
**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, 2018

or

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

For the transition period from _____ to _____

Commission file number 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 every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit 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, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act:

Large accelerated filer	<input checked="" type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
		Emerging growth company	<input type="checkbox"/>

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

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

As of October 30, 2018 the registrant had 53,986,114 shares of common stock outstanding.

MKS INSTRUMENTS, INC.
FORM 10-Q
INDEX

PART I. FINANCIAL INFORMATION

ITEM 1.	<u>FINANCIAL STATEMENTS (Unaudited).</u>	
	<u>Condensed Consolidated Balance Sheets – September 30, 2018 and December 31, 2017</u>	3
	<u>Condensed Consolidated Statements of Operations and Comprehensive Income – Three and nine months ended September 30, 2018 and 2017</u>	4
	<u>Consolidated Statements of Stockholders' Equity</u>	5
	<u>Condensed Consolidated Statements of Cash Flows – Nine months ended September 30, 2018 and 2017</u>	6
	<u>Notes to Unaudited Condensed Consolidated Financial Statements</u>	7
ITEM 2.	<u>MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS.</u>	35
ITEM 3.	<u>QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK.</u>	48
ITEM 4.	<u>CONTROLS AND PROCEDURES.</u>	48

PART II. OTHER INFORMATION

ITEM 1.	<u>LEGAL PROCEEDINGS.</u>	48
ITEM 1A.	<u>RISK FACTORS.</u>	49
ITEM 2.	<u>UNREGISTERED SALES OF EQUITY SECURITIES AND USE OF PROCEEDS.</u>	50
ITEM 6.	<u>EXHIBITS.</u>	51

<u>SIGNATURES</u>		52
-------------------	--	----

PART I. FINANCIAL INFORMATION

ITEM 1. FINANCIAL STATEMENTS.

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

ASSETS	<u>September 30, 2018</u>	<u>December 31, 2017</u>
Current assets:		
Cash and cash equivalents, including restricted cash	\$ 399,850	\$ 333,887
Short-term investments	219,776	209,434
Trade accounts receivable, net of allowance for doubtful accounts of \$4,761 and \$4,135 at September 30, 2018 and December 31, 2017, respectively	318,470	300,308
Inventories, net	399,077	339,081
Other current assets	75,298	53,543
Total current assets	<u>1,412,471</u>	<u>1,236,253</u>
Property, plant and equipment, net	180,182	171,782
Goodwill	587,861	591,047
Intangible assets, net	331,288	366,398
Long-term investments	10,404	10,655
Other assets	42,390	37,883
Total assets	<u>\$ 2,564,596</u>	<u>\$ 2,414,018</u>
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Short-term debt	\$ 6,130	\$ 2,972
Accounts payable	81,486	82,518
Accrued compensation	74,472	96,147
Income taxes payable	12,942	21,398
Deferred revenue	9,136	12,842
Other current liabilities	78,327	73,945
Total current liabilities	<u>262,493</u>	<u>289,822</u>
Long-term debt, net	342,970	389,993
Non-current deferred taxes	61,540	61,571
Non-current accrued compensation	56,888	51,700
Other liabilities	30,412	32,025
Total liabilities	<u>\$ 754,303</u>	<u>\$ 825,111</u>
Commitments and contingencies (Note 19)		
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; 53,984,623 and 54,355,535 shares issued and outstanding at September 30, 2018 and December 31, 2017, respectively	113	113
Additional paid-in capital	786,138	789,644
Retained earnings	1,023,959	795,698
Accumulated other comprehensive income	83	3,452
Total stockholders' equity	<u>1,810,293</u>	<u>1,588,907</u>
Total liabilities and stockholders' equity	<u>\$ 2,564,596</u>	<u>\$ 2,414,018</u>

The accompanying notes are an integral part of the unaudited condensed 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,	
	2018	2017	2018	2017
Net revenues:				
Products	\$ 426,255	\$ 428,891	\$ 1,432,931	\$ 1,243,146
Services	60,897	57,376	181,636	161,031
Total net revenues	487,152	486,267	1,614,567	1,404,177
Cost of revenues:				
Cost of products	219,311	226,445	747,522	662,985
Cost of services	35,981	31,827	97,453	88,067
Total cost of revenues (exclusive of amortization shown separately below)	255,292	258,272	844,975	751,052
Gross profit	231,860	227,995	769,592	653,125
Research and development	31,898	32,548	103,259	99,510
Selling, general and administrative	70,822	71,347	229,952	217,546
Acquisition and integration costs	36	2,466	(1,132)	4,698
Restructuring	1,364	10	3,374	2,596
Environmental costs	—	—	1,000	—
Asset impairment	—	—	—	6,719
Fees and expenses related to repricing of term loan	—	492	378	492
Amortization of intangible assets	10,695	10,977	32,786	34,946
Income from operations	117,045	110,155	399,975	286,618
Interest income	1,516	873	4,077	1,896
Interest expense	3,719	7,172	13,071	23,001
Gain on sale of business	—	—	—	74,856
Other expense, net	326	2,485	1,179	3,741
Income before income taxes	114,516	101,371	389,802	336,628
Provision for income taxes	21,239	25,377	68,542	75,134
Net income	<u>\$ 93,277</u>	<u>\$ 75,994</u>	<u>\$ 321,260</u>	<u>\$ 261,494</u>
Other comprehensive income:				
Changes in value of financial instruments designated as cash flow hedges, net of tax expense (benefit) ⁽¹⁾	\$ 163	\$ (908)	\$ 8,053	\$ (3,578)
Foreign currency translation adjustments, net of tax of \$0	(3,576)	8,088	(11,314)	30,352
Unrecognized pension gain (loss), net of tax expense (benefit) ⁽²⁾	24	(565)	(13)	(204)
Unrealized gain (loss) on investments, net of tax expense (benefit) ⁽³⁾	230	1,301	(95)	1,137
Total comprehensive income	<u>\$ 90,118</u>	<u>\$ 83,910</u>	<u>\$ 317,891</u>	<u>\$ 289,201</u>
Net income per share:				
Basic	<u>\$ 1.71</u>	<u>\$ 1.40</u>	<u>\$ 5.89</u>	<u>\$ 4.84</u>
Diluted	<u>\$ 1.70</u>	<u>\$ 1.38</u>	<u>\$ 5.82</u>	<u>\$ 4.75</u>
Cash dividends per common share	<u>\$ 0.20</u>	<u>\$ 0.175</u>	<u>\$ 0.58</u>	<u>\$ 0.525</u>
Weighted average common shares outstanding:				
Basic	<u>54,476</u>	<u>54,282</u>	<u>54,539</u>	<u>54,076</u>
Diluted	<u>54,954</u>	<u>55,101</u>	<u>55,171</u>	<u>55,020</u>

- (1) Tax expense was \$49 and \$688 for the three months ended September 30, 2018 and 2017, respectively. Tax expense (benefit) was \$2,304 and \$(884) for the nine months ended September 30, 2018 and 2017, respectively.
- (2) Tax expense (benefit) was \$7 and \$(312) for the three months ended September 30, 2018 and 2017, respectively. Tax benefit was \$(17) and \$(315) for the nine months ended September 30, 2018 and 2017, respectively.
- (3) Tax expense (benefit) was \$17 and \$(467) for the three months ended September 30, 2018 and 2017, respectively. Tax (benefit) expense was \$(22) and \$274 for the nine months ended September 30, 2018 and 2017, respectively.

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

MKS INSTRUMENTS, INC.
CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(in thousands, except per share data)
(Unaudited)

(in thousands, except share data)	Common Stock		Additional Paid-In Capital	Retained Earnings	Accumulated Other Comprehensive Income/(Loss)	Total Stockholders' Equity
	Shares	Amount				
Balance at June 30, 2018	54,787,153	\$ 113	\$ 793,384	\$ 1,004,698	\$ 3,243	\$ 1,801,438
Net issuance under stock-based plans	15,601		(589)			(589)
Stock-based compensation			5,213			5,213
Stock repurchase	(818,131)		(11,870)	(63,130)		(75,000)
Cash dividend				(10,859)		(10,859)
Accounting Standards Codification Topic 606 adjustment				(27)		(27)
Comprehensive income (net of tax):						
Net income				93,277		93,277
Other comprehensive loss					(3,160)	(3,160)
Balance at September 30, 2018	<u>53,984,623</u>	<u>\$ 113</u>	<u>\$ 786,138</u>	<u>\$ 1,023,959</u>	<u>\$ 83</u>	<u>\$ 1,810,293</u>

(in thousands, except share data)	Common Stock		Additional Paid-In Capital	Retained Earnings	Accumulated Other Comprehensive Income/(Loss)	Total Stockholders' Equity
	Shares	Amount				
Balance at December 31, 2017	54,355,535	\$ 113	\$ 789,644	\$ 795,698	\$ 3,452	\$ 1,588,907
Net issuance under stock-based plans	447,219		(13,641)			(13,641)
Stock-based compensation			22,005			22,005
Stock repurchase	(818,131)		(11,870)	(63,130)		(75,000)
Cash dividend				(31,608)		(31,608)
Accounting Standards Codification Topic 606 adjustment				1,739		1,739
Comprehensive income (net of tax):						
Net income				321,260		321,260
Other comprehensive loss					(3,369)	(3,369)
Balance at September 30, 2018	<u>53,984,623</u>	<u>\$ 113</u>	<u>\$ 786,138</u>	<u>\$ 1,023,959</u>	<u>\$ 83</u>	<u>\$ 1,810,293</u>

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

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

	Nine Months Ended September 30,	
	2018	2017
Cash flows provided by operating activities:		
Net income	\$ 321,260	\$ 261,494
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	59,906	62,550
Amortization of debt issuance costs, original issue discount and soft call premium	3,784	6,385
Asset impairment	—	6,719
Gain on sale of business	—	(74,856)
Stock-based compensation	22,005	19,834
Provision for excess and obsolete inventory	15,575	15,349
Provision for bad debt	859	650
Deferred income taxes	(3,525)	6,641
Other	531	832
Changes in operating assets and liabilities:		
Trade accounts receivable	(23,125)	(26,489)
Inventories	(80,441)	(51,251)
Income taxes	(13,874)	15,646
Other current and non-current assets	(17,652)	(9,714)
Accrued compensation	(15,529)	11,058
Other current and non-current liabilities	8,934	22,517
Accounts payable	(385)	7,071
Net cash provided by operating activities	278,323	274,436
Cash flows (used in) provided by investing activities:		
Net proceeds from sale of business	—	72,509
Purchases of investments	(213,774)	(199,012)
Maturities of investments	135,339	116,779
Sales of investments	67,868	43,571
Purchases of property, plant and equipment	(36,885)	(17,857)
Net cash (used in) provided by investing activities	(47,452)	15,990
Cash flows used in financing activities:		
Repurchase of common stock	(75,000)	—
Proceeds from short and long-term borrowings	60,624	13,158
Payments on short-term borrowings	(57,865)	(13,277)
Payments on long-term borrowings	(50,002)	(178,141)
Net payments related to employee stock awards	(13,641)	(14,719)
Dividend payments to common stockholders	(31,608)	(28,403)
Net cash used in financing activities	(167,492)	(221,382)
Effect of exchange rate changes on cash and cash equivalents	2,584	3,140
Increase in cash and cash equivalents and restricted cash	65,963	72,184
Cash and cash equivalents, including restricted cash, at beginning of period ⁽¹⁾	333,887	233,910
Cash and cash equivalents, including restricted cash, at end of period ⁽²⁾	<u>\$ 399,850</u>	<u>\$ 306,094</u>

(1) Restricted cash at the beginning of the period was \$119 and \$5,287 for the nine months ended September 30, 2018 and 2017, respectively.

(2) Restricted cash at the end of the period was \$114 and \$117 for the nine months ended September 30, 2018 and 2017, respectively.

The accompanying notes are an integral part of the unaudited condensed 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, 2018, and for the three and nine months ended September 30, 2018 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, 2017 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, 2017 filed with the Securities and Exchange Commission on February 28, 2018.

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.

Reclassification of certain line items in prior period financial statements

The Company has historically recorded the revenue and related cost of revenue for the sale of its spare parts within Products in its Statements of Operations for the Vacuum & Analysis segment. The Company has now determined that these items are better presented within revenue and related cost of revenue within Services for the Vacuum & Analysis segment in its Statements of Operations to align with the current manner in which the Company operates its services business, and has elected to reclassify these amounts in previously issued financial statements as shown below. This change in presentation has no impact on total revenue or total cost of revenue.

	Three Months Ended September 30, 2017		
	As previously reported	Adjustment	As reclassified
Net revenues:			
Products	\$ 434,710	\$ (5,819)	\$ 428,891
Services	51,557	5,819	57,376
Total net revenues	<u>486,267</u>	<u>—</u>	<u>486,267</u>
Cost of revenues:			
Cost of products	225,174	1,271	226,445
Cost of services	33,098	(1,271)	31,827
Total cost of revenues	<u>\$ 258,272</u>	<u>\$ —</u>	<u>\$ 258,272</u>
	Nine Months Ended September 30, 2017		
	As previously reported	Adjustment	As reclassified
Net revenues:			
Products	\$ 1,259,582	\$ (16,436)	\$ 1,243,146
Services	144,595	16,436	161,031
Total net revenues	<u>1,404,177</u>	<u>—</u>	<u>1,404,177</u>
Cost of revenues:			
Cost of products	659,538	3,447	662,985
Cost of services	91,514	(3,447)	88,067
Total cost of revenues	<u>\$ 751,052</u>	<u>\$ —</u>	<u>\$ 751,052</u>

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

2) Recently Issued Accounting Pronouncements

In March 2018, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) 2018-05, “Income Taxes (Topic 740).” This standard is an amendment that adopts the language of Securities and Exchange Commission Staff Accounting Bulletin No. 118 (“SAB 118”) and aims to address certain circumstances that may arise for registrants in accounting for the income tax effects of the Tax Cuts and Jobs Act (the “Act”) and to address any uncertainty or diversity of views in practice regarding the application of Topic 740 in situations where a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting under Topic 740 for certain income tax effects of the Act for the reporting period in which the Act was enacted. The provisions of this ASU were applied to the Company’s December 31, 2017 financial statements. The Company recorded provisional amounts with respect to the Act under SAB 118 at December 31, 2017 and September 30, 2018 and needs to complete additional analysis and receive additional guidance from the U.S. Internal Revenue Service with respect to provisions of the Act that affect the Company before the provisional determinations become final. Until the Company completes its analysis and receives additional guidance, the Company is not able to determine if the impact of ASU 2018-05 is material to the Company’s consolidated financial statements in any period.

In August 2017, the FASB issued ASU 2017-12, “Derivatives and Hedging (Topic 815).” This standard better aligns an entity’s risk management activities and financial reporting for hedging relationships through changes to both the designation and measurement guidance for qualifying hedging relationships and the presentation of hedge results. The provisions of this ASU are effective for annual periods beginning after December 15, 2018, 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 May 2017, the FASB issued ASU 2017-09, “Compensation-Stock Compensation (Topic 718)-Scope of Modification Accounting.” This standard provides guidance about which changes to the terms or conditions of a share-based payment award require an entity to apply modification accounting in Topic 718. The provisions of this ASU are effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. The Company adopted this ASU during the three month period ended March 31, 2018. The adoption of this ASU did not have a material impact on the Company’s consolidated financial statements.

In March 2017, the FASB issued ASU 2017-07, “Compensation-Retirement Benefits (Topic 715)-Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost.” This standard requires that an employer disaggregate the service cost component from the other components of net benefit cost. This standard also provides explicit guidance on how to present the service cost component and the other components of the net benefit cost in the income statement and allows only the service cost component of net benefit cost to be eligible for capitalization. The provisions of this ASU are effective for annual periods beginning after December 31, 2017, including interim periods within those fiscal years. The Company adopted this ASU during the three month period ended March 31, 2018. The adoption of this ASU did not have a material impact on the Company’s consolidated financial statements.

In January 2017, the FASB issued ASU 2017-01, “Business Combinations (Topic 805)-Clarifying the Definition of a Business.” This standard clarifies the definition of a business with the objective of adding guidance to assist entities with evaluating whether transactions should be accounted for as acquisitions (or disposals) of assets or businesses. This standard also provides a more robust framework to use in determining when a set of assets and activities is a business. Because the current definition of a business is interpreted broadly and can be difficult to apply, stakeholders indicated that analyzing transactions is inefficient and costly and that the definition does not permit the use of reasonable judgment. The provisions of this ASU are effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. The Company adopted this ASU during the three month period ended March 31, 2018. The adoption of this ASU did not have a material impact on the Company’s consolidated financial statements.

In November 2016, the FASB issued ASU 2016-18, “Statement of Cash Flows (Topic 230)-Restricted Cash,” an amendment to ASU 2016-15. This standard requires that a statement of cash flows explain the change during the period in the total of cash, cash equivalents and amounts generally described as restricted cash and restricted cash equivalents. Therefore, amounts generally described as restricted cash and restricted cash equivalents should be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. The provisions of this ASU are effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years and should be applied at the time of adoption of ASU 2016-15. The Company adopted this ASU during the three month period ended March 31, 2018. The adoption of this ASU did not have a material impact on the Company’s consolidated financial statements.

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

In October 2016, the FASB issued ASU 2016-16, “Income Taxes (Topic 740)-Intra-Entity Transfer of Assets Other Than Inventory.” This standard requires that an entity recognize the income tax consequences of an intra-entity transfer of an asset other than inventory when the transfer occurs as opposed to when the assets have been sold to an outside party. The provisions of this ASU are effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. The Company adopted this ASU during the three month period ended March 31, 2018. The adoption of this ASU did not have a material impact on the Company’s consolidated financial statements.

In August 2016, the FASB issued 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 adopted this ASU during the three month period ended March 31, 2018. The adoption of this ASU did not 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 have the option to either apply the standard retrospectively through a cumulative-effect adjustment to the opening balance of retained earnings in the period of adoption or they can apply the new standard to comparative periods presented. This ASU is effective for annual periods beginning after December 15, 2018, including interim periods within those fiscal years. The FASB issued additional updates to the new standard in Topic 842 (Update 2018-01 in January 2018 – Land Easement Practical Expedient for Transition to Topic 842, Update 2018-10 – Codification Improvements to Topic 842 and Update 2018-11 in July 2018 – Targeted Improvements). The Company has reviewed the requirements of this standard and has formulated a plan for implementation. The management team has communicated its approach to the Audit Committee and will provide regular updates as appropriate. The Company is currently accumulating details on the population of leases and entering these details into a selected software database, which will be a repository and accounting solution for reporting and disclosure requirements required by the standard. The Company will continue to assess and disclose the impact that this ASU will have on its consolidated financial statements, disclosures and related controls, when known.

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 standard 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 equity method. Changes in the fair value of these equity securities will be recognized directly in net income. This standard is effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. The Company adopted this ASU during the three month period ended March 31, 2018. The adoption of this ASU did not have a material impact on the Company’s consolidated financial statements.

In May 2014, the FASB issued ASU 2014-09, “Revenue from Contracts with Customers (Topic 606)” (“ASC 606”). This ASU provides for a single comprehensive model to use in accounting for revenue arising from contracts with customers and has replaced most existing revenue recognition guidance in GAAP. This ASU is effective for fiscal years and interim periods within those years beginning after December 15, 2017. 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 used the modified retrospective method upon adoption in the first quarter of 2018. The FASB issued additional updates to the new revenue standard in Topic 606 relating to reporting revenue on a gross versus net basis (Update 2016-08 in March 2016), identifying performance obligations and licensing arrangements (Update 2016-10 in April 2016), narrow-scope improvements and practical expedients (Update 2016-12 in May 2016), technical corrections and improvements (Update 2016-20 in December 2016), and SEC Updates (Update 2017-13 in September 2017 and Update 2017-14 in November 2017). The adoption of this ASU did not have a material impact on the Company’s consolidated financial statements as described further in Note 3.

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

3) Revenue from Contracts with Customers

The Company adopted Accounting Standards Codification ASC 606 (“ASC 606”) on January 1, 2018 using the modified retrospective method for all contracts not completed as of the date of adoption. The reported results for the nine months ended September 30, 2018 reflect the application of ASC 606 guidance while the reported results for 2017 were prepared under the guidance of Accounting Standards Codification 605, Revenue Recognition.

The Company has recorded a net increase to opening retained earnings of \$1,809 as of January 1, 2018 due to the cumulative impact of adopting ASC 606, with the impact primarily related to its service business and certain custom products. The impact to revenue for the quarter ended September 30, 2018 as a result of applying ASC 606 was immaterial.

The adoption of ASC 606 represents a change in accounting principle that will more closely align revenue recognition with the delivery of the Company's goods or services and will provide financial statement readers with enhanced disclosures. To achieve this core principle, the Company applies the following five steps:

- *Identify the contract with a customer*
- *Identify the performance obligations in the contract*
- *Determine the transaction price*
- *Allocate the transaction price to performance obligations in the contract*
- *Recognize revenue when or as the Company satisfies a performance obligation*

Revenue under ASC 606 is recognized when or as obligations under the terms of a contract with the Company’s customer has been satisfied and control has transferred to the customer. The majority of the Company's performance obligations, and associated revenue, are transferred to customers at a point in time, generally upon shipment of a product to the customer or receipt of the product by the customer and without significant judgments. Installation services are not significant and are usually completed in a short period of time (normally less than two weeks) and therefore, recorded at a point in time when the installation services are completed, rather than over time as they are not material. Extended warranty, service contracts, and repair services, which are transferred to the customer over time, are recorded as revenue as the services are performed. For repair services, the Company makes an accrual at quarter end based upon historical repair times within its product groups to record revenue based upon the estimated number of days completed to date, which is consistent with ratable recognition. Customized products with no alternative future use to the Company, and that have an enforceable right to payment for performance completed to date, are also recorded over time. The Company considers this to be a faithful depiction of the transfer to the customer of revenue over time as the work is performed or service is delivered, ratably over time.

Revenue is measured as the amount of consideration the Company expects to receive in exchange for transferring goods or providing services. Performance obligations promised in a contract are identified based on the products or services that will be transferred to the customer that are both capable of being distinct, whereby the customer can benefit from the product or service either on its own or together with other resources that are readily available from third parties or from the Company, and are distinct in the context of the contract, whereby the transfer of the product or service is separately identifiable from other promises in the contract. Sales, value add, and other taxes the Company collects concurrent with revenue-producing activities are excluded from revenue. The Company’s normal payment terms are 30 to 60 days but vary by the type and location of its customers and the products or services offered. The time between invoicing and when payment is due is not significant. For certain products and services and customer types, the Company requires payment before the products or services are delivered to, or performed for, the customer. None of the Company’s contracts as of September 30, 2018 contained a significant financing component. Contract assets as of January 1 and September 30, 2018 were \$3,065 and \$3,951, respectively, and included in other current assets.

Contracts with Multiple Performance Obligations

The Company periodically enters into contracts with its customers in which a customer may purchase a combination of goods and or services, such as products with installation services or extended warranty obligations. These contracts include multiple promises that the Company evaluates to determine if the promises are separate performance obligations. Once the Company determines the performance obligations, the Company then determines the transaction price, which includes estimating the amount of variable consideration to be included in the transaction price, if any. To the extent the transaction price includes variable consideration, the Company estimates the amount of variable consideration that should be included in the transaction price utilizing either the expected value method or the most likely amount method depending on the method the Company expects to better predict the amount of consideration to which it will be entitled. There are no constraints on the variable

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

consideration recorded. The Company then allocates the transaction price to each performance obligation in the contract based on a relative stand-alone selling price charged separately to customers or using an expected cost plus margin method. The corresponding revenues are recognized when or as the related performance obligations are satisfied, which are noted above. The impact of variable consideration was immaterial during the three and nine months ended September 30, 2018.

Deferred Revenues

The Company's standard assurance warranty period is normally 12 to 24 months. The Company sells separately-priced service contracts and extended warranty contracts related to certain of its products, especially its laser products. The separately priced contracts generally range from 12 to 60 months. The Company normally receives payment at the inception of the contract and recognizes revenue over the term of the agreement in proportion to the costs expected to be incurred in satisfying the obligations under the contract. The Company has elected to use the practical expedient related to disclosing the remaining performance obligations as of September 30, 2018, as the majority have a duration of less than one year.

A rollforward of the Company's deferred revenue is as follows:

	Nine Months Ended September 30, 2018
Beginning balance, January 1 ⁽¹⁾	\$ 14,448
Amount of deferred revenue recognized in income	(15,846)
Additions to deferred revenue	13,869
Ending balance, September 30 ⁽²⁾	\$ 12,471

- (1) Beginning deferred revenue as of January 1, 2018 included \$11,322 of current deferred revenue and \$3,126 of long-term deferred revenue.
- (2) Ending deferred revenue as of September 30, 2018 included \$9,136 of current deferred revenue and \$3,335 of long-term deferred revenue.

Costs to Obtain and Fulfill a Contract

Under ASC 606, the Company expenses sales commissions when incurred because the amortization period would have been one year or less. These costs are recorded within selling, general and administration expenses. The Company has elected to recognize the costs for freight and shipping when control over products has transferred to the customer as an expense in cost of sales.

The Company monitors and tracks the amount of product returns and reduces revenue at the time of shipment for the estimated amount of future returns, based on historical experience. The Company makes estimates evaluating its allowance for doubtful accounts. The Company continuously monitors collections and payments from its customers and maintains a provision for estimated credit losses based upon its historical experience and any specific customer collection issues that it has identified.

Disaggregation of Revenue

The following table summarizes revenue from contracts with customers:

	Three Months Ended September 30, 2018		
	Vacuum & Analysis	Light & Motion	Total
Net revenues:			
Products	\$ 239,924	\$ 186,331	\$ 426,255
Services	46,114	14,783	60,897
Total net revenues	\$ 286,038	\$ 201,114	\$ 487,152

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

	Three Months Ended September 30, 2017		
	Vacuum & Analysis	Light & Motion	Total
Net revenues:			
Products	\$ 265,136	\$ 163,755	\$ 428,891
Services	43,133	14,243	57,376
Total net revenues	\$ 308,269	\$ 177,998	\$ 486,267

	Nine Months Ended September 30, 2018		
	Vacuum & Analysis	Light & Motion	Total
Net revenues:			
Products	\$ 865,714	\$ 567,217	\$ 1,432,931
Services	136,996	44,640	181,636
Total net revenues	\$ 1,002,710	\$ 611,857	\$ 1,614,567

	Nine Months Ended September 30, 2017		
	Vacuum & Analysis	Light & Motion	Total
Net revenues:			
Products	\$ 776,256	466,890	\$ 1,243,146
Services	119,958	41,073	161,031
Total net revenues	\$ 896,214	\$ 507,963	\$ 1,404,177

Product revenue, excluding revenue from certain custom products, is recorded at a point in time, while the majority of the service revenue and revenue from certain custom products is recorded over time.

Refer to Note 17 in the financial statements for revenue by reportable segment, geography and groupings of similar products.

4) Investments

The fair value of investments classified as short-term consists of the following:

	September 30, 2018	December 31, 2017
Available-for-sale investments:		
Time deposits and certificates of deposit	\$ 14,552	\$ 9,757
Bankers' acceptance drafts	2,107	5,330
Asset-backed securities	38,947	36,990
Commercial paper	32,057	13,750
Corporate obligations	71,971	77,821
Municipal bonds	1,288	1,970
U.S. treasury obligations	28,208	28,078
U.S. agency obligations	30,646	35,738
	\$ 219,776	\$ 209,434

Investments classified as long-term consist of the following:

	September 30, 2018	December 31, 2017
Available-for-sale investments:		
Group insurance contracts	\$ 6,004	\$ 6,255
Cost method investments:		
Minority interest in a private company	4,400	4,400
	\$ 10,404	\$ 10,655

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

The following tables show the gross unrealized gains and (losses) aggregated by investment category for available-for-sale investments:

As of September 30, 2018:	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
Short-term investments:				
Available-for-sale investments:				
Time deposits and certificates of deposit	\$ 14,552	\$ —	\$ —	\$ 14,552
Bankers' acceptance drafts	2,107	—	—	2,107
Asset-backed securities	38,961	11	(25)	38,947
Commercial paper	32,238	—	(181)	32,057
Corporate obligations	71,931	59	(19)	71,971
Municipal bonds	1,290	—	(2)	1,288
U.S. treasury obligations	28,200	10	(2)	28,208
U.S. agency obligations	30,649	4	(7)	30,646
	<u>\$ 219,928</u>	<u>\$ 84</u>	<u>\$ (236)</u>	<u>\$ 219,776</u>

As of September 30, 2018:	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
Long-term investments:				
Available-for-sale investments:				
Group insurance contracts	<u>\$ 6,010</u>	<u>\$ —</u>	<u>\$ (6)</u>	<u>\$ 6,004</u>

As of December 31, 2017:	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
Short-term investments:				
Available-for-sale investments:				
Time deposits and certificates of deposit	\$ 9,756	\$ 1	\$ —	\$ 9,757
Bankers acceptance drafts	5,330	—	—	5,330
Asset-backed securities	37,017	15	(42)	36,990
Commercial paper	13,810	—	(60)	13,750
Corporate obligations	77,788	58	(25)	77,821
Municipal bonds	1,970	—	—	1,970
U.S. treasury obligations	28,054	24	—	28,078
U.S. agency obligations	35,728	10	—	35,738
	<u>\$ 209,453</u>	<u>\$ 108</u>	<u>\$ (127)</u>	<u>\$ 209,434</u>

As of December 31, 2017:	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
Long-term investments:				
Available-for-sale investments:				
Group insurance contracts	<u>\$ 6,006</u>	<u>\$ 249</u>	<u>\$ —</u>	<u>\$ 6,255</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, 2018 and December 31, 2017, 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 on the accompanying balance sheets.

The Company reviews and evaluates its investments for any indication of possible impairment. Based on this review, the Company has determined that the unrealized losses related to these investments at September 30, 2018 and December 31, 2017 were temporary.

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

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 nine months ended September 30, 2018 and 2017.

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.

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.

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

Assets and liabilities of the Company are measured at fair value on a recurring basis as of September 30, 2018 and are summarized as follows:

Description	September 30, 2018	Fair Value Measurements at Reporting Date Using		
		Quoted Prices in Active Markets for Identical Assets or Liabilities (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Cash equivalents:				
Money market funds	\$ 17,584	\$ 17,584	\$ —	\$ —
Commercial paper	13,283	—	13,283	—
Corporate obligations	4,373	—	4,373	—
U.S. agency obligations	2,244	—	2,244	—
Restricted cash – money market funds	114	114	—	—
Available-for-sale investments:				
Time deposits and certificates of deposit	14,552	—	14,552	—
Bankers acceptance drafts	2,107	—	2,107	—
Asset-backed securities	38,947	—	38,947	—
Commercial paper	32,057	—	32,057	—
Corporate obligations	71,971	—	71,971	—
Municipal bonds	1,288	—	1,288	—
U.S. treasury obligations	28,208	—	28,208	—
U.S. agency obligations	30,646	—	30,646	—
Group insurance contracts	6,004	—	6,004	—
Derivatives – foreign exchange contracts	3,434	—	3,434	—
Funds in investments and other assets:				
Israeli pension assets	15,815	—	15,815	—
Derivatives – interest rate hedge – non-current	8,539	—	8,539	—
Total assets	\$ 291,166	\$ 17,698	\$ 273,468	\$ —
Liabilities:				
Derivatives – foreign exchange contracts	\$ 343	\$ —	\$ 343	\$ —
Reported as follows:				
Assets:				
Cash and cash equivalents, including restricted cash ⁽¹⁾	\$ 37,598	\$ 17,698	\$ 19,900	\$ —
Short-term investments	219,776	—	219,776	—
Other current assets	3,434	—	3,434	—
Total current assets	\$ 260,808	\$ 17,698	\$ 243,110	\$ —
Long-term investments ⁽²⁾	\$ 6,004	\$ —	\$ 6,004	\$ —
Other assets	24,354	—	24,354	—
Total long-term assets	\$ 30,358	\$ —	\$ 30,358	\$ —
Liabilities:				
Other current liabilities	\$ 343	\$ —	\$ 343	\$ —

(1) The cash and cash equivalent amounts presented in the table above do not include cash of \$362,252 as of September 30, 2018.

(2) The long-term investments presented in the table above do not include the Company's minority interest investment in a private company, which is accounted for under the cost method.

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

Assets and liabilities of the Company are measured at fair value on a recurring basis as of December 31, 2017 and are summarized as follows:

Description	December 31, 2017	Fair Value Measurements at Reporting Date Using		
		Quoted Prices in Active Markets for Identical Assets or Liabilities (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Cash equivalents:				
Money market funds	\$ 4,987	\$ 4,987	\$ —	\$ —
Time deposits and certificates of deposit	2,100	—	2,100	—
Commercial paper	30,475	—	30,475	—
Restricted cash – money market funds	119	119	—	—
Available-for-sale investments:				
Time deposits and certificates of deposit	9,757	—	9,757	—
Bankers acceptance drafts	5,330	—	5,330	—
Asset-backed securities	36,990	—	36,990	—
Commercial paper	13,750	—	13,750	—
Corporate obligations	77,821	—	77,821	—
Municipal bonds	1,970	—	1,970	—
U.S. treasury obligations	28,078	—	28,078	—
U.S. agency obligations	35,738	—	35,738	—
Group insurance contracts	6,255	—	6,255	—
Derivatives – foreign exchange contracts	168	—	168	—
Funds in investments and other assets:				
Israeli pension assets	15,048	—	15,048	—
Derivatives – interest rate hedge – non-current	6,179	—	6,179	—
Total assets	\$ 274,765	\$ 5,106	\$ 269,659	\$ —
Liabilities:				
Derivatives – foreign exchange contracts	\$ 6,198	\$ —	\$ 6,198	\$ —
Assets:				
Cash and cash equivalents, including restricted cash ⁽¹⁾	\$ 37,681	\$ 5,106	\$ 32,575	\$ —
Short-term investments	209,434	—	209,434	—
Other current assets	168	—	168	—
Total current assets	\$ 247,283	\$ 5,106	\$ 242,177	\$ —
Long-term investments ⁽²⁾	\$ 6,255	\$ —	\$ 6,255	\$ —
Other assets	21,227	—	21,227	—
Total long-term assets	\$ 27,482	\$ —	\$ 27,482	\$ —
Liabilities:				
Other current liabilities	\$ 6,198	\$ —	\$ 6,198	\$ —

(1) The cash and cash equivalent amounts presented in the table above do not include cash of \$292,808 and non-negotiable time deposits of \$3,398 as of December 31, 2017.

(2) The long-term investments presented in the table above do not include the Company's minority interest investment in a private company, which is accounted for under the cost method.

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

Money Market Funds

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

Available-For-Sale Investments

Available-for-sale investments consisted of time deposits and drafts, certificates of deposit, bankers acceptance drafts, asset-backed securities (which include auto loans, credit card receivables and equipment trust receivables), commercial paper, 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 2 of the fair value hierarchy.

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

6) Derivatives

The Company enters into derivative instruments for risk management purposes only, including derivatives designated as hedging instruments and those utilized as economic hedges. The Company operates internationally and, in the normal course of business, is exposed to fluctuations in interest rates and foreign exchange rates. These fluctuations can increase the costs of financing, investing and operating the business. The Company has used derivative instruments, such as forward foreign currency exchange contracts, to manage certain foreign currency exposure, and interest rate swaps to manage interest rate 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 then-outstanding balance under the Credit Agreement, as described further in Note 10. This hedge fixes the interest rate paid on the hedged debt at 1.198% per annum plus the applicable credit spread, which was 1.75% as of September 30, 2018, through September 30, 2020. The interest rate swap is recorded at fair value on the balance sheet and changes in the fair value are 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 \$290,000 and had a fair value of \$8,539 at September 30, 2018. The notional amount of this transaction was \$305,000 and had a fair value of \$6,179 at December 31, 2017.

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

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 is recorded currently in earnings in the period it occurs. The cash flows resulting from forward exchange contracts are classified in the consolidated statements of cash flows as part of cash flows from operating activities. The Company does not enter into derivative instruments for trading or speculative purposes.

As of September 30, 2018 and December 31, 2017, the Company had outstanding forward foreign exchange contracts with gross notional values of \$149,088 and \$208,922, respectively. The following tables provide a summary of the primary net hedging positions and corresponding fair values held as of September 30, 2018 and December 31, 2017:

<u>Currency Hedged (Buy/Sell)</u>	<u>September 30, 2018</u>	
	<u>Gross Notional Value</u>	<u>Fair Value(1)</u>
U.S. Dollar/Japanese Yen	\$ 40,004	\$ 1,143
U.S. Dollar/South Korean Won	56,628	759
U.S. Dollar/Euro	23,678	612
U.S. Dollar/U.K. Pound Sterling	10,001	314
U.S. Dollar/Taiwan Dollar	18,777	263
Total	<u>\$ 149,088</u>	<u>\$ 3,091</u>

<u>Currency Hedged (Buy/Sell)</u>	<u>December 31, 2017</u>	
	<u>Gross Notional Value</u>	<u>Fair Value(1)</u>
U.S. Dollar/Japanese Yen	\$ 70,175	\$ (233)
U.S. Dollar/South Korean Won	79,672	(3,799)
U.S. Dollar/Euro	26,140	(1,047)
U.S. Dollar/U.K. Pound Sterling	12,104	(337)
U.S. Dollar/Taiwan Dollar	20,831	(614)
Total	<u>\$ 208,922</u>	<u>\$ (6,030)</u>

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

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

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

<u>Derivatives Designated as Hedging Instruments</u>	September 30, 2018	December 31, 2017
Derivative assets:		
Foreign exchange contracts ⁽¹⁾	\$ 3,434	\$ 168
Foreign currency interest rate hedge ⁽²⁾	8,539	6,179
Derivative liabilities:		
Foreign exchange contracts ⁽¹⁾	(343)	(6,198)
Total net derivative asset designated as hedging instruments	\$ 11,630	\$ 149

- (1) The derivative asset of \$3,434 and \$168 as of September 30, 2018 and December 31, 2017, respectively, related to foreign exchange contracts and is classified in other current assets in the consolidated balance sheet. The derivative liability of \$(343) and \$(6,198) as of September 30, 2018 and December 31, 2017, respectively, is classified in other current liabilities in the consolidated balance sheet. 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.
- (2) The interest rate hedge assets of \$8,539 and \$6,179 as of September 30, 2018 and December 31, 2017, respectively, are classified in other assets in the consolidated balance sheet.

The net amount of existing gains as of September 30, 2018 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 cash flow hedging instruments:

<u>Derivatives Designated as Cash Flow Hedging Instruments</u>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Forward exchange contracts:				
Net gain (loss) recognized in OCI ⁽¹⁾	\$ 212	\$ (220)	\$ 10,357	\$ (4,462)
Net gain (loss) reclassified from accumulated OCI into income ⁽²⁾	\$ 306	\$ (1,360)	\$ (4,882)	\$ (1,842)

- (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, 2018 and 2017. The tax effect of the gains or losses reclassified from accumulated OCI into income is immaterial.

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

<u>Derivatives Not Designated as Hedging Instruments</u>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Forward exchange contracts:				
Net (loss) gain recognized in income ⁽¹⁾	\$ (111)	\$ (877)	\$ 12	\$ (2,559)

- (1) The Company enters into foreign exchange contracts to hedge against changes in the balance sheet for certain subsidiaries 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 other (expense) income.

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

7) Inventories, net

Inventories consist of the following:

	September 30, 2018	December 31, 2017
Raw materials	\$ 237,547	\$ 191,351
Work-in-process	66,635	54,050
Finished goods	94,895	93,680
	<u>\$ 399,077</u>	<u>\$ 339,081</u>

8) Dispositions

Sale of Data Analytics Solutions

In April 2017, the Company completed the sale of its Data Analytics Solutions business for total proceeds of \$72,509, net of cash sold and recorded a gain of \$74,856. This business, which had revenues in 2016 of \$12,700 and was included in the Vacuum & Analysis segment, was no longer a part of the Company's long-term strategic objectives.

The business did not qualify as a discontinued operation as this sale did not represent a strategic shift in the Company's business, nor did the sale have a major effect on the Company's operations. Therefore, the results of operations for all periods are included in the Company's income from operations. The assets and liabilities of this business have not been reclassified or segregated in the consolidated balance sheet or consolidated statements of cash flows as the amounts were immaterial.

9) 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.

Effective July 1, 2018, the Company reassigned goodwill to certain reporting units within the Light & Motion reportable segment resulting from a reorganization of the composition of goodwill reporting units. The goodwill was reassigned to the reporting units affected using the relative fair value approach. In conjunction with this goodwill reassignment, the Company performed an interim quantitative impairment test as of July 1, 2018 for all of its reporting units and concluded that the fair values of each reporting unit exceeded their respective carrying values.

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

The changes in the carrying amount of goodwill and accumulated impairment loss during the nine months ended September 30, 2018 and year ended December 31, 2017 were as follows:

	Nine Months Ended September 30, 2018			Twelve Months Ended December 31, 2017		
	Gross Carrying Amount	Accumulated Impairment Loss	Net	Gross Carrying Amount	Accumulated Impairment Loss	Net
Beginning balance at January 1	\$ 735,323	\$ (144,276)	\$ 591,047	\$ 727,999	\$ (139,414)	\$ 588,585
Sale of business ⁽¹⁾	—	—	—	(3,115)	—	(3,115)
Impairment loss ⁽²⁾	—	—	—	—	(4,862)	(4,862)
Foreign currency translation	(3,186)	—	(3,186)	10,439	—	10,439
Ending balance at September 30, 2018 and December 31, 2017	<u>\$ 732,137</u>	<u>\$ (144,276)</u>	<u>\$ 587,861</u>	<u>\$ 735,323</u>	<u>\$ (144,276)</u>	<u>\$ 591,047</u>

(1) In 2017, the Company sold its Data Analytics Solutions business and, as a result, charged the related goodwill of \$(3,115) to the gain on sale of business.

(2) In 2017, the Company recorded an impairment loss of \$(4,862) related to the write-off of goodwill related to the discontinuation of a product line and consolidation of two manufacturing plants.

Intangible Assets

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

	Gross	Impairment Charges ⁽¹⁾	Accumulated Amortization	Foreign Currency Translation	
				Net	Net
<u>As of September 30, 2018:</u>					
Completed technology	\$ 172,431	\$ (105)	\$ (131,840)	\$ —	\$ 40,486
Customer relationships	282,744	(1,406)	(59,260)	174	222,252
Patents, trademarks, trade names and other	110,523	—	(41,970)	(3)	68,550
	<u>\$ 565,698</u>	<u>\$ (1,511)</u>	<u>\$ (233,070)</u>	<u>\$ 171</u>	<u>\$ 331,288</u>
<u>As of December 31, 2017:</u>					
Completed technology	\$ 172,431	\$ (105)	\$ (115,371)	\$ 333	\$ 57,288
Customer relationships	282,744	(1,406)	(45,518)	1,571	237,391
Patents, trademarks, trade names and other	110,523	—	(38,730)	(74)	71,719
	<u>\$ 565,698</u>	<u>\$ (1,511)</u>	<u>\$ (199,619)</u>	<u>\$ 1,830</u>	<u>\$ 366,398</u>

(1) In 2017, the Company recorded impairment charges of \$1,511 related to the write-off of intangible assets as a result of the discontinuation of a product line and consolidation of two manufacturing plants.

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

Aggregate amortization expense related to acquired intangibles for the nine months ended September 30, 2018 and 2017 was \$32,786 and \$34,946, respectively. The amortization expense for the nine months ended September 30, 2018 and 2017 is net of \$665 and \$588, respectively, of amortization income from unfavorable lease commitments. Aggregate net amortization expense related to acquired intangible assets and unfavorable lease commitments for future years is as follows:

Year	Amount
2018 (remaining)	\$ 10,760
2019	\$ 40,144
2020	\$ 28,125
2021	\$ 20,248
2022	\$ 17,619
2023	\$ 17,253
Thereafter	\$ 138,955

10) Debt

Term Loan Credit Agreement

In connection with the completion of the Company's acquisition of Newport Corporation ("Newport") in April 2016 (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; 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. The Company has elected the interest rate as described in clause (b). The Credit Agreement provides that all loans will be determined by reference to the Base Rate if the LIBOR rate cannot be ascertained, if regulators impose material restrictions on the authority of a lender to make LIBOR rate loans, or for other reasons. The Term Loan Facility was issued with original issue discount of 1.00% of the principal amount thereof.

On June 9, 2016, the Company entered into Amendment No. 1 (the "Repricing Amendment 1") 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 1 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 1. In connection with the execution of the Repricing Amendment 1, 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 1, the Company prepaid \$50,000 of principal under the Credit Agreement. In September 2016, the Company prepaid an additional \$60,000 under the Credit Agreement.

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 then-outstanding balance of the Credit Agreement. The rate is fixed at 1.198% per annum plus the applicable credit spread, which was 1.75% at September 30, 2018. The notional amount of this transaction was \$290,000 and had a fair value of \$8,539 at September 30, 2018.

On December 14, 2016, the Company entered into Amendment No. 2 (the "Repricing Amendment 2") 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 2 decreased the applicable margin for the Company's term loan under the Credit Agreement to 2.75% for LIBOR borrowings and 1.75% for base rate borrowings and reset the period during which a prepayment premium may be required for a Repricing Transaction until six months after the effective date of the Repricing Amendment 2. In November 2016, prior to the effectiveness of the Repricing Amendment 2, the Company prepaid an additional \$40,000 of principal under the Credit Agreement. In March 2017, the Company prepaid an additional \$50,000 of principal under the Credit Agreement.

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

On July 6, 2017, the Company entered into Amendment No. 3 (the “Repricing Amendment 3”) 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 3 decreased the applicable margin for the Company’s term loan under the Credit Agreement to 2.25% for LIBOR rate loans when the Total Leverage Ratio (as defined in the Credit Agreement) was at or above 1.25:1 and decreased to 2.00% when the Total Leverage Ratio was below 1.25:1, both with a LIBOR floor of 0.75%. The margin for base rate borrowings decreased to 1.25% when the Total Leverage Ratio is at or above 1.25:1 and to 1.00% when the Total Leverage Ratio is below 1.25:1. The period during which a prepayment premium may be required for a Repricing Transaction was reset to six months after the effective date of the Repricing Amendment 3.

On April 11, 2018, the Company entered into Amendment No. 4 (the “Repricing Amendment 4”) 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 4 decreased the applicable margin for the Company’s LIBOR rate term loan under the Credit Agreement to 1.75%, with a LIBOR rate floor of 0.75%. The margin for base rate borrowings decreased to 0.75% with a base rate floor of 1.75%. The period during which a prepayment premium may be required for a Repricing Transaction was reset to six months after the effective date of the Repricing Amendment 4.

In July 2017, August 2017, November 2017 and March 2018, the Company voluntarily prepaid \$50,000, \$75,000, \$50,000 and \$50,000, respectively, of principal under the Credit Agreement. As of September 30, 2018, after total prepayments of \$425,000 and regularly scheduled principal payments of \$6,536, the total outstanding principal balance was \$348,464. The interest rate as of September 30, 2018 was 3.8%.

The Company incurred \$28,747 of deferred finance fees, original issue discount and repricing fees related to the term loans under the Term Loan Facility, which are included in long-term debt in the accompanying consolidated balance sheets and are being amortized to interest expense over the estimated life of the term loans using the effective interest method. A portion of these fees has been accelerated in connection with the various debt prepayments during 2016, 2017 and 2018. As of September 30, 2018, the remaining balance of the deferred finance fees, original issue discount and repricing fee related to the Term Loan Facility was \$5,581.

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 payments each equal to 0.25% of the principal amount of the term loans outstanding, less the amount of certain voluntary and mandatory repayments after such date, with the balance due on the seventh anniversary of the closing date. As a result of making total prepayments of \$425,000 through September 30, 2018 and based on the Company’s Total Leverage Ratio, the Company is no longer required to make any scheduled principal payments until maturity date of the loan.

All obligations under the Term Loan Facility are guaranteed by certain of the Company’s domestic subsidiaries, and are collateralized 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, 2018, the Company was 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 as of September 30, 2018.

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

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 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 are being 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. The total commitment fees recognized in interest expense for the three and nine months ended September 30, 2018 were immaterial. 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, 2018 of up to an equivalent of \$35,623 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. Total borrowings outstanding under these arrangements were \$484 at September 30, 2018. There were no borrowings outstanding under these arrangements at December 31, 2017.

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, 2018 of up to an equivalent of \$10,995 U.S. dollars. These lines of credit have a base interest rate of 1.25% plus a Japanese Yen overnight LIBOR rate. Total borrowings outstanding under these arrangements were \$5,040 and \$2,965 at September 30, 2018 and December 31, 2017.

One of the Company’s Austrian subsidiaries has various 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% to 2.00%.

	<u>September 30, 2018</u>	<u>December 31, 2017</u>
Short-term debt:		
Japanese lines of credit	\$ 5,524	\$ 2,750
Japanese receivables financing facility	—	215
Austrian loans due through March 2020	606	—
Other debt	—	7
	<u>\$ 6,130</u>	<u>\$ 2,972</u>

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

	September 30, 2018	December 31, 2017
Long-term debt:		
Austrian loans due through March 2020 and other debt	\$ 87	\$ 714
Term Loan Facility, net ⁽¹⁾	342,883	389,279
	<u>\$ 342,970</u>	<u>\$ 389,993</u>

⁽¹⁾ Net of deferred financing fees, original issuance discount and repricing fee of \$5,581 and \$9,185 as of September 30, 2018 and December 31, 2017, respectively.

The Company recognized interest expense of \$13,071 and \$23,001 for the nine months ended September 30, 2018 and 2017, respectively.

Contractual maturities of the Company's debt obligations as of September 30, 2018 are as follows:

Year	Amount
2018 (remaining)	\$ 5,524
2019	606
2020	73
2021	14
2022	—
2023	—
Thereafter	\$ 348,464

11) 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.

Product warranty activities were as follows:

	Nine Months Ended September 30,	
	2018	2017
Beginning of period	\$ 10,104	\$ 8,261
Provision for product warranties	11,448	11,941
Direct and other charges to warranty liability	(11,072)	(10,080)
End of period ⁽¹⁾	<u>\$ 10,480</u>	<u>\$ 10,122</u>

⁽¹⁾ Short-term product warranty of \$10,067 and long-term product warranty of \$413 as of September 30, 2018, are included within other current liabilities and other liabilities, respectively, within the accompanying condensed consolidated balance sheet. Short-term product warranty of \$9,725 and long-term product warranty of \$397 as of September 30, 2017, are included within other current liabilities and other liabilities, respectively, within the accompanying condensed consolidated balance sheet.

12) Income Taxes

The Act was enacted on December 22, 2017. The Act reduces the U.S. federal corporate income tax rate from 35% to 21%, requires companies to pay a one-time transition tax on earnings of certain foreign subsidiaries that were previously tax deferred and creates new taxes on certain foreign sourced earnings. The Company is applying SAB 118 when accounting for

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

the enactment effects of the Act. As of September 30, 2018, the Company has not completed the accounting for all of the tax effects of the Act; however, provisional estimates have been recorded.

For the quarter ended September 30, 2018, the Company recognized a tax expense of \$863 from an adjustment of the provisional estimates recorded for the Act and included these adjustments as a component of income tax expense from continuing operations. The calculations will continue to be refined and adjusted as additional analysis is completed. Future adjustments are not expected to be material.

The global intangible low-taxed income ("GILTI") provision from the Act subjects a U.S. shareholder to current tax on GILTI earned by certain foreign subsidiaries. Under FASB Staff Q&A, Topic 740 No. 5, the Company has elected to recognize the resulting tax on GILTI as a period expense in the period the tax is incurred. The Company expects to incur GILTI tax for the year ended December 31, 2018. The estimate for this GILTI tax, net of foreign tax credits, increased the Company's effective tax rate for 2018 by approximately 0.3%.

The Company's effective tax rate for the three and nine months ended September 30, 2018 was 18.5% and 17.6%, respectively. The effective tax rate for the three and nine months ended September 30, 2018, and related income tax expense, was lower than the U.S. statutory tax rate mainly due to the geographic mix of income earned by the Company's international subsidiaries being taxed at rates lower than the U.S. statutory tax rate, windfall tax benefits of stock compensation, and the new deduction for foreign derived intangible income from the Act, offset by state taxes.

The Company's effective tax rate for the three and nine months ended September 30, 2017 was 25.0% and 22.3%, respectively. The effective tax rate for the three and nine months ended September 30, 2017 was lower than the U.S. statutory tax rate of 35.0% mainly due to the impact of lower tax rates on foreign income, and the deductions for domestic production activities and windfall tax benefits of stock compensation.

As of September 30, 2018 and December 31, 2017, the total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately \$32,535 and \$27,345, respectively. As of September 30, 2018, if these benefits were recognized in a future period, the timing of which is not estimable, the net unrecognized tax benefit of \$25,008, 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, 2018 and December 31, 2017, the Company had accrued interest on unrecognized tax benefits of approximately \$11 and \$327, respectively.

Over the next 12 months it is reasonably possible that the Company may recognize approximately \$1,521 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 U.S. Internal Revenue Service commenced an examination of our U.S. federal income tax filings for tax years 2015 and 2016 during the quarter ended September 30, 2017. This audit was effectively settled during the quarter ended March 31, 2018, and the impact was not material. During the quarter ended March 31, 2018, the Company received notification from the U.S. Internal Revenue Service of its intent to audit the Company's U.S. subsidiary, Newport Corporation, for tax year 2015. This audit commenced during the quarter ended June 30, 2018 and there have been no issues identified at this time. The U.S. statute of limitations remains open for tax years 2015 through present. The statute of limitations for the Company's tax filings in other jurisdictions varies between fiscal years 2012 through present. The Company has certain federal credit carry-forwards and state tax loss and credit carry-forwards that are open to examination for tax years 2000 through the present.

13) Pension Plans

As a result of the acquisition of Newport, 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. The net periodic benefit costs were immaterial for both the three and nine month periods ended September 30, 2018 and 2017. The Company's contributions to these plans for both the three and nine month periods ended September 30, 2018 and 2017, as required by local pension accounting laws, were immaterial.

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

14) 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,	
	2018	2017	2018	2017
Numerator:				
Net income	\$ 93,277	\$ 75,994	\$ 321,260	\$ 261,494
Denominator:				
Shares used in net income per common share – basic	54,476,000	54,282,000	54,539,000	54,076,000
Effect of dilutive securities:				
Restricted stock units, stock appreciation rights and shares issued under employee stock purchase plan	478,000	819,000	632,000	944,000
Shares used in net income per common share – diluted	54,954,000	55,101,000	55,171,000	55,020,000
Net income per common share:				
Basic	\$ 1.71	\$ 1.40	\$ 5.89	\$ 4.84
Diluted	\$ 1.70	\$ 1.38	\$ 5.82	\$ 4.75

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

For the three and nine months ended September 30, 2018, there were approximately 159,800 and 68,800 weighted-average restricted stock units, respectively, that would have had an anti-dilutive effect on EPS, and would thus need to be excluded from the computation of diluted weighted-average shares.

For the three and nine months ended September 30, 2017, there were approximately 200 and 2,100 weighted-average restricted stock units, respectively, that would have had an anti-dilutive effect on EPS, and would thus need to be excluded from the computation of diluted weighted-average shares.

15) Stockholders’ Equity

Share 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 will depend upon a variety of factors, including business conditions, stock market conditions and business development activities, including, but not limited to, merger and acquisition opportunities. These repurchases may be commenced, suspended or discontinued at any time without prior notice.

During the nine months ended September 30, 2018, the Company repurchased approximately 818,000 shares of its common stock for \$75,000, or an average price of \$91.67. During the nine months ended September 30, 2017, the Company did not repurchase any shares of common stock. The Company has repurchased approximately 2,588,000 shares of common stock for approximately \$127,000 pursuant to the program since its adoption.

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. The Company’s Board of Directors declared a cash dividend of \$0.18 per share during the first quarter of 2018 and \$0.20 per share during the second and third quarters of 2018, which totaled \$31,608 or \$0.58 per share. The Company’s

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

Board of Directors declared a cash dividend of \$0.175 per share during the first, second and third quarters of 2017, which totaled \$28,403 or \$0.525 per share.

On October 29, 2018, the Company's Board of Directors declared a quarterly cash dividend of \$0.20 per share to be paid on December 7, 2018 to shareholders of record as of November 26, 2018. 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. In addition, under the terms of the Company's senior secured Term Loan Facility and its senior secured asset-based revolving credit facility, the Company may be restricted from paying dividends under certain circumstances.

16) Stock-Based Compensation

The Company grants restricted stock units ("RSUs") to employees and directors under the 2014 Stock Incentive Plan (the "2014 Plan"). The 2014 Plan is administered by the Compensation Committee of the Company's Board of Directors. The 2014 Plan is intended to attract and retain employees and directors, and to provide an incentive for these individuals to assist the Company to achieve long-range performance goals and to enable these individuals to participate in the long-term growth of the Company.

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

- all 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 ("SARs") granted under any Newport equity plan, whether vested or unvested, that were outstanding immediately prior to the effective time of the Newport Merger.

During the nine months ended September 30, 2018, the Company granted 260,341 RSUs with a weighted average grant date fair value of \$112.49. During the nine months ended September 30, 2017, the Company granted 388,137 RSUs with a weighted average grant date fair value of \$67.58. There were no SARs granted during the nine months ended September 30, 2018 or 2017.

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

	<u>Three Months Ended September 30,</u>		<u>Nine Months Ended September 30,</u>	
	2018	2017	2018	2017
Cost of revenues	\$ 170	\$ 1,016	\$ 2,664	\$ 3,133
Research and development expense	708	712	2,249	2,284
Selling, general and administrative expense	4,335	3,117	17,092	14,417
Total pre-tax stock-based compensation expense	<u>\$ 5,213</u>	<u>\$ 4,845</u>	<u>\$ 22,005</u>	<u>\$ 19,834</u>

At September 30, 2018, the total compensation expense related to unvested stock-based awards granted to employees and directors under the 2014 Plan that had not been recognized was \$23,738, net of estimated forfeitures. The future compensation expense for time-based awards is recognized on a straight-line basis and the future compensation expense for performance-based awards is recognized using the accelerated graded vesting method, both of which expense over the requisite service period, net of estimated forfeitures, except for retirement eligible employees, in which case 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.

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

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

	Nine Months Ended September 30, 2018	
	Outstanding RSUs	Weighted Average Grant Date Fair Value
RSUs – beginning of period	943,379	\$ 47.57
Accrued dividend shares	46	\$ 105.26
Granted	260,341	\$ 112.49
Vested	(487,856)	\$ 44.60
Forfeited	(62,021)	\$ 65.37
RSUs – end of period	653,889	\$ 73.95

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

	Nine Months Ended September 30, 2018	
	Outstanding SARs	Weighted Average Grant Date Fair Value
SARs – beginning of period	282,907	\$ 28.62
Exercised	(100,683)	\$ 28.77
Forfeited or expired	(1,950)	\$ 29.00
SARs Outstanding – end of period	180,274	\$ 28.52

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

The Company is a global provider of instruments, subsystems and process control solutions that measure, monitor, deliver, analyze, power and control critical parameters of advanced manufacturing processes to improve process performance and productivity for its customers. The Company’s products are derived from its core competencies in pressure measurement and control, flow measurement and control, gas and vapor delivery, gas composition analysis, residual gas analysis, leak detection, control technology, ozone generation and delivery, power, reactive gas generation, vacuum technology, lasers, photonics, sub-micron positioning, vibration control, and optics. The Company also provides services related to the maintenance and repair of its products, installation services and training. The Company’s primary served markets are manufacturers of capital equipment for semiconductor manufacturing, industrial technologies, life and health sciences, as well as research and defense.

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. The Company’s two reportable segments are: Vacuum & Analysis and Light & Motion.

The Vacuum & Analysis segment provides a broad range of instruments, components and subsystems 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 technology, ozone generation and delivery, RF & DC power, reactive gas generation and vacuum technology.

The Light & Motion segment 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 control, 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.

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

The following are net revenues by reportable segment:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Vacuum & Analysis	\$ 286,038	\$ 308,269	\$ 1,002,710	\$ 896,214
Light & Motion	201,114	177,998	611,857	507,963
	<u>\$ 487,152</u>	<u>\$ 486,267</u>	<u>\$ 1,614,567</u>	<u>\$ 1,404,177</u>

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Gross profit by reportable segment:				
Vacuum & Analysis	\$ 132,835	\$ 141,438	\$ 462,418	\$ 410,228
Light & Motion	99,025	86,557	307,174	242,897
Total gross profit by reportable segment	231,860	227,995	769,592	653,125
Operating expenses:				
Research and development	31,898	32,548	103,259	99,510
Selling, general and administrative	70,822	71,347	229,952	217,546
Acquisition and integration costs	36	2,466	(1,132)	4,698
Restructuring	1,364	10	3,374	2,596
Asset impairment	—	—	—	6,719
Fees and expenses related to repricing of term loan	—	492	378	492
Environmental Costs	—	—	1,000	—
Amortization of intangible assets	10,695	10,977	32,786	34,946
Income from operations	117,045	110,155	399,975	286,618
Gain on sale of business	—	—	—	74,856
Interest and other expense, net	2,529	8,784	10,173	24,846
Income before income taxes	114,516	101,371	389,802	336,628
Provision for income taxes	21,239	25,377	68,542	75,134
Net income	<u>\$ 93,277</u>	<u>\$ 75,994</u>	<u>\$ 321,260</u>	<u>\$ 261,494</u>

The following is capital expenditures by reportable segment for the three and nine months ended September 30, 2018 and 2017:

	Vacuum & Analysis	Light & Motion	Total
Three Months Ended September 30, 2018:			
Capital expenditures	\$ 9,532	\$ 5,535	\$ 15,067
Nine Months Ended September 30, 2018:			
Capital expenditures	\$ 22,701	\$ 14,184	\$ 36,885
Three Months Ended September 30, 2017:			
Capital expenditures	\$ 4,212	\$ 3,906	\$ 8,118
Nine Months Ended September 30, 2017:			
Capital expenditures	\$ 10,114	\$ 7,743	\$ 17,857

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

The following is depreciation and amortization by reportable segment for the three and nine months ended September 30, 2018 and 2017:

	Vacuum & Analysis	Light & Motion	Total
Three Months Ended September 30, 2018:			
Depreciation and amortization	\$ 5,083	\$ 14,446	\$ 19,529
Nine Months Ended September 30, 2018			
Depreciation and amortization	\$ 15,180	\$ 44,726	\$ 59,906
Three Months Ended September 30, 2017:			
Depreciation and amortization	\$ 5,058	\$ 15,071	\$ 20,129
Nine Months Ended September 30, 2017:			
Depreciation and amortization	\$ 15,277	\$ 47,273	\$ 62,550

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

The following are segment assets by reportable segment:

September 30, 2018:	Vacuum & Analysis	Light & Motion	Corporate, Eliminations & Other	Total
Segment assets:				
Accounts receivable	\$ 195,244	\$ 138,599	\$ (15,373)	\$ 318,470
Inventory, net	235,253	163,783	41	399,077
Total segment assets	\$ 430,497	\$ 302,382	\$ (15,332)	\$ 717,547
December 31, 2017:				
Segment assets:				
Accounts receivable	\$ 201,318	\$ 119,934	\$ (20,944)	\$ 300,308
Inventory, net	197,831	141,250	—	339,081
Total segment assets	\$ 399,149	\$ 261,184	\$ (20,944)	\$ 639,389

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

	September 30, 2018	December 31, 2017
Total segment assets	\$ 717,547	\$ 639,389
Cash and cash equivalents, restricted cash and investments	630,030	553,976
Other current assets	75,298	53,543
Property, plant and equipment, net	180,182	171,782
Goodwill and intangible assets, net	919,149	957,445
Other assets	42,390	37,883
Consolidated total assets	\$ 2,564,596	\$ 2,414,018

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

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 tax transfer prices and have been eliminated from consolidated net revenues.

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Net revenues:				
United States	\$ 243,273	\$ 237,592	\$ 801,811	\$ 700,291
Korea	43,468	60,908	164,462	165,613
Japan	38,964	38,411	151,325	113,068
Asia (excluding Korea and Japan)	105,336	94,084	313,913	273,957
Europe	56,111	55,272	183,056	151,248
	<u>\$ 487,152</u>	<u>\$ 486,267</u>	<u>\$ 1,614,567</u>	<u>\$ 1,404,177</u>

	September 30, 2018	December 31, 2017
	Long-lived assets:(1)	
United States	\$ 138,549	\$ 124,689
Europe	26,188	28,820
Asia	49,801	49,645
	<u>\$ 214,538</u>	<u>\$ 203,154</u>

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

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

Reportable segment:	September 30, 2018	December 31, 2017
	Vacuum & Analysis	\$ 197,193
Light & Motion	390,668	393,430
Total goodwill	<u>\$ 587,861</u>	<u>\$ 591,047</u>

Worldwide Product Information

Because the reportable segment information above does not reflect worldwide sales of the Company's products, the Company groups its products into six groups of similar products based upon the similarity of product function. The following table sets forth worldwide net revenue for each group of products:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Analytical and Control Solutions Products	\$ 26,727	\$ 33,068	\$ 91,932	\$ 97,689
Power, Plasma and Reactive Gas Solutions Products	132,469	193,808	487,286	549,999
Vacuum Solutions Products	126,842	81,300	423,492	248,291
Lasers Products	63,999	56,623	209,459	153,866
Optics Products	57,836	52,548	169,415	149,759
Photonics Products	79,279	68,920	232,983	204,573
	<u>\$ 487,152</u>	<u>\$ 486,267</u>	<u>\$ 1,614,567</u>	<u>\$ 1,404,177</u>

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

MKS INSTRUMENTS, INC.
NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(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 below:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Applied Materials, Inc.	12%	12%	13%	13%
LAM Research Corporation	8%	11%	11%	12%

18) Restructuring

The Company recorded restructuring charges of \$1,364 and \$3,374 during the three and nine months ended September 30, 2018. The restructuring charges for the three months ended September 30, 2018, primarily related to severance costs related to a moderate reduction in workforce. The restructuring charges for the nine months ended September 30, 2018 also includes severance costs related to transferring a portion of our shared accounting functions in the United States to a third party as well as the consolidation of certain shared accounting functions in Asia. The Company recorded restructuring charges of \$2,596 during the nine months ended September 30, 2017, which primarily relate to: (i) the discontinuation of a product line resulting in the consolidation of two manufacturing plants related to our Light & Motion segment, (ii) the restructuring of one of our international facilities and (iii) the consolidation of two sales offices.

Restructuring activities were as follows:

	Nine Months Ended September 30,	
	2018	2017
Beginning of period	\$ 3,244	\$ 540
Charged to expense	3,374	2,596
Payments and adjustments	(3,963)	(608)
End of period	\$ 2,655	\$ 2,528

19) Commitments and Contingencies

In March 2016, two putative class actions lawsuit captioned Dixon Chung v. Newport Corp., et al., Case No. A-16-733154-C and Hubert C. Pincon v. Newport Corp., et al., Case No. A-16-734039-B were 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 lawsuits named as defendants the Company, Newport, Merger Sub, and certain then current and former members of Newport's board of directors. Both complaints alleged that Newport 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 statement. The complaints also alleged that the Company, Newport, and Merger Sub aided and abetted the directors' alleged breaches of their fiduciary duties. The complaints sought 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 consolidated the actions.

On October 19, 2016, plaintiffs in the consolidated action 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 putative class of Newport's stockholders for claims related to the Merger Agreement. The amended complaint contained substantially similar allegations related to Newport's former board of directors' alleged breaches of their fiduciary duties to Newport's stockholders. The amended complaint sought monetary damages, including pre- and post-judgment interest. On June 22, 2017, the Court granted Defendants' motion to dismiss and dismissed the amended complaint against all defendants but granted plaintiffs leave to amend.

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

On July 27, 2017, plaintiffs filed a second amended complaint containing substantially similar allegations but naming only Newport's former directors as defendants. On August 8, 2017, the Court dismissed the Company and Newport from the action. The second amended complaint seeks monetary damages, including pre- and post-judgment interest. The Court granted a motion for class certification on September 27, 2018, appointing Mr. Pincon and Locals 302 and 612 of the International Union of Operating Engineers - Employers Construction Industry Retirement Trust as class representatives. On June 11, 2018, plaintiff Dixon Chung was voluntarily dismissed from the litigation. Discovery is ongoing in this action.

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

20) Subsequent Event – Announcement of the Acquisition of Electro Scientific Industries, Inc. (amounts not in thousands)

On October 29, 2018, the Company entered into a definitive merger agreement to acquire Electro Scientific Industries, Inc. ("ESI"), an innovator in laser-based manufacturing solutions for the micro-machining industry. Pursuant to the merger agreement, the Company agreed to pay \$30.00 per share in cash for all of the outstanding shares of ESI, for total cash consideration of approximately \$1 billion. The Company intends to fund the transaction with a combination of available cash on hand and up to \$650 million in committed term loan debt financing. The acquisition is expected to close in the first quarter of 2019, subject to the satisfaction of customary closing conditions, including receipt of required regulatory approvals and approval by ESI's shareholders. The Company's obligations to complete the acquisition are not subject to any financing condition. Also, on October 29, 2018, the Company entered into a commitment letter to provide for a \$100 million asset-based revolving credit facility for working capital purposes to replace the existing \$50 million asset-based revolving credit facility.

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 our Annual Report on Form 10-K for the year ended December 31, 2017 in the section entitled "Risk Factors" as referenced in Part II, Item 1A "Risk Factors" of this Quarterly Report on Form 10-Q.

Overview

We are a global provider of instruments, subsystems and process control solutions that measure, monitor, deliver, analyze, power and control critical parameters of advanced manufacturing processes to improve process performance and productivity. 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 technology, ozone generation and delivery, power, reactive gas generation, vacuum technology, lasers, photonics, sub-micron positioning, vibration control, and optics. We also provide services relating to the maintenance and repair of our products, installation services and training.

Our two reportable segments are the Vacuum & Analysis segment and the Light & Motion segment.

The Vacuum & Analysis segment provides a broad range of instruments, components and subsystems 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 technology, ozone generation and delivery, RF & DC power, reactive gas generation and vacuum technology. The Light & Motion segment provides a broad range of instruments, components and subsystems which are derived from our core competencies in lasers, photonics, sub-micron positioning, vibration control, and optics.

Our primary served markets are manufacturers of capital equipment for semiconductor manufacturing, industrial technologies, life and health sciences, as well as research and defense. We have a diverse base of customers. Approximately 56% and 58% of our net revenues for the nine months ended September 30, 2018 and 2017, respectively, were from sales to semiconductor capital equipment manufacturers and semiconductor device manufacturers.

Approximately 44% and 42% of our net revenues for the nine months ended September 30, 2018 and 2017, respectively, were from other advanced manufacturing applications. These include, but are not limited to, industrial technologies, life and health sciences, and research and defense.

Net revenues from semiconductor capital equipment manufacture and semiconductor device manufacture customers decreased by \$21 million, or 8%, for the three months ended September 30, 2018, compared to the same period in the prior year. This decrease was comprised of a decrease in net semiconductor revenues of \$28 million in the Vacuum & Analysis segment, offset by an increase of \$7 million in the Light & Motion segment. This net decrease was primarily due to volume decreases from our semiconductor customers. Net revenues from semiconductor capital equipment manufacture and semiconductor device manufacture customers increased by \$98 million, or 9%, for the nine months ended September 30, 2018, compared to the same period in the prior year. This increase was comprised of an increase in net semiconductor revenues from the Vacuum & Analysis segment of \$80 million and an increase from the Light & Motion segment of \$18 million. These increases were primarily due to volume increases from our semiconductor customers.

The semiconductor capital equipment industry is experiencing a moderation in capital spending in the near term and, we have seen a similar effect on our semiconductor revenue in the third quarter and expect that to continue into the fourth quarter. The semiconductor capital equipment industry is subject to rapid demand shifts, which are difficult to predict, and we cannot be certain as to the timing or extent of future demand or any future weakness in the semiconductor capital equipment industry.

Net revenues from customers in our advanced markets, which exclude semiconductor capital equipment and semiconductor device product applications, increased by \$22 million, or 11%, for the three months ended September 30, 2018, compared to the same period in the prior year. This increase was comprised of an increase in net revenues from customers in our advanced markets of \$16 million in the Light & Motion segment and \$6 million in the Vacuum & Analysis segment. Net revenues from customers in our advanced markets increased by \$113 million, or 14%, for the nine month period ended September 30, 2018, compared to the same period in the prior year. This increase was comprised of an increase in net revenues from customers in our advanced markets of \$86

million in the Light & Motion segment and \$27 million in the Vacuum & Analysis segment. The increases for the three and nine months ended September 30, 2018 were mainly due to volume increases from customers in the industrial technologies market.

A significant portion of our net revenues is from sales to customers in international markets. For both nine month periods ended September 30, 2018 and 2017, international net revenues accounted for approximately 50% of our total net revenues. A significant portion of our international net revenues was from South Korea, Japan, Germany, China and Israel. We expect that international net revenues will continue to represent a significant percentage of our total net revenues. Long-lived assets located in the United States were \$139 million and \$125 million as of September 30, 2018 and December 31, 2017, respectively, excluding goodwill and intangibles, and long-term tax-related accounts. Long-lived assets located outside of the United States were \$76 million and \$78 million as of September 30, 2018 and December 31, 2017, respectively, excluding goodwill and intangibles, and long-term tax-related accounts.

Recent Events

On October 29, 2018, we entered into a definitive merger agreement to acquire Electro Scientific Industries, Inc. (“ESI”), an innovator in laser-based manufacturing solutions for the micro-machining industry. Pursuant to the merger agreement, we agreed to pay \$30.00 per share in cash for all of the outstanding shares of ESI, for total cash consideration of approximately \$1 billion. We intend to fund the transaction with a combination of available cash on hand and up to \$650 million in committed term loan debt financing. The acquisition is expected to close in the first quarter of 2019, subject to the satisfaction of customary closing conditions, including receipt of required regulatory approvals and approval by ESI’s shareholders. Our obligations to complete the acquisition are not subject to any financing condition. Also, on October 29, 2018, we entered into a commitment letter to provide for a \$100 million asset-based revolving credit facility for working capital purposes to replace our existing \$50 million asset-based revolving credit facility.

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 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, 2017, other than the adoption of ASC 606 as outlined below.

We adopted ASC 606 on January 1, 2018 using the modified retrospective method for all contracts not completed as of the date of adoption. The reported results for the nine months ended September 30, 2018 reflect the application of ASC 606 guidance while the reported results for 2017 were prepared under the guidance of Accounting Standards Codification 605, Revenue Recognition.

We have recorded a net increase to opening retained earnings of \$1.8 million as of January 1, 2018 due to the cumulative impact of adopting ASC 606, with the impact primarily related to our service business and certain custom products. The impact to revenue for the quarter ended September 30, 2018 as a result of applying ASC 606 was immaterial.

The adoption of ASC 606 represents a change in accounting principle that will more closely align revenue recognition with the delivery of our goods or services and will provide financial statement readers with enhanced disclosures. To achieve this core principle, we apply the following five steps:

- *Identify the contract with a customer*
- *Identify the performance obligations in the contract*
- *Determine the transaction price*
- *Allocate the transaction price to performance obligations in the contract*
- *Recognize revenue when or as we satisfy a performance obligation*

Revenue under ASC 606 is recognized when or as obligations under the terms of a contract with our customer has been satisfied and control has transferred to the customer. The majority of our performance obligations, and associated revenue, are transferred to customers at a point in time, generally upon shipment of a product to the customer or receipt of the product by the customer and without significant judgments. Installation services are not significant and are usually completed in a short period of time (normally less than two weeks) and therefore, recorded at a point in time when the installation services are completed, rather than over time as they are not material. Extended warranty, service contracts, and repair services, which are transferred to the customer over time, are recorded as revenue as the services are performed. For repair services, we make an accrual at quarter end based upon historical repair times within our product groups to record revenue based upon the estimated number of days completed to date, which is consistent

with ratable recognition. Customized products with no alternative future use to us, and that have an enforceable right to payment for performance completed to date, are also recorded over time. We consider this to be a faithful depiction of the transfer to the customer of revenue over time as the work performed daily is primarily ratable over time.

Revenue is measured as the amount of consideration we expect to receive in exchange for transferring goods or providing services. Performance obligations promised in a contract are identified based on the product or service that will be transferred to the customer that are both capable of being distinct, whereby the customer can benefit from the product or service either on its own or together with other resources that are readily available from third parties or from us, and are distinct in the context of the contract, whereby the transfer of the product or service is separately identifiable from other promises in the contract. Sales, value add, and other taxes we collect concurrent with revenue-producing activities are excluded from revenue. Our normal payment terms are 30 to 60 days but vary by the type and location of our customers and the products or services offered. The time between invoicing and when payment is due is not significant. For certain products and services and customer types, we require payment before the products or services are delivered to, or performed for, the customer. None of our contracts as of September 30, 2018 contain a significant financing component. Contract assets as of January 1 and September 30, 2018 were \$3.1 million and \$4.0 million, respectively, and included in other current assets.

Contracts with Multiple Performance Obligations

We periodically enter into contracts with our customers in which a customer may purchase a combination of goods and or services, such as products with installation services or extended warranty obligations. These contracts include multiple promises that we evaluate to determine if the promises are separate performance obligations. Once we determine the performance obligations, we then determine the transaction price, which includes estimating the amount of variable consideration to be included in the transaction price, if any. To the extent the transaction price includes variable consideration, we estimate the amount of variable consideration that should be included in the transaction price utilizing either the expected value method or the most likely amount method depending on the method we expect to better predict the amount of consideration to which it will be entitled. There are no constraints on the variable consideration recorded. We then allocate the transaction price to each performance obligation in the contract based on a relative stand-alone selling price charged separately to customers or using an expected cost plus margin method. The corresponding revenues are recognized when or as the related performance obligations are satisfied, which are noted above. Impacts of variable consideration were immaterial during the period.

Deferred Revenues

Our standard assurance warranty period is normally 12 to 24 months. We sell separately-priced service contracts and extended warranty contracts related to certain of our products, especially our laser products. The separately priced contracts generally range from 12 to 60 months. We normally receive payment at the inception of the contract and recognize revenue over the term of the agreement in proportion to the costs expected to be incurred in satisfying the obligations under the contract. We have elected to use the practical expedient related to disclosing the remaining performance obligations as of September 30, 2018, as the majority have a duration of less than one year.

Costs to Obtain and Fulfill a Contract

Under ASC 606, we expense sales commissions when incurred because the amortization period would have been one year or less. These costs are recorded within selling, general and administration expenses. We have elected to recognize the costs for freight and shipping when control over products has transferred to the customer as an expense in cost of sales.

We monitor and track the amount of product returns and reduce revenue at the time of shipment for the estimated amount of future returns, based on historical experience. We make estimates evaluating our allowance for doubtful accounts. We continuously monitor collections and payments from our customers and maintain a provision for estimated credit losses based upon our historical experience and any specific customer collection issues that we have identified.

For further information about our critical accounting policies, including our revenue recognition policy, please see the discussion of critical accounting policies in our Annual Report on Form 10-K for the year ended December 31, 2017 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,	
	2018	2017	2018	2017
Net revenues:				
Product	87.5%	88.2%	88.7%	88.5%
Services	12.5	11.8	11.3	11.5
Total net revenues	100.0	100.0	100.0	100.0
Cost of revenues:				
Cost of product revenues	45.0	46.6	46.3	47.2
Cost of service revenues	7.4	6.5	6.0	6.3
Total cost of revenues (exclusive of amortization shown separately below)	52.4	53.1	52.3	53.5
Gross profit	47.6	46.9	47.7	46.5
Research and development	6.5	6.7	6.4	7.1
Selling, general and administrative	14.5	14.8	14.2	15.5
Acquisition and integration costs	—	0.5	(0.1)	0.3
Restructuring	0.3	—	0.2	0.2
Environmental costs	—	—	0.1	—
Asset impairment	—	—	—	0.5
Amortization of intangible assets	2.2	2.3	2.0	2.5
Income from operations	24.1	22.6	24.9	20.4
Interest income	0.3	0.2	0.2	0.2
Interest expense	0.8	1.5	0.8	1.6
Gain on sale of business	—	—	—	5.3
Other expense, net	0.1	0.5	0.1	0.3
Income from operations before income taxes	23.5	20.8	24.2	24.0
Provision for income taxes	4.4	5.2	4.3	5.4
Net income	19.1%	15.6%	19.9%	18.6%

Net Revenues

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
<i>(dollars in millions)</i>				
Product	\$ 426.3	\$ 428.9	\$ 1,432.9	\$ 1,243.2
Service	60.9	57.4	181.7	161.0
Total net revenues	\$ 487.2	\$ 486.3	\$ 1,614.6	\$ 1,404.2

Product revenues decreased \$2.6 million during the three months ended September 30, 2018, compared to the same period in the prior year, due to a decrease in net product revenues from our semiconductor customers of \$24.2 million, offset by an increase in net product revenues from customers in our other advanced markets of \$21.6 million, primarily from our industrial technologies market. Product revenues increased \$189.7 million during the nine months ended September 30, 2018, due to increases in net product revenues from customers in our other advanced markets of \$110.0 million, primarily from our industrial technologies market, and an increase in net product revenues from our semiconductor customers of \$79.7 million, primarily due to volume increases.

Service revenues consisted mainly of fees for services related to the maintenance and repair of our products, sales of spare parts, and installation and training. In 2018, we started to record the sales of spare parts in our service revenue and related cost of sales line items rather than in our product revenue and related cost of sales line items. As a result, for the three and nine months ended September 30, 2017, we reclassified \$5.8 million and \$16.4 million, respectively, of product revenue for spare parts from product to service revenue. Service revenues increased \$3.5 million and \$20.7 million during the three and nine months ended September 30, 2018, respectively, compared to the same periods in the prior year. These increases were primarily attributed to increases in net service revenues from our semiconductor customers of \$3.0 million and \$18.0 million for the three and nine month periods ended

September 30, 2018, respectively. The remainder of the changes were attributed to net service revenues from customers in our advanced markets of \$0.5 million and \$2.7 million for the three and nine months ended September 30, 2018, respectively, primarily from our research and defense and industrial technologies markets.

Total international net revenues, including product and service, were \$243.9 million and \$812.8 million for the three and nine months ended September 30, 2018, respectively, compared to \$248.7 million and \$703.9 million for the three and nine months ended September 30, 2017, respectively. The decreases of \$4.8 million for the three months ended September 30, 2018 were primarily due to decreases in net revenues in Korea. The increase of \$108.9 million in total international net revenues for the nine months ended September 30, 2018, compared to the same period in the prior year, were due to increases in net revenues in Japan, Germany, and China.

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

<i>(dollars in millions)</i>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Net revenues:				
Vacuum & Analysis	\$ 286.1	\$ 308.3	\$ 1,002.7	\$ 896.2
Light & Motion	201.1	178.0	611.9	508.0
Total net revenues	\$ 487.2	\$ 486.3	\$ 1,614.6	\$ 1,404.2

Net revenues from our Vacuum & Analysis segment decreased \$22.2 million for the three months ended September 30, 2018, compared to the same period in the prior year due to decreases in net revenues from semiconductor customers of \$28.3 million, offset by an increase in net revenues from customers in our advanced markets of \$6.1 million, primarily due to an increase in our industrial technologies market. Net revenues from our Vacuum & Analysis segment increased \$106.5 million for the nine months ended September 30, 2018, compared to the same period in the prior year due to increases in net revenues from semiconductor customers of \$79.4 million and an increase in revenues from customers in our advanced markets of \$27.1 million, primarily due to an increase in our industrial technologies market.

Net revenues from our Light & Motion segment increased \$23.1 million and \$103.9 million for the three and nine months ended September 30, 2018, respectively, compared to the same periods in the prior year. The increases were attributed to increases in net revenues from customers in our other advanced markets of \$16.0 million and \$85.6 million for the three and nine months ended September 30, 2018, respectively, primarily due to increases in our industrial technologies market. The remainder of the increases were attributed to increases in net revenues from semiconductor customers of \$7.1 million and \$18.3 million for the three and nine months ended September 30, 2018, respectively.

Gross Profit

	Three Months Ended September 30,			Nine Months Ended September 30,		
	2018	2017	% Points Change	2018	2017	% Points Change
Gross profit as a percentage of net revenues:						
Product	48.5%	47.2%	1.3%	47.8%	46.7%	1.1%
Service	40.9	44.5	(3.6)	46.3	45.3	1.0
Total gross profit	47.6%	46.9%	0.7%	47.7%	46.5%	1.2%

Gross profit as a percentage of net product revenues increased by 1.3 percentage points for the three months ended September 30, 2018, compared to the same period in the prior year, primarily due to favorable product mix. Gross profit as a percentage of net product revenues increased by 1.1 percentage points for the nine months ended September 30, 2018, compared to the same period in the prior year, primarily due to higher revenue volumes.

Gross profit as a percentage of net service revenues decreased by 3.6 percentage points for the three months ended September 30, 2018, compared to the same period in the prior year, primarily due to higher material costs from unfavorable product mix, partially offset by lower overhead costs. Gross profit as a percentage of net service revenues increased 1.0 percentage points for the nine months ended September 30, 2018, compared to the same period in the prior year, primarily due to lower overhead costs, partially offset by unfavorable product mix.

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

	Three Months Ended September 30,			Nine Months Ended September 30,		
	2018	2017	% Points Change	2018	2017	% Points Change
Gross profit as a percentage of net revenues:						
Vacuum & Analysis	46.4%	45.9%	0.5%	46.1%	45.8%	0.3%
Light & Motion	49.2	48.6	0.6	50.2	47.8	2.4
Total gross profit	47.6%	46.9%	0.7%	47.7%	46.5%	1.2%

Gross profit for our Vacuum & Analysis segment increased by 0.5 percentage points for the three months ended September 30, 2018, compared to the same period in the prior year, primarily due to lower variable compensation costs and favorable changes in foreign exchange rates, partially offset by higher material costs. Gross profit for our Vacuum & Analysis segment increased by 0.3 percentage points for the nine months ended September 30, 2018 compared to the same period in the prior year, primarily due to higher revenue volumes and lower overhead costs, partially offset by unfavorable product mix.

Gross profit for our Light & Motion segment increased by 0.6 percentage points for the three months ended September 30, 2018, compared to the same period in the prior year, primarily due to higher revenue volumes and favorable product mix, partially offset by higher material costs. Gross profit for our Light & Motion segment increased by 2.4 percentage points for the nine months ended September 30, 2018, compared to the same period in the prior year, primarily due to higher revenue volumes and favorable product mix, partially offset by higher material costs.

Research and Development

<i>(dollars in millions)</i>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Research and development expenses	\$ 31.9	\$ 32.5	\$ 103.3	\$ 99.5

Research and development expenses decreased \$0.6 million for the three months ended September 30, 2018, compared to the same period in the prior year, primarily due to a decrease of project materials.

Research and development expenses increased \$3.8 million for the nine months ended September 30, 2018, compared to the same period in the prior year, primarily due to an increase of \$3.0 million in compensation costs and benefits.

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.

We believe that the continued investment in research and development and ongoing development of new products are essential to the expansion of our markets. We expect to continue to make significant investment in research and development activities. We are subject to risks from products not being developed in a timely manner, as well as from 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>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Selling, general and administrative expenses	\$ 70.8	\$ 71.3	\$ 230.0	\$ 217.5

Selling, general and administrative expenses decreased by \$0.5 million for the three months ended September 30, 2018, compared to the same period in the prior year, primarily due to a decrease of \$2.7 million of compensation costs and related benefits and \$0.8 million of commissions expense, partially offset by an increase of \$2.2 million of consulting and professional fees and \$0.4 million in information technology related expenses.

Selling, general and administrative expenses increased by \$12.5 million for the nine months ended September 30, 2018, compared to the same period in the prior year, primarily due to an increase of \$8.4 million of compensation costs and related benefits, and \$4.0 million of consulting and professional fees.

Acquisition and Integration Costs

<i>(dollars in millions)</i>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Acquisition and integration costs	\$ —	\$ 2.5	\$ (1.1)	\$ 4.7

We recorded acquisition and integration costs related to the Company's acquisition of Newport Corporation in April 2016 (the "Newport Merger") during the three and nine months ended September 30, 2017. During the nine months ended September 30, 2018, we reversed a portion of these costs related to severance agreement provisions that were not met.

Restructuring

<i>(dollars in millions)</i>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Restructuring	\$ 1.4	\$ —	\$ 3.4	\$ 2.6

We recorded restructuring costs during the three and nine months ended September 30, 2018, which were primarily comprised of severance costs related to a moderate reduction in workforce during the third quarter of 2018 and transferring a portion of our shared accounting functions in the United States to a third party as well as the consolidation of certain shared accounting functions in Asia. We recorded restructuring costs during the nine months ended September 30, 2017 related to the discontinuation of a product line resulting in the consolidation of two manufacturing plants, the restructuring of one of our international facilities and the consolidation of sales offices.

Environmental Costs

<i>(dollars in millions)</i>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Environmental costs	\$ —	\$ —	\$ 1.0	\$ —

We recorded \$1.0 million of environmental costs during the first quarter of 2018 related to a U.S. Environmental Protection Agency-designated Superfund site acquired as part of the Newport Merger.

Asset Impairment

<i>(dollars in millions)</i>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Asset impairment	\$ —	\$ —	\$ —	\$ 6.7

We recorded \$6.7 million of asset impairment charges for the nine months ended September 30, 2017 due to the consolidation of two manufacturing plants. These charges primarily related to the write-off of certain goodwill and intangible assets.

Fees and Expenses Related to Repricing of Term Loan

<i>(dollars in millions)</i>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Fees and expenses related to repricing of term loan	\$ —	\$ 0.5	\$ 0.4	\$ 0.5

We recorded fees and expenses related to the third and fourth repricing, respectively, of our Term Loan Facility (as defined below under “Liquidity and Capital Resources – Term Loan Credit Agreement.”

Amortization of Intangible Assets

<i>(dollars in millions)</i>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Amortization of intangible assets	\$ 10.7	\$ 11.0	\$ 32.8	\$ 34.9

Amortization of intangible assets decreased by \$0.3 million and \$2.1 million during the three and nine months ended September 30, 2018, respectively, compared to the same periods in the prior year, due to certain intangible assets becoming fully amortized.

Interest Expense, Net

<i>(dollars in millions)</i>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Interest expense, net	\$ 2.2	\$ 6.3	\$ 9.0	\$ 21.1

Interest expense, net, decreased by \$4.1 million and \$12.1 million for the three and nine months ended September 30, 2018, respectively. The decreases for the three and nine month periods ended September 30, 2018 were due primarily to principal prepayments of \$275.0 million since the beginning of 2017, and repricings of, our Term Loan Facility.

Gain on Sale of Business

<i>(dollars in millions)</i>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Gain on sale of business	\$ —	\$ —	\$ —	\$ 74.9

We recorded a \$74.9 million gain for the nine months ended September 30, 2017 on the sale of our Data Analytics Solutions business during the second quarter of 2017.

Other Expense, Net

<i>(dollars in millions)</i>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Other expense, net	\$ 0.3	\$ 2.5	\$ 1.2	\$ 3.7

The changes in other expense, net for the three and nine months ended September 30, 2018 and 2017, respectively, primarily related to changes in foreign exchange rates.

Provision for Income Taxes

<i>(dollars in millions)</i>	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Provision for income taxes	\$ 21.2	\$ 25.4	\$ 68.5	\$ 75.1

Our effective tax rate for the three and nine months ended September 30, 2018 was 18.5% and 17.6%, respectively. The effective tax rate in 2018 and related income tax expense, was impacted by the Tax Cuts and Jobs Act (“the Act”), which was enacted into law on December 22, 2017. We account for income tax effects resulting from changes in tax laws in accordance with the authoritative guidance, which requires that these tax effects be recognized in the period in which the law is enacted and that the effects are recorded as a component of provision for income taxes from continuing operations. As a result, we recorded provisional amounts as of December 31, 2017 related to the one-time transition tax and the change in U.S. net deferred tax liabilities resulting from the change in the U.S. statutory rate resulting from the enactment of the Act in accordance with Staff Accounting Bulletin 118 (“SAB 118”). The provisional amounts recorded for the Act were adjusted in the quarter ended September 30, 2018 and resulted in an increase to our tax expense of approximately \$0.9 million. We expect these provisional amounts to be finalized during the fourth quarter of 2018. The effective tax rate for the period ending September 30, 2018 was lower than the U.S. statutory rate due to foreign earnings taxed at lower rates, windfall tax benefits of stock compensation and the new deduction for foreign derived intangible income from the Act, offset by state taxes.

Our effective tax rate for the three and nine months ended September 30, 2017 was 25.0% and 22.3%, respectively. The effective tax rate for the three and nine months ended September 30, 2017 was lower than the U.S. statutory tax rate mainly due to the impact of lower tax rates on foreign income and the deductions for domestic production activities and windfall tax benefits of stock compensation.

At September 30, 2018, the total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately \$32.5 million. At December 31, 2017, the total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately \$27.3 million. The net increase from December 31, 2017 was primarily attributable to uncertain tax positions and the addition of income tax reserves related to the one-time transition tax from the Act. At September 30, 2018, excluding interest and penalties, there were approximately \$25.0 million of net unrecognized tax benefits that, if recognized, would impact our annual effective tax rate. We accrue interest 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, 2018 and December 31, 2017, we had accrued interest on unrecognized tax benefits of approximately \$0.5 million and \$0.3 million, respectively.

Over the next 12 months it is reasonably possible that we may recognize approximately \$1.5 million of previously net unrecognized tax benefits, excluding interest and penalties, related to federal, state and foreign tax positions as a result of the expiration of statutes of limitation. The U.S. statute of limitations remains open for tax years 2015 through present. The statute of limitations for our tax filings in other jurisdictions varies between fiscal years 2012 through the present. We also have certain federal credit carry-forwards and state tax loss and credit carry-forwards that are open to examination for tax years 2000 through the present.

We are subject to examination by U.S. federal, state and foreign tax authorities. The U.S. Internal Revenue Service commenced an examination of our U.S. federal income tax filings for tax years 2015 and 2016 during the quarter ended September 30, 2017. This audit was effectively settled during the quarter ended March 31, 2018. During the quarter ended March 31, 2018 we received notification from the U.S. Internal Revenue Service of their intent to audit our U.S. subsidiary, Newport Corporation, for tax year 2015. This audit commenced during the quarter ended June 30, 2018 and there have been no issues identified at this time.

On a quarterly basis, we evaluate both positive and negative evidence that affects the realizability of net deferred tax assets and assess the need for a valuation allowance. The future benefit to be derived from our deferred tax assets is dependent upon our ability to generate sufficient future taxable income in each jurisdiction of the right type to realize the assets.

Our future effective tax rate depends on various factors, including further interpretations and guidance from U.S. federal and state governments on the impact of the enactment of the Act, the adoption of the proposed regulations issued by the U.S. Internal Revenue Service on the one-time transition tax and the global intangible low-taxed income provision, as well as the geographic composition of our pre-tax income, and changes in income 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. The effective tax rate in 2018 could be affected by adjustments to the provisional amounts recorded under the guidance of SAB 118 for the one-time transition tax and the revaluation of deferred tax assets and liabilities due to the U.S. statutory rate change in 2017. 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. 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, restricted cash and short-term marketable investments totaled \$619.6 million at September 30, 2018, compared to \$543.3 million at December 31, 2017.

Net cash provided by operating activities was \$278.3 million for the nine months ended September 30, 2018 and resulted from net income of \$321.3 million, which included non-cash charges of \$99.1 million, offset by a net increase in working capital of \$142.1 million. The net increase in working capital was due to an increase in inventories of \$80.4 million, an increase in accounts receivable of \$23.1 million and an increase in other current and non-current assets of \$17.7 million, related to an increase in business activities, a decrease in accrued compensation of \$15.5 million, a decrease in income taxes of \$13.9 million and a decrease in accounts payable \$0.4 million. These increases in working capital were offset by an increase in other current and non-current liabilities of \$8.9 million.

Net cash provided by operating activities was \$274.4 million for the nine months ended September 30, 2017 and resulted from net income of \$261.5 million, which included non-cash charges of \$44.1 million, offset by a net increase in working capital of \$31.2 million. The net increase in working capital was due to an increase in inventories of \$51.3 million and an increase in accounts receivable of \$26.5 million, related to an increase in business activities, and an increase in other current and non-current assets of \$9.7 million. These increases in working capital were offset by an increase in other current and non-current liabilities of \$22.5 million, an increase in accrued income taxes of \$15.6 million, accrued compensation of \$11.1 million and accounts payable of \$7.1 million.

Net cash used in investing activities was \$47.4 million for the nine months ended September 30, 2018, due to the purchases of production-related equipment of \$36.9 million and net purchases of short-term investments of \$10.5 million. Net cash provided by investing activities was \$16.0 million for the nine months ended September 30, 2017 due to proceeds received from the sale of our Data Analytics Solutions business of \$72.5 million, offset by net sales and maturities of short-term investments of \$38.7 million and purchases of production-related equipment of \$17.8 million.

Net cash used in financing activities was \$167.5 million for the nine months ended September 30, 2018, and resulted from the repurchase of common stock of \$75.0 million, partial repayment of our Term Loan Facility of \$50.0 million, dividend payments made to common stockholders of \$31.6 million and net payments related to tax payments for employee stock awards of \$13.6 million, partially offset by net borrowings relating to our lines of credit of \$2.7 million. Net cash used in financing activities was \$221.4 million for the nine months ended September 30, 2017 and resulted primarily from partial repayment of the Term Loan Facility of \$178.1 million, dividend payments made to common stockholders of \$28.4 million and net payments related to tax payments for employee stock awards of \$14.7 million.

On July 25, 2011, our Board of Directors approved a share repurchase program for the repurchase of up to an aggregate of \$200 million of our 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. During the nine months ended September 30, 2018, we repurchased approximately 818,000 shares of our common stock for \$75 million, or an average price of \$91.67. During the nine months ended September 30, 2017, we did not repurchase any shares of common stock. We have repurchased approximately 2,588,000 shares of common stock for approximately \$127 million pursuant to the program since its adoption.

Holders of our common stock are entitled to receive dividends when and if they are declared by our Board of Directors. Our Board of Directors declared a cash dividend of \$0.18 per share during the first quarter of 2018 and \$0.20 per share during the second and third quarters of 2018, which totaled \$31.6 million, or \$0.58 per share. Our Board of Directors declared a cash dividend of \$0.175 per share during the first, second and third quarters of 2017, which totaled \$28.4 million, or \$0.53 per share.

On October 29, 2018, our Board of Directors declared a quarterly cash dividend of \$0.20 per share to be paid on December 7, 2018 to shareholders of record as of November 26, 2018. 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.

Sale of Data Analytics Solutions Business

In April 2017, we completed the sale of our Data Analytics Solutions business for total proceeds of \$72.5 million, net of cash sold and recorded a pre-tax gain of \$74.9 million.

Term Loan Credit Agreement

In connection with the completion of the Newport Merger, we 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 \$780.0 million, subject to increase at our 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; 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. We have elected the interest rate as described in clause (b). The Credit Agreement provides that all loans will be determined by reference to the Base Rate if the LIBOR rate cannot be ascertained, if regulators impose material restrictions on the authority of a lender to make LIBOR rate loans, and for other reasons. The Term Loan Facility was issued with original issue discount of 1.00% of the principal amount thereof.

In June 2016, we entered into Amendment No. 1 (the "Repricing Amendment 1") 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 1 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 1. In connection with the execution of the Repricing Amendment 1, 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 1, we prepaid \$50.0 million of principal under the Credit Agreement. In September 2016, we prepaid an additional \$60.0 million under the Credit Agreement.

In September 2016, we entered into an interest rate swap agreement, which has a maturity date of September 30, 2020, to fix the rate on \$335.0 million of the then-outstanding balance under the Credit Agreement. The rate is fixed at 1.198% per annum plus the applicable credit spread, which was 1.75% at September 30, 2018. At September 30, 2018, the notional amount of the interest rate swap agreement was \$290.0 million.

In December 2016, we entered into Amendment No. 2 (the "Repricing Amendment 2") 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 2 decreased the applicable margin for our term loan under the Credit Agreement to 2.75% for LIBOR borrowings and 1.75% for base rate borrowings and reset the period during which a prepayment premium may be required for a Repricing Transaction until six months after the effective date of the Repricing Amendment 2. In November 2016, prior to the effectiveness of the Repricing Amendment 2, we prepaid an additional \$40.0 million of principal under the Credit Agreement. In March 2017, we prepaid an additional \$50.0 million of principal under the Credit Agreement.

In July 2017, we entered into Amendment No. 3 (the "Repricing Amendment 3") to our 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 3 decreased the applicable margin for our term loan under the Credit Agreement to 2.25% for LIBOR rate loans when the Total Leverage Ratio (as defined in the Credit Agreement) is at or above 1.25:1 and decreased to 2.00% when the Total Leverage Ratio was below 1.25:1, both with a LIBOR floor of 0.75%. The margin for base rate borrowings decreased to 1.25% when our Total Leverage Ratio was at or above 1.25:1 and will decrease to 1.00% when the Total Leverage Ratio is below 1.25:1. The period in which a prepayment premium may be required for a Repricing Transaction was reset to six months after the effective date of the Repricing Amendment 3.

In April 2018, we entered into Amendment No. 4 (the "Repricing Amendment 4") 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 4 decreased the applicable margin for our term loan under the Credit Agreement to 1.75% for LIBOR rate loans, with a LIBOR rate floor of 0.75%. The margin for base rate borrowings decreased to 0.75% with a base rate floor of 1.75%. The period during which a prepayment premium may be required for a Repricing Transaction was reset to six months after the effective date of the Repricing Amendment 4.

In July 2017, August 2017, November 2017 and March 2018 we voluntarily prepaid \$50.0 million, \$75.0 million, \$50.0 million and \$50.0 million, respectively, of principal under the Credit Agreement. As of September 30, 2018, after total principal prepayments of \$425.0 million and regularly scheduled principal payments of \$6.5 million, the total outstanding principal balance was \$348.5 million. The interest rate as of September 30, 2018 was 3.8%.

We incurred \$28.7 million of deferred finance fees, original issue discount and repricing fees related to the term loans under the Term Loan Facility, which are included in long-term debt in the accompanying consolidated balance sheets and are being amortized to interest expense over the estimated life of the term loans using the effective interest method. A portion of these fees have been accelerated in connection with the various debt prepayments during 2016, 2017 and 2018. As of September 30, 2018, the remaining balance of the deferred finance fees, original issue discount and repricing fees related to the Term Loan Facility was \$5.6 million.

Under the Credit Agreement, we are required to prepay outstanding term loans, subject to certain exceptions, with portions of our 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 principal amount of the term loan, less the amount of certain voluntary and mandatory repayments after such date, with the balance due on the seventh anniversary of the closing date. As a result of making total prepayments of \$425.0 million through September 30, 2018 and based on our Total Leverage Ratio, we are no longer required to make any scheduled quarterly principal payments until maturity of the loan.

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.

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, 2018, we were 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, 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 \$50.0 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 (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 \$15.0 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.

We have incurred \$1.2 million of costs in connection with the ABL Facility, which were capitalized and included in other assets in the accompanying consolidated balance sheets and are being 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, we are required to pay a commitment fee in respect of the unutilized commitments thereunder. The initial commitment fee is 0.375% per annum. The total commitment fees recognized in interest expense for both the three and nine months ended September 30, 2018 were immaterial. 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 provide for aggregate borrowings as of September 30, 2018, of up to an equivalent of \$35.6 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. Total borrowings outstanding under these arrangements were \$0.5 million at September 30, 2018. There were no borrowings outstanding under these arrangements at December 31, 2017.

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 provide for aggregate borrowings as of September 30, 2018 of up to an equivalent of \$11.0 million U.S. dollars. These lines of credit have a base interest rate of 1.25% plus a Japanese Yen overnight LIBOR rate. Total borrowings outstanding under these arrangements were \$5.0 million and \$3.0 million at September 30, 2018 and December 31, 2017.

One of our Austrian subsidiaries has various 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% to 2.00%.

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, changes in financial condition, revenues or expenses, results of operations, liquidity, capital expenditures or capital resources that are material to investors.

Contractual Obligations

Since inception of the Credit Agreement, we have made total prepayments of \$425.0 million and regularly scheduled principal payments of \$6.5 million. The total outstanding principal balance on our Credit Agreement was \$348.5 million at September 30, 2018. As a result of making total prepayments of \$425.0 million since the inception of the Credit Agreement and based on our Total Leverage Ratio, we are no longer required to make any scheduled principal payments until the maturity date of the loan. There have been no other changes outside the ordinary course of business to our contractual obligations as disclosed in our Annual Report on Form 10-K for the year ended December 31, 2017.

Recently Issued Accounting Pronouncements

In March 2018, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) 2018-05, “Income Taxes (Topic 740).” This standard is an amendment that adopts the language of SAB 118 and aims to address certain circumstances that may arise for registrants in accounting for the income tax effects of the Act and to address any uncertainty or diversity of views in practice regarding the application of Topic 740 in situations where a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting under Topic 740 for certain income tax effects of the Act for the reporting period in which the Act was enacted. The provisions of this ASU were applied to our December 31, 2017 financial statements. We recorded provisional amounts with respect to the Act at December 31, 2017 and September 30, 2018 and need to complete additional analysis and receive additional guidance from the U.S. Internal Revenue Service with respect to provisions of the Act that affect us before the provisional determinations become final. Until we complete our analysis and receive additional guidance, we are not able to determine if the impact of ASU 2018-05 is material to our consolidated financial statements in any period.

In August 2017, the FASB issued ASU 2017-12, “Derivatives and Hedging (Topic 815).” This standard better aligns an entity’s risk management activities and financial reporting for hedging relationships through changes to both the designation and measurement guidance for qualifying hedging relationships and the presentation of hedge results. The provisions of this ASU are effective for annual periods beginning after December 15, 2018, 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 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 have the option to either apply the standard retrospectively through a cumulative-effect adjustment to the opening balance of retained earnings in the period of

adoption or they can apply the new standard to comparative periods presented. This ASU is effective for annual periods beginning after December 15, 2018, including interim periods within those fiscal years. The FASB issued additional updates to the new standard in Topic 842 (Update 2018-01 in January 2018 – Land Easement Practical Expedient for Transition to Topic 842, Update 2018-10 – Codification Improvements to Topic 842 and Update 2018-11 in July 2018 – Targeted Improvements). We have reviewed the requirements of the new standard and have formulated a plan for implementation. We have communicated our approach to our Audit Committee and will provide regular updates as appropriate. We are currently accumulating details on the population of leases and entering these details into a selected software database, which will be a repository and accounting solution for reporting and disclosure requirements required by the standard. We will continue to assess and disclose the impact that this ASU will have on our consolidated financial statements, disclosures and related controls, when known.

ITEM 3. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK.

Information concerning market risk is contained in the section entitled “Quantitative and Qualitative Disclosures About Market Risk” contained in our Annual Report on Form 10-K for the year ended December 31, 2017 filed with the Securities and Exchange Commission on February 28, 2018. As of September 30, 2018, there were no material changes in our exposure to market risk from December 31, 2017.

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, 2018. 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 Securities and Exchange Commission’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, 2018, 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, 2018, 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.

In March 2016, two putative class actions lawsuit captioned *Dixon Chung v. Newport Corp., et al.*, Case No. A-16-733154-C and *Hubert C. Pincon v. Newport Corp., et al.*, Case No. A-16-734039-B were 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 lawsuits named as defendants the Company, Newport, Merger Sub, and certain then current and former members of Newport’s board of directors. Both complaints alleged that Newport 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 statement. The complaints also alleged that the Company, Newport, and Merger Sub aided and abetted the directors’ alleged breaches of their fiduciary duties. The complaints sought 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 consolidated the actions.

On October 19, 2016, plaintiffs in the consolidated action 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 putative class of Newport's stockholders for claims related to the Merger Agreement. The amended complaint contained substantially similar allegations related to Newport's former board of directors' alleged breaches of their fiduciary duties to Newport's stockholders. The amended complaint sought monetary damages, including pre- and post-judgment interest. On June 22, 2017, the Court granted Defendants' motion to dismiss and dismissed the amended complaint against all defendants but granted plaintiffs leave to amend.

On July 27, 2017, plaintiffs filed a second amended complaint containing substantially similar allegations but naming only Newport's former directors as defendants. On August 8, 2017, the Court dismissed the Company and Newport from the action. The second amended complaint seeks monetary damages, including pre- and post-judgment interest. The Court granted a motion for class certification on September 27, 2018, appointing Mr. Pincon and Locals 302 and 612 of the International Union of Operating Engineers - Employers Construction Industry Retirement Trust as class representatives. On June 11, 2018, plaintiff Dixon Chung was voluntarily dismissed from the litigation. Discovery is ongoing in this action.

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

ITEM 1A. RISK FACTORS.

Information regarding risk factors affecting the Company's business are discussed in the Company's Annual Report on Form 10-K for the year ended December 31, 2017 in the section entitled "Risk Factors." There have been no material changes to the risk factors as described in Part I, Item 1A, "Risk Factors," in our Annual Report on Form 10-K for the year ended December 31, 2017 other than the supplemental risk factor added below.

If significant additional tariffs or other trade restrictions are placed on our products made in China and/or the components that we or our suppliers source from China, our business, financial condition and results of operations may be materially harmed.

General trade tensions between the U.S. and China have been escalating in 2018, with one round of U.S. tariffs on Chinese goods taking effect in July 2018, and a second round implemented in September 2018. Although we do not anticipate a material impact on our products made in China from the first and second rounds of U.S. tariffs, a third round of tariffs has been proposed by the U.S. In July 2018, the Trump Administration proposed a new list of thousands of categories of goods, including electronics, that could face tariffs of 10%. The Trump Administration subsequently proposed that the third round tariffs be increased from 10% to 25% in January 2019 if there is no agreement on trade with China. If the proposed new tariff list remains unaltered and these additional tariffs are placed on our products made in China and/or the components that we or our suppliers source from China, or any related counter-measures are taken by China, our business, financial condition and results of operations may be materially harmed. To date, China's retaliatory tariffs have generally focused on other industries. We will explore all of our options to reduce the potential impact of these proposed tariffs on our business, including but not limited to, seeking alternative sources for our components, modifying other business practices, raising our prices, and shifting production outside of China. Additionally, the Trump Administration continues to signal that it may alter trade agreements and terms between China and the United States, including limiting trade with China, and may impose additional tariffs on imports from China. Even if the currently proposed tariffs are not imposed on our products or on the components that we or our suppliers source from China, it is possible further tariffs will be imposed on imports of our products or the components used in our products, or that our business will be impacted by retaliatory trade measures taken by China or other countries in response to existing or future tariffs, causing us to seek alternative suppliers, raise prices or make changes to our operations, any of which could materially harm our business, financial condition and results of operations.

ITEM 2. UNREGISTERED SALES OF EQUITY SECURITIES AND USE OF PROCEEDS

The following table sets forth certain information with respect to repurchases of our common stock during the three months ended September 30, 2018.

ISSUER PURCHASES OF EQUITY SECURITIES

Period	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs ⁽¹⁾⁽²⁾	Approximate Dollar Value of Shares that May Yet Be Purchased Under the Plans or Programs ⁽¹⁾ (in thousands)
July 1 – July 31, 2018	—	\$ —	—	\$ 147,972
August 1 – August 31, 2018	818,131	\$ 91.67	818,131	\$ 72,972
September 1 – September 30, 2018	—	\$ —	—	\$ 72,972
Total	<u>818,131</u>	\$ 91.67	<u>818,131</u>	

- (1) On July 25, 2011, our Board of Directors approved a share repurchase program (the “Program”) for the repurchase of up to an aggregate of \$200 million of our common stock from time to time in open market purchases, privately negotiated transactions or through other appropriate means, which we announced on July 27, 2011. The timing and quantity of any shares repurchased will depend 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.
- (2) We have repurchased approximately 2,588,000 shares of our common stock for approximately \$127 million pursuant to the Program since its adoption.

ITEM 6. EXHIBITS.

<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 of the Registrant, as filed with the Secretary of State of Massachusetts on May 18, 2001
+3.3(3)	Articles of Amendment to Restated Articles of Organization of the Registrant, as filed with the Secretary of State of Massachusetts on May 16, 2002
+3.4(4)	Amended and Restated By-Laws of the Registrant
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 Extension Calculation Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document

+ Previously filed

- (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 (File No. 000-23621), filed with the Securities and Exchange Commission on August 14, 2001.
- (3) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2002 (File No. 000-23621), filed with the Securities and Exchange Commission on August 13, 2002.
- (4) Incorporated by reference to the Registrant's Current Report on Form 8-K (File No. 000-23621), filed with the Securities and Exchange Commission on May 6, 2014.

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.

Date: November 6, 2018

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

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 6, 2018

/s/ Gerald G. Colella

Gerald G. Colella
Chief Executive Officer
(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 6, 2018

/s/ Seth H. Bagshaw

Seth H. Bagshaw

Senior 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, 2018, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Gerald G. Colella, Chief Executive Officer of the Company, and Seth H. Bagshaw, Senior 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 6, 2018

/s/ Gerald G. Colella

Gerald G. Colella

Chief Executive Officer

Dated: November 6, 2018

/s/ Seth H. Bagshaw

Seth H. Bagshaw

Senior Vice President, Chief Financial Officer and Treasurer