year, primarily as a result of higher revenue volumes and favorable product mix, partially offset by slightly higher material costs and unfavorable changes in foreign exchange. Gross profit decreased by 1.2 percentage points for the nine months ended September 30, 2016, compared to the same period in the prior year, primarily as a result of unfavorable product mix and unfavorable changes in foreign exchange.

Gross profit for our Light & Motion Division segment was 42.3% and 40.4% of net revenues for the three and nine months ended September 30, 2016. This included charges of \$5.0 million and \$15.1 million of inventory step-up amortization for the three and nine months ended September 30, 2016, respectively, related to the Newport Merger. Excluding these inventory step-up amortization charges, the gross profit would have been 45.6% and 46.0% for the three and nine months ended September 30, 2016, respectively. The Light & Motion Division segment was established in the second quarter of 2016 as a result of the Newport Merger.

Research and Development

<i>(dollars in millions)</i>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Research and development expenses	\$ 32.3	\$ 17.2	\$ 77.7	\$ 51.5

Research and development expenses increased \$15.1 million for the three months ended September 30, 2016, compared to the same period in the prior year. The increase was primarily attributed to an increase of \$14.1 million from our Newport Merger in the second quarter of 2016, and consisted mainly of \$10.7 million of compensation and related benefits, \$1.4 million of project materials and \$1.0 million of occupancy costs. The remaining increase of \$1.0 million relates to the legacy MKS business (Vacuum & Analysis Division segment) and consists primarily of \$0.7 million of project materials.

Research and development expenses increased \$26.2 million for the nine months ended September 30, 2016, compared to the same period in the prior year. The increase was primarily attributed to an increase of \$24.1 million from our Newport Merger in the second quarter of 2016, and consisted mainly of \$18.2 million of compensation costs and related benefits, \$2.3 million of project materials and \$1.7 million of occupancy costs. The remaining increase of \$2.1 million relates to the legacy MKS business (Vacuum & Analysis Division segment) and consists primarily of \$1.2 million of compensation and related benefits and \$1.0 million of project materials.

Our research and development efforts are 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.

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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

<i>(dollars in millions)</i>	<u>Three Months Ended September 30,</u>		<u>Nine Months Ended September 30,</u>	
	<u>2016</u>	<u>2015</u>	<u>2016</u>	<u>2015</u>
Selling, general and administrative expenses	\$ 70.4	\$ 33.4	\$ 175.8	\$ 97.5

Selling, general and administrative expenses increased by \$37.0 million for the three months ended September 30, 2016, compared to the same period in the prior year. The increase was primarily attributable to an increase of \$34.1 million from the Newport Merger, and consisted primarily of \$20.9 million of compensation costs and related benefits, \$2.9 million of consulting and professional fees, \$2.2 million of depreciation, \$1.9 million of commissions and \$0.7 million of integration costs related to the acquisition. The remaining increase of \$2.9 million related to the legacy MKS business (Vacuum & Analysis Division segment) and consisted primarily of \$2.5 million of compensation related expenses, including the timing of stock compensation expense as well as the annual increase in compensation costs, and \$1.7 million of integration costs related to the Newport Merger partially offset by \$0.8 million of favorable changes in foreign exchange and \$0.2 million decrease in commissions.

Selling, general and administrative expenses increased by \$78.3 million for the nine months ended September 30, 2016, compared to the same period in the prior year. The increase was primarily attributed to an increase of \$68.0 million from the Newport Merger, and consisted primarily of \$35.7 million of compensation costs and related benefits, \$11.0 million of integration costs related to the acquisition, \$4.6 million of consulting and professional fees, \$3.7 million of depreciation, \$3.4 million of commissions, and \$2.3 million of travel and entertainment-related expenses. The remaining increase of \$10.3 million related to the legacy MKS business (Vacuum & Analysis Division segment) and consisted primarily of \$6.8 million of compensation-related expenses, including the timing of stock compensation expense as well as the annual increase in compensation costs, and \$3.3 million of integration costs related to the Newport Merger.

Acquisition Costs

<i>(dollars in millions)</i>	<u>Three Months Ended September 30,</u>		<u>Nine Months Ended September 30,</u>	
	<u>2016</u>	<u>2015</u>	<u>2016</u>	<u>2015</u>
Acquisition costs	\$ 0.2	\$ —	\$ 10.9	\$ —

We incurred \$0.2 million and \$10.9 million of acquisition costs in the three and nine months ended September 30, 2016, respectively, related to the Newport Merger. These acquisition costs were comprised mainly of bank fees and consulting and professional fees.

Restructuring

<i>(dollars in millions)</i>	<u>Three Months Ended September 30,</u>		<u>Nine Months Ended September 30,</u>	
	<u>2016</u>	<u>2015</u>	<u>2016</u>	<u>2015</u>
Restructuring	\$ —	\$ 0.6	\$ —	\$ 1.6

Restructuring charges for the three months ended September 30, 2015 related to severance costs from a reduction in workforce of 14 people, arising from the consolidation of certain foreign manufacturing locations. Restructuring charges for the nine months ended September 30, 2015 primarily related to severance costs associated with a reduction in workforce of 137 people, primarily related to the outsourcing of a non-core foreign manufacturing process and the consolidation of certain foreign manufacturing locations.

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Amortization of Intangible Assets

<i>(dollars in millions)</i>	<u>Three Months Ended September 30,</u>		<u>Nine Months Ended September 30,</u>	
	<u>2016</u>	<u>2015</u>	<u>2016</u>	<u>2015</u>
Amortization of intangible assets	\$ 12.5	\$ 1.7	\$ 23.0	\$ 5.1

Amortization expense increased by \$10.8 million and \$17.9 million for the three and nine months ended September 30, 2016, respectively. These increases were primarily attributable to amortization expense of intangible assets acquired through the Newport Merger.

Interest and Other (Expense) Income, Net

<i>(dollars in millions)</i>	<u>Three Months Ended September 30,</u>		<u>Nine Months Ended September 30,</u>	
	<u>2016</u>	<u>2015</u>	<u>2016</u>	<u>2015</u>
Interest and other (expense) income, net	\$ (10.8)	\$ 0.7	\$ (16.3)	\$ 2.0

Interest and other (expense) income, net of \$(10.8) million and \$(16.3) million for the three and nine months ended September 30, 2016, respectively, includes net interest expense of \$11.6 million and \$18.7 million for the three and nine months ended September 30, 2016, respectively, and primarily related to our senior secured Term Loan Facility (as defined below). During the three and nine months ended September 30, 2016, we recorded net proceeds of \$1.3 million from a Company-owned life insurance policy.

Provision for Income Taxes

<i>(dollars in millions)</i>	<u>Three Months Ended September 30,</u>		<u>Nine Months Ended September 30,</u>	
	<u>2016</u>	<u>2015</u>	<u>2016</u>	<u>2015</u>
Provision for income taxes	\$ 9.7	\$ 12.3	\$ 19.1	\$ 39.6

Our effective tax rate for the three and nine months ended September 30, 2016 was 23.0% and 24.4%, respectively. The effective tax rate for the three and nine months ended September 30, 2016 was lower than the U.S. statutory tax rate primarily due to the geographic mix of income and profits earned by the Company's international subsidiaries being taxed at rates lower than the U.S. statutory tax rate, the federal research credit and the deduction for domestic production activities. These amounts were partially offset by taxes paid on the Company's reorganization of certain international subsidiaries and state income taxes. During the three and nine months ended September 30, 2016, the geographic mix of our pre-tax income was impacted by additional acquisition-related costs associated with the Newport Merger, amortization of intangibles, reversal of other purchase accounting-related charges and interest expense primarily located in the U.S. tax jurisdiction. The acquisition-related costs are treated as expenses in the financial reports but are largely capitalized for tax purposes. The reduction in higher taxed U.S. income relative to income earned by our non-U.S. subsidiaries resulted in a reduction in the overall effective tax rate in periods after the acquisition. These effects of the acquisition on the tax rate are expected to diminish in future periods.

Our effective tax rate for the three and nine months ended September 30, 2015 was 29.3% and 29.1%, respectively. The effective tax rate for the three and nine months ended September 30, 2015 was lower than the U.S. statutory tax rate primarily due to the geographic mix of income and profits earned by the Company's international subsidiaries being taxed at rates lower than the U.S. statutory tax rate and the impact of the deduction for domestic production activities.

Our future effective tax rate depends on various factors, including the impact of tax legislation, the geographic composition of our pre-tax income, and changes in tax reserves for unrecognized tax benefits. We monitor these factors and timely adjust our estimates of the effective tax rate accordingly. We expect that the geographic mix of pre-tax income will continue to have a favorable impact on our effective tax rate, however the geographic mix of pre-tax income can change based on multiple factors resulting in changes to the effective tax rate in future periods.

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.

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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 law and regulations. We and our subsidiaries are subject to examination by U.S. federal, state and foreign tax authorities. The United States Internal Revenue Service commenced an examination of our U.S. federal tax filings for open tax years 2011 through 2013 during the three months ended March 31, 2015. This audit was effectively settled during the three months ended December 31, 2015 upon our acceptance of the income tax examination changes. Additionally, the recognition and measurement of certain tax benefits include estimates and judgment by management. Accordingly, we could record additional provisions or benefits for U.S. federal, state, and foreign tax matters in future periods as new information becomes available.

Liquidity and Capital Resources

Cash and cash equivalents and short-term investments, excluding restricted cash, totaled \$420.0 million at September 30, 2016, compared to \$658.2 million at December 31, 2015. The decrease is primarily related to cash and investments used for the Newport Merger.

Net cash provided by operating activities was \$127.4 million for the nine months ended September 30, 2016 and resulted from net income of \$59.3 million, which included non-cash charges of \$86.2 million, offset by a net increase in working capital of \$18.1 million. The net increase in working capital was due to an increase in trade accounts receivable of \$44.5 million, as a result of increased revenue levels, an increase in other current assets of \$8.8 million, an increase in inventories of \$5.1 million and an increase in other non-current assets of \$3.3 million. These increases in working capital were offset by an increase in income taxes of \$20.4 million, an increase in accounts payable of \$14.1 million, an increase in other current and non-current liabilities of \$4.6 million and an increase in accrued compensation of \$4.5 million.

Net cash provided by operating activities was \$95.6 million for the nine months ended September 30, 2015 and resulted mainly from net income of \$96.8 million, which included non-cash charges of \$32.7 million, partially offset by a net increase in working capital of \$33.9 million. The net increase in working capital was primarily due to an increase in inventories of \$25.2 million and an increase in trade accounts receivable of \$11.4 million, both related to an increase in business activities, an increase in other current assets of \$7.9 million and a decrease in accounts payable of \$7.5 million. These increases in working capital were offset by an increase in income taxes of \$10.5 million, an increase in other current and non-current liabilities of \$4.6 million and an increase in accrued compensation of \$3.6 million.

Net cash used in investing activities was \$581.4 million for the nine months ended September 30, 2016 and resulted primarily from the Newport Merger for \$937.0 million and the purchase of production-related equipment of \$12.0 million, partially offset by the net sale and maturities of investments of \$370.1 million, which was used to partially finance the Newport Merger. Net cash used in investing activities was \$170.3 million for the nine months ended September 30, 2015 and resulted primarily from \$151.6 million of net purchases of short-term and long-term investments, \$9.9 million of cash primarily used for the acquisition of Precise, LLC on March 17, 2015 and \$8.8 million in purchases of production-related equipment.

Net cash provided by financing activities was \$601.7 million for the nine months ended September 30, 2016 and resulted primarily from net proceeds of \$639.1 million, primarily related to the Credit Agreement used to finance the Newport Merger, partially offset by dividend payments made to common stockholders of \$27.2 million, restricted cash of \$6.2 million for collateral cash deposits relating to letters of credit and net payments related to tax payments made for employee stock awards of \$3.1 million.

Net cash used in financing activities was \$35.7 million for the nine months ended September 30, 2015 and consisted primarily of \$26.9 million of dividend payments made to common stockholders and \$8.9 million used in the repurchase of our common stock.

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 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 depends 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. We have repurchased approximately 1,770,000 shares of our common stock for approximately \$52.0 million pursuant to the program since its adoption.

During the nine months ended September 30, 2016, we repurchased approximately 45,000 shares of our common stock for \$1.5 million, or an average price of \$34.50 per share. During the nine months ended September 30, 2015, we repurchased approximately 244,000 shares of our common stock for \$8.9 million, or an average price of \$36.32 per share.

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During the nine months ended September 30, 2016, our Board of Directors declared a cash dividend of \$0.17 per share during the first, second and third quarters of 2016 that totaled \$27.2 million. During the nine months ended September 30, 2015, our Board of Directors declared a cash dividend of \$0.165 per share during the first quarter of 2015 and a cash dividend of \$0.17 per share during the second and third quarters of 2015, which dividends totaled \$26.9 million.

On October 24, 2016, our Board of Directors declared a quarterly cash dividend of \$0.17 per share to be paid on December 9, 2016 to shareholders of record as of November 28, 2016. 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. In addition, under the terms of our senior secured term loan facility and our senior secured asset-based revolving credit facility, we may be restricted from paying dividends under certain circumstances.

On April 27, 2016, we invested \$9.3 million for a minority interest in Reno Sub-Systems, Inc., a Delaware corporation, which operates in the field of semiconductor process equipment instrumentation. We accounted for this investment using the cost method of accounting.

Acquisition of Newport Corporation

In connection with the Newport Merger, which closed in April 2016, we paid to the former Newport stockholders aggregate consideration of approximately \$905 million, excluding related transaction fees and expenses and repaid approximately \$93 million of Newport's U.S. indebtedness outstanding as of immediately prior to the effective time of the Newport Merger, and funded the payment of the aggregate consideration with a combination of our available cash on hand of approximately \$240 million and the proceeds from the senior secured term loan facility of \$780 million described below.

Term Loan Credit Agreement

In connection with the completion of the Newport Merger, we entered into the Credit Agreement with Barclays Bank PLC, as administrative agent and collateral agent, and the Lenders, that provided senior secured financing of \$780 million, subject to increase in accordance with the Credit Agreement (the "Term Loan Facility"). Borrowings under the Term Loan Facility bear interest per annum at one of the following rates selected by us: (a) a base rate determined by reference to the highest of (1) the federal funds effective rate plus 0.50%, (2) the "prime rate" quoted in The Wall Street Journal, (3) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for an interest period of one month, adjusted for certain additional costs, plus 1.00%, and (4) a floor of 1.75%, plus, in each case, an applicable margin of 3.00%; or (b) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for the interest period relevant to such borrowing adjusted for certain additional costs, subject to a LIBOR rate floor of 0.75%, plus an applicable margin of 4.00%. We have elected the interest rate as described in clause (b). The Term Loan Facility was issued with original issue discount of 1.00% of the principal amount thereof.

On June 9, 2016, we entered into the Repricing Amendment to the Credit Agreement, by and among us, the Lenders, and Barclays Bank PLC, as administrative agent and collateral agent for the Lenders. The Repricing Amendment decreased the applicable margin for borrowings under our Term Loan Facility to 2.50% for base rate borrowings and 3.50% for LIBOR borrowings and extended the period during which a prepayment premium may be required for a "Repricing Transaction" (as defined in the Credit Agreement) until six months after the effective date of the Repricing Amendment. In connection with the execution of the Repricing Amendment, we paid a prepayment premium of 1.00%, or \$7.3 million, as well as certain fees and expenses of the administrative agent and the Lenders, in accordance with the terms of the Credit Agreement. Immediately prior to the effectiveness of the Repricing Amendment, we prepaid \$50 million of principal under the Credit Agreement. In September 2016, we prepaid an additional \$60 million of principal under the Credit Agreement. The total outstanding principal balance of the Credit Agreement as of September 30, 2016, which also reflected a regularly scheduled principal payment of \$1.8 million during the third quarter of 2016, was \$668.2 million.

Under the Credit Agreement, we are required to prepay outstanding term loans, subject to certain exceptions, with portions of its annual excess cash flow as well as with the net cash proceeds of certain asset sales, certain casualty and condemnation events and the incurrence or issuance of certain debt. We are also required to make scheduled quarterly payments each equal to 0.25% of the original principal amount of the term loans made on the closing date with such original principal amount reduced by any such prepayments (including the \$110 million prepaid to date in 2016), with the balance due on the seventh anniversary of the closing date.

All obligations under the Term Loan Facility are guaranteed by certain of our domestic subsidiaries, and are secured by substantially all of our assets and the assets of such subsidiaries, subject to certain exceptions and exclusions.

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The Credit Agreement contains customary representations and warranties, affirmative and negative covenants and provisions relating to events of default. If an event of default occurs, the Lenders under the Term Loan Facility will be entitled to take various actions, including the acceleration of amounts due under the Term Loan Facility and all actions permitted to be taken by a secured creditor.

Senior Secured Asset-Based Revolving Credit Facility

In connection with our completion of the Newport Merger, we also entered into an asset-based credit agreement with Deutsche Bank AG New York Branch, as administrative agent and collateral agent, the other borrowers from time to time party thereto, and the lenders and letters of credit issuers from time to time party thereto (the "ABL Facility"), that provides senior secured financing of up to \$50 million, subject to a borrowing base limitation. The borrowing base for the ABL Facility at any time equals the sum of: (a) 85% of certain eligible accounts; plus (b) subject to certain notice and field examination and appraisal requirements, the lesser of (i) the lesser of (A) 65% of the lower of cost or market value of certain eligible inventory and (B) 85% of the net orderly liquidation value of certain eligible inventory and (ii) 30% of the borrowing base; minus (c) reserves established by the administrative agent; provided that until the administrative agent's receipt of a field examination of accounts receivable, the borrowing base shall be equal to 70% of the book value of certain eligible accounts. The ABL Facility includes borrowing capacity in the form of letters of credit up to \$15 million. We have not drawn against the ABL Facility.

Borrowings under the ABL Facility bear interest per annum at one of the following rates selected by us: (a) a base rate determined by reference to the highest of (1) the federal funds effective rate plus 0.50%, (2) the "prime rate" quoted in The Wall Street Journal, and (3) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for an interest period of one month adjusted for certain additional costs, plus 1.00%, plus, in each case, an initial applicable margin of 0.75%; and (b) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for the interest period relevant to such borrowing adjusted for certain additional costs, plus an initial applicable margin of 1.75%. Commencing with the completion of the first fiscal quarter ending after the closing of the ABL Facility, the applicable margin for borrowings thereunder is subject to upward or downward adjustment each fiscal quarter, based on the average historical excess availability during the preceding quarter.

In addition to paying interest on outstanding principal under the ABL Facility, we are required to pay a commitment fee in respect of the unutilized commitments thereunder. The initial commitment fee is 0.375% per annum. Commencing with the completion of the first fiscal quarter ending after the closing of the ABL Facility, the commitment fee is subject to downward adjustment based on the amount of average unutilized commitments for the three-month period immediately preceding such adjustment date. We must also pay customary letter of credit fees and agency fees.

Lines of Credit and Short-Term Borrowing Arrangements

One of our Japanese subsidiaries has lines of credit and short-term borrowing arrangements with two financial institutions, which arrangements generally expire and are renewed at three-month intervals. The lines of credit provided for aggregate borrowings as of September 30, 2016 of up to an equivalent of \$22.8 million 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 September 30, 2016 and December 31, 2015.

We assumed various revolving lines of credit and a financing facility with the completion of the Newport Merger. These revolving lines of credit and financing facility have no expiration date and provided for aggregate borrowings as of September 30, 2016 of up to an equivalent of \$9.9 million U.S. dollars. As of September 30, 2016, \$4.2 million was outstanding under these arrangements. These lines of credit have a base interest rate of 1.25% plus a Japanese Yen overnight LIBOR rate.

One of our Austrian subsidiaries has four outstanding loans with a balance of \$0.6 million at September 30, 2016 from the Austrian government to fund research and development. These loans are unsecured and do not require principal repayment as long as certain conditions are met. Interest on these loans is payable semi-annually. The interest rates associated with these loans range from 0.75%-2.00%.

Our total cash and cash equivalents and short-term marketable investments at September 30, 2016 consisted of \$214.1 million held in the United States and \$205.9 million held by our foreign subsidiaries, substantially all of which would be subject to tax in the United States if returned to the United States. We believe our existing United States cash and short-term investment balances and ability to borrow against our ABL Facility are adequate for us to meet domestic operating needs, including estimated working capital, planned capital expenditure requirements and any future cash dividends, if declared, during the next twelve months and the foreseeable future.

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 for other contractually narrow or limited purposes. Accordingly, we have no off-balance sheet arrangements that have or are reasonably expected to have a current or future effect on our financial condition, results of operations, liquidity, capital expenditures or capital resources that are material to investors.

Contractual Obligations

In connection with the Newport Merger, in addition to debt obligations and pension obligations as described within this document, we have also assumed contractual capital and operating lease obligations and purchase obligations.

Future payments due under debt, lease, pension and purchase commitment obligations as of September 30, 2016 are as follows:

Contractual Obligations (In thousands)	Payment Due By Period					
	Total	Less than 1 Year	1-3 years	3-5 years	After 5 years	Other (1)
Operating lease obligations	\$ 70,369	\$ 9,156	\$ 41,669	\$15,385	\$ 4,159	\$ —
Purchase obligations (2)	205,506	52,437	125,471	18,137	9,461	—
Pension obligations	31,822	410	5,478	1,610	24,324	—
Debt	672,990	6,054	22,442	14,644	629,850	—
Other long-term liabilities reflected on the Balance Sheet under U.S. GAAP (3)	124,801	214	12,262	1,141	96,187	14,997
Total	\$1,105,488	\$68,271	\$207,322	\$50,917	\$763,981	\$14,997

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

(2) As of September 30, 2016, 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 one to three years and aggregate to approximately \$205.5 million.

(3) The majority of this balance relates to deferred tax liabilities.

Recently Issued Accounting Pronouncements

In August 2016, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) 2016-15, “Statement of Cash Flows (Topic 230)-Classification of Certain Cash Receipts and Cash Payments.” This standard addresses eight specific cash flow issues with the objective of addressing the diversity in practice in how certain cash receipts and cash payments are presented and classified in the statement of cash flows under Topic 230. The provisions of this ASU are effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. We are currently evaluating the requirements of this ASU and have not yet determined its impact on our consolidated financial statements.

In March 2016, the FASB issued ASU 2016-09 “Compensation - Stock Compensation (Topic 718)—Improvements to Employee Share-Based Payment Accounting.” This standard simplifies several aspects of the accounting for share-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. The provisions of this ASU are effective for annual periods beginning after December 15, 2016, including interim periods within those fiscal years and early adoption is permitted. This ASU will be adopted in the first quarter of 2017 and could have a material impact on our consolidated financial statements.

In February 2016, the FASB issued ASU 2016-02, “Leases (Topic 842).” This standard requires the recognition of lease assets and liabilities for all leases, with certain exceptions, on the balance sheet. In transition, lessees and lessors are required to recognize and measure leases at the beginning of the earliest period presented using a modified retrospective approach. This ASU is effective for annual periods beginning after December 15, 2018, including interim periods within those fiscal years. We are currently evaluating the requirements of this ASU and have not yet determined its impact on our consolidated financial statements.

In January 2016, the FASB issued ASU 2016-01, “Financial Instruments— Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities.” This ASU provides guidance for the recognition, measurement, presentation, and disclosure of financial instruments. The new pronouncement revises accounting related to equity investments and the presentation of certain fair value changes for financial assets and liabilities measured at fair value. Among other things, it amends the presentation and disclosure requirements of equity securities that do not result in consolidation and are not accounted for under the

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equity method. Changes in the fair value of these equity securities will be recognized directly in net income. This pronouncement is effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. We do not expect adoption of this ASU to have a material impact on our consolidated financial statements.

In July 2015, the FASB issued ASU 2015-11, "Inventory (Topic 330)—Simplifying the Measurement of Inventory." The amendments in this ASU apply to all inventory that is measured using first-in, first-out or average cost. This standard requires that an entity measure inventory within the scope of this update at the lower of cost and net realizable value. Net realizable value is the estimated selling prices in the ordinary course of business, less reasonably predictable costs of completion, disposal, and transportation. The amendments in this ASU are effective for annual periods beginning after December 15, 2016, including interim periods within those fiscal years. We do not expect adoption of this ASU to have a material impact on our consolidated financial statements.

In August 2014, the FASB issued ASU 2014-15, "Presentation of Financial Statements—Going Concern (Subtopic 205-40): Disclosure of Uncertainties about an Entity's Ability to Continue as a Going Concern." Under this guidance, management will be required to assess an entity's ability to continue as a going concern, and to provide related footnote disclosures in certain circumstances. The provisions of this ASU are effective for annual periods beginning after December 15, 2016, including interim periods within those fiscal years. We do not expect adoption of this ASU to have a material impact on our consolidated financial statements.

In May 2014, the FASB issued ASU 2014-09, "Revenue from Contracts with Customers (Topic 606)," which supersedes all existing revenue recognition requirements, including most industry-specific guidance. This standard requires a company to recognize revenue when it transfers goods and services to customers in an amount that reflects the consideration that the company expects to be entitled to in exchange for those goods or services. The ASU also requires additional disclosure about the nature, amount, timing and uncertainty of revenue and cash flows arising from customer contracts, including significant judgments and assets recognized from costs incurred to obtain or fulfill a contract. This pronouncement is effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. The two permitted transition methods under the new standard are the full retrospective method, in which case the standard would be applied to each prior reporting period presented, or the modified retrospective method, in which case the cumulative effect of applying the standard would be recognized at the date of initial application. We have not yet selected a transition method. We are currently evaluating the requirements of this ASU and have not yet determined its impact on our consolidated financial statements.

ITEM 3. 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 Term Loan Facility and investment portfolio, as well as fluctuations in foreign currency exchange rates.

Interest Rate Risk

We hold our cash, cash equivalents and short-term investments for working capital purposes. Some of the securities we invest in are subject to market risk. This means that a change in prevailing interest rates may cause the principal amount of such investments to fluctuate. To minimize this risk, we maintain our portfolio of cash, cash equivalents and short-term investments in a variety of securities, including money market funds and government debt securities. The risk associated with fluctuating interest rates is limited to our investment portfolio. Due to the short-term nature of these instruments, we believe that we do not have any material exposure to changes in the fair value of our investment portfolio as a result of changes in interest rates. Declines in interest rates, however, would reduce future interest income. The effect of a hypothetical 10% increase or decrease in overall interest rates would not have had a material impact on our operating results or the total fair value of the portfolio.

We are exposed to market risks related to fluctuations in interest rates related to our Term Loan Facility. As of September 30, 2016, we owed \$668.2 million with \$335.0 million at a fixed interest rate of 4.7% and \$333.2 million at a variable interest rate of 4.25%. We performed a sensitivity analysis on the outstanding portion of our debt obligation as of September 30, 2016. Should the current average interest rate increase or decrease by 10%, the resulting annual increase or decrease to interest expense would be approximately \$1.4 million as of September 30, 2016.

From time to time, we have outstanding lines of credit and short-term borrowings with variable interest rates, primarily denominated in Japanese Yen. As of September 30, 2016, \$4.2 million was outstanding under these arrangements. These lines of credit have a base interest rate of 1.25% plus a Japanese Yen overnight LIBOR rate. A 10% change in interest rates would not have had a material impact on our operating results.

Foreign Exchange Rate Risk

We mainly enter into forward exchange contracts to reduce currency exposure arising from intercompany sales of inventory. We 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 approximately \$41.5 million outstanding and a net fair value liability of \$2.8 million at September 30, 2016. The potential fair value loss for a hypothetical 10% adverse change in the currency exchange rate on our forward exchange contracts at September 30, 2016 would be immaterial.

ITEM 4. 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 September 30, 2016. 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 September 30, 2016, 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.

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 the quarter ended September 30, 2016 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

PART II. OTHER INFORMATION

ITEM 1. LEGAL PROCEEDINGS.

On March 9, 2016, a putative class action lawsuit captioned Dixon Chung v. Newport Corp., et al, Case No. A-16-733154-C, was filed in the District Court, Clark County, Nevada on behalf of a putative class of stockholders of Newport Corporation (“Newport”) for claims related to the February 22, 2016 Agreement and Plan of Merger (the “Merger Agreement”) between the Company, Newport, and PSI Equipment, Inc., a Nevada corporation and a wholly owned subsidiary of the Company, which was merged with Newport on April 29, 2016 (“Merger Sub”). The complaint, filed on March 9, 2016, names as defendants the Company, Newport, Merger Sub, and certain then-current and former members of Newport’s former board of directors. The complaint alleges that the named directors breached their fiduciary duties to Newport’s stockholders by agreeing to sell Newport through an inadequate and unfair process, which led to inadequate and unfair consideration, and by agreeing to unfair deal protection devices. The complaint also alleges that the Company, Newport, and Merger Sub aided and abetted the named directors’ alleged breaches of their fiduciary duties. The complaint seeks injunctive relief, including to enjoin or rescind the Merger Agreement, monetary damages, and an award of attorneys’ and other fees and costs, among other relief. On March 25, 2016, the plaintiff in the Chung action filed an amended complaint, which adds certain allegations, including that the preliminary proxy statement filed by Newport on March 15, 2016 (the “Proxy”) omitted material information. The amended complaint also names as defendants the Company, Newport, Merger Sub, and then-current members of Newport’s board of directors.

Also on March 25, 2016, a second putative class action complaint captioned Hubert C. Pincon v. Newport Corp., et al., Case No. A-16-734039-B, was filed in the District Court, Clark County, Nevada, on behalf of a putative class of the Newport’s stockholders for claims related to the Merger Agreement. The complaint names as defendants the Company, Newport, and Merger Sub and the then-current members of Newport’s former board of directors. It alleges that the named directors breached their fiduciary duties to Newport’s stockholders by agreeing to sell Newport through an inadequate and unfair process, which led to inadequate and unfair consideration, by agreeing to unfair deal protection devices, and by omitting material information from the Proxy. The complaint also alleges that the Company, Newport, and Merger Sub aided and abetted the named directors’ alleged breaches of their fiduciary duties. The complaint seeks injunctive relief, including to enjoin or rescind the Merger Agreement, and an award of attorneys’ and other fees and costs, among other relief.

On April 14, 2016, the Court granted plaintiffs’ motion to consolidate the Pincon and Chung actions and appointed counsel in the Pincon action as lead counsel. Also on April 14, 2016, the Court granted plaintiffs’ motion for expedited discovery and scheduled a hearing on plaintiffs’ anticipated motion for a preliminary injunction for April 25, 2016. On April 20, 2016, plaintiffs filed a motion to vacate the hearing on their anticipated motion for a preliminary injunction and notified the Court that they did not presently intend to file a motion for a preliminary injunction regarding the Merger Agreement. On April 22, 2016, the Court vacated the hearing on plaintiffs’ anticipated motion for a preliminary injunction. In August, plaintiffs completed the expedited discovery that the Court ordered.

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On October 24, 2016, plaintiffs filed an amended complaint captioned In re Newport Corporation Shareholder Litigation, Case No. A-16-733154-B, in the District Court, Clark County, Nevada, on behalf of a class of Newport's stockholders for claims related to the Merger Agreement. The complaint names as defendants the Company, Newport, and the then-current members of Newport's former board of directors. It alleges that the named directors breached their fiduciary duties to Newport's stockholders by agreeing to sell Newport through an inadequate and unfair process, which led to inadequate and unfair consideration, by agreeing to unfair deal protection devices, and by omitting material information from the Proxy. The complaint also alleges that the Company and Newport aided and abetted the named directors' alleged breaches of their fiduciary duties. The complaint seeks monetary damages, including pre- and post-judgment interest.

We believe that the claims asserted in the amended complaint have no merit and the Company, Newport and the named directors intend to defend vigorously against these claims.

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

ITEM 1A. RISK FACTORS.

Information regarding risk factors affecting the Company's business are discussed in the Company's Form 10-Q for the period ended June 30, 2016 in the section entitled "Risk Factors." There have been no material changes from the risks disclosed therein.

ITEM 6. EXHIBITS.

The exhibits filed as part of this quarterly report on Form 10-Q are listed in the exhibit index immediately preceding the exhibits and are incorporated herein.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

MKS INSTRUMENTS, INC.

November 8, 2016

By: /s/ Seth H. Bagshaw
Seth H. Bagshaw
Vice President, Chief Financial Officer and Treasurer (Principal
Financial Officer)

EXHIBIT INDEX

<u>Exhibit No.</u>	<u>Exhibit Description</u>
+3.1(1)	Restated Articles of Organization of the Registrant
+3.2(2)	Articles of Amendment to Restated Articles of Organization, as filed with the Secretary of State of Massachusetts on May 18, 2001
+3.3(3)	Articles of Amendment to Restated Articles of Organization, as filed with the Secretary of State of Massachusetts on May 16, 2002
+3.4(4)	Amended and Restated By-Laws of the Registrant
+10.1(5)*	Employment Agreement dated August 1, 2016 between Seth Bagshaw and the Registrant
+10.2(5)*	Employment Agreement dated August 1, 2016 between John Abrams and the Registrant
+10.3(5)*	Employment Agreement dated August 1, 2016 between John Lee and the Registrant
+10.4(5)*	Employment Agreement dated August 1, 2016 between Brian Quirk and the Registrant
+10.5(5)*	Employment Agreement dated August 1, 2016 between Dennis Werth and Newport Corporation
+10.6(5)*	Summary of 2016 Cash Incentive Bonus Arrangements with Dennis Werth
+10.7(5)*	Form of Indemnification Agreement between Newport Corporation and Dennis L. Werth
31.1	Certification of Principal Executive Officer pursuant to Rule 13a-14(a)/Rule 15d-14(a) of the Securities Exchange Act of 1934, as amended
31.2	Certification of Principal Financial Officer pursuant to Rule 13a-14(a)/Rule 15d-14(a) of the Securities Exchange Act of 1934, as amended
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 Document.
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.
(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 Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on May 6, 2014.
(5)	Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2016.

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER
PURSUANT TO RULE 13a-14(a)/RULE 15d-14(a) OF THE
SECURITIES EXCHANGE ACT OF 1934, AS AMENDED

I, Gerald G. Colella, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of MKS Instruments, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: November 8, 2016

/s/ Gerald G. Colella

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

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER
PURSUANT TO RULE 13a-14(a)/RULE 15d-14(a) OF THE
SECURITIES EXCHANGE ACT OF 1934, AS AMENDED

I, Seth H. Bagshaw, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of MKS Instruments, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: November 8, 2016

/s/ Seth H. Bagshaw

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

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

In connection with the Quarterly Report on Form 10-Q of MKS Instruments, Inc. (the "Company") for the period ended September 30, 2016, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Gerald G. Colella, Chief Executive Officer and President of the Company, and Seth H. Bagshaw, Vice President, Chief Financial Officer and Treasurer of the Company, each hereby certifies, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, based on his knowledge:

- (1) the Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: November 8, 2016

/s/ Gerald G. ColellaGerald G. Colella
Chief Executive Officer and President

Dated: November 8, 2016

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