

**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 March 31, 2020

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)

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

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

01810
(Zip Code)

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

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

<u>Title of each class</u>	<u>Trading Symbol(s)</u>	<u>Name of each exchange on which registered</u>
Common Stock, no par value	MKSI	Nasdaq Global Select Market

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes No

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

Indicate by check mark 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 April 29, 2020, the registrant had 54,964,309 shares of common stock outstanding.

MKS INSTRUMENTS, INC.
FORM 10-Q
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MKS INSTRUMENTS, INC.
CONDENSED CONSOLIDATED BALANCE SHEETS
(in millions, except share and per share data)
(Unaudited)

ASSETS	March 31, 2020	December 31, 2019
Current assets:		
Cash and cash equivalents	\$ 442.0	\$ 414.6
Short-term investments	61.4	109.4
Trade accounts receivable, net of allowance for doubtful accounts of \$1.9 and \$1.8 at March 31, 2020 and December 31, 2019, respectively	381.0	341.1
Inventories	474.2	462.1
Other current assets	98.0	106.3
Total current assets	1,456.6	1,433.5
Property, plant and equipment, net	238.2	241.9
Right-of-use asset	127.1	64.5
Goodwill	1,056.4	1,058.5
Intangible assets, net	547.7	564.6
Long-term investments	6.0	5.8
Other assets	42.9	47.5
Total assets	\$ 3,474.9	\$ 3,416.3
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Short-term debt	\$ 14.3	\$ 12.1
Accounts payable	110.7	88.4
Accrued compensation	82.8	100.9
Income taxes payable	14.7	15.4
Lease liability	18.2	20.6
Deferred revenue and customer advances	21.9	21.5
Other current liabilities	59.0	58.8
Total current liabilities	321.6	317.7
Long-term debt, net	820.4	871.7
Non-current deferred taxes	71.6	72.4
Non-current accrued compensation	42.3	43.9
Non-current lease liability	111.6	44.8
Other non-current liabilities	54.9	42.5
Total liabilities	1,422.4	1,393.0
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; 54,872,983 and 54,596,183 shares issued and outstanding at March 31, 2020 and December 31, 2019, respectively	0.1	0.1
Additional paid-in capital	852.4	864.3
Retained earnings	1,239.3	1,181.2
Accumulated other comprehensive loss	(39.3)	(22.3)
Total stockholders' equity	2,052.5	2,023.3
Total liabilities and stockholders' equity	\$ 3,474.9	\$ 3,416.3

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 millions, except per share data)
(Unaudited)

	Three Months Ended March 31,	
	2020	2019
Net revenues:		
Products	\$ 461.2	\$ 397.4
Services	74.5	66.2
Total net revenues	535.7	463.6
Cost of revenues:		
Cost of products	256.1	229.7
Cost of services	40.0	35.8
Total cost of revenues (exclusive of amortization shown separately below)	296.1	265.5
Gross profit	239.6	198.1
Research and development	42.4	38.9
Selling, general and administrative	87.2	82.5
Acquisition and integration costs	2.2	30.2
Restructuring and other	0.4	1.9
Fees and expenses related to repricing of Term Loan Facility	—	5.8
Amortization of intangible assets	16.3	15.7
Asset impairments	1.2	—
Income from operations	89.9	23.1
Interest income	0.7	1.7
Interest expense	8.9	9.1
Other expense, net	0.4	0.3
Income before income taxes	81.3	15.4
Provision for income taxes	12.2	2.9
Net income	\$ 69.1	\$ 12.5
Other comprehensive (loss) income, net of tax:		
Changes in value of financial instruments designated as cash flow hedges	\$ (6.0)	\$ 0.1
Foreign currency translation adjustments	(11.2)	(4.3)
Unrecognized pension gain	0.1	—
Unrealized gain (loss) on investments	0.1	(0.1)
Total comprehensive income	\$ 52.1	\$ 8.2
Net income per share:		
Basic	\$ 1.26	\$ 0.23
Diluted	\$ 1.25	\$ 0.23
Weighted average common shares outstanding:		
Basic	54.9	54.1
Diluted	55.2	54.8

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

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

	Common Stock		Additional Paid-In Capital	Retained Earnings	Accumulated Other Comprehensive Loss	Total Stockholders' Equity
	Shares	Amount				
Balance at December 31, 2019	54,596,183	\$ 0.1	\$ 864.3	\$ 1,181.2	\$ (22.3)	\$ 2,023.3
Net issuance under stock-based plans	276,800		(20.4)			(20.4)
Stock-based compensation			8.5			8.5
Cash dividend (\$0.20 per common share)				(11.0)		(11.0)
Comprehensive income (net of tax):						
Net income				69.1		69.1
Other comprehensive loss					(17.0)	(17.0)
Balance at March 31, 2020	<u>54,872,983</u>	<u>\$ 0.1</u>	<u>\$ 852.4</u>	<u>\$ 1,239.3</u>	<u>\$ (39.3)</u>	<u>\$ 2,052.5</u>
	Common Stock		Additional Paid-In Capital	Retained Earnings	Accumulated Other Comprehensive Loss	Total Stockholders' Equity
	Shares	Amount				
Balance at December 31, 2018	54,039,554	\$ 0.1	\$ 793.9	\$ 1,084.8	\$ (5.6)	\$ 1,873.2
Net issuance under stock-based plans	192,218		22.5			22.5
Stock-based compensation			27.8			27.8
Cash dividend (\$0.20 per common share)				(10.9)		(10.9)
Comprehensive income (net of tax):						
Net income				12.5		12.5
Other comprehensive loss					(4.3)	(4.3)
Balance at March 31, 2019	<u>54,231,772</u>	<u>\$ 0.1</u>	<u>\$ 844.2</u>	<u>\$ 1,086.4</u>	<u>\$ (9.9)</u>	<u>\$ 1,920.8</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 millions)
(Unaudited)

	Three Months Ended March 31,	
	2020	2019
Cash flows provided by operating activities:		
Net income	\$ 69.1	\$ 12.5
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	28.4	25.2
Amortization of inventory step-up adjustment to fair value	—	5.1
Amortization of debt issuance costs, original issue discount, and soft call premium	1.1	1.2
Stock-based compensation	8.5	27.8
Provision for excess and obsolete inventory	6.2	5.1
Provision for doubtful accounts	0.2	(0.4)
Deferred income taxes	0.6	(2.4)
Asset impairments	1.2	—
Other	(0.1)	—
Changes in operating assets and liabilities, net of business acquired:		
Trade accounts receivable	(42.5)	4.0
Inventories	(20.3)	(10.3)
Income taxes	1.0	(3.7)
Other assets	10.1	4.8
Accrued compensation	(19.3)	(22.9)
Other liabilities	8.0	0.4
Accounts payable	22.7	(17.3)
Net cash provided by operating activities	74.9	29.1
Cash flows provided by (used in) investing activities:		
Acquisition of business, net of cash acquired	—	(988.6)
Purchases of investments	(30.2)	(44.2)
Maturities of investments	49.5	18.6
Sales of investments	28.7	154.5
Proceeds from sale of assets	—	0.1
Purchases of property, plant and equipment	(10.0)	(14.5)
Net cash provided by (used in) investing activities	38.0	(874.1)
Cash flows (used in) provided by financing activities:		
Net proceeds from borrowings	12.1	638.6
Payments on borrowings	(62.2)	(0.2)
Net payments related to employee stock awards	(20.4)	(9.0)
Dividend payments	(11.0)	(10.8)
Net cash (used in) provided by financing activities	(81.5)	618.6
Effect of exchange rate changes on cash and cash equivalents	(4.0)	0.1
Increase (decrease) in cash and cash equivalents	27.4	(226.3)
Cash and cash equivalents at beginning of period	414.6	644.3
Cash and cash equivalents at end of period	\$ 442.0	\$ 418.0

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

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 March 31, 2020, and for the three months ended March 31, 2020 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, 2019 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, 2019 filed with the Securities and Exchange Commission on February 28, 2020.

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 and income taxes. Management bases its estimates and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

While the Company’s operations and financial performance in certain areas of its business have been negatively impacted by the coronavirus (“COVID-19”) pandemic, the impact to the Company’s financial results for the first quarter of 2020 was minimal due to the strong demand for its products from its semiconductor customers. The extent to which the COVID-19 pandemic impacts the Company’s financial results and operations for the remainder of 2020 and beyond will depend on future developments that are highly uncertain and cannot be predicted at this time. The Company is not aware of any specific event or circumstance that would require an update to its estimates or judgments or a revision of the carrying value of its assets or liabilities as of the date of issuance of this Quarterly Report on Form 10-Q. These estimates may change, as new events occur and additional information is obtained. Actual results could differ materially from these estimates under different assumptions or conditions.

2) Recently Issued or Adopted Accounting Pronouncements

In March 2020, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) No. 2020-04, “Reference Rate Reform (Topic 848): Facilitation of the Effects of Reference Rate Reform on Financial Reporting.” This standard provides temporary optional expedients and exceptions to accounting guidance on contract modifications and hedge accounting to ease entities’ financial reporting burdens as the market transitions from the London Interbank Offered Rate (“LIBOR”) and other interbank offered rates to alternative reference rates. The standard was effective upon issuance and generally can be applied through December 31, 2022. The Company is uncertain of the effects this standard will have on its financial position, results of operations and cash flows.

In December 2019, the FASB issued ASU 2019-12, “Income Taxes (Topic 740).” This standard simplifies the accounting for income taxes by removing certain exceptions to the general principles in Topic 740. The amendments also improve consistent application and simplify U.S. GAAP for other areas of Topic 740 by clarifying and amending existing guidance. This standard is effective for annual periods beginning after December 15, 2021, including interim periods within those fiscal years beginning after December 15, 2022. The Company evaluated the requirements of this ASU and the impact of pending adoption on the Company’s consolidated financial statements. The Company does not expect that the impact of these changes will be material to its financial position, results of operations and cash flows.

In August 2018, the FASB issued ASU 2018-15, “Intangibles-Goodwill and Other-Internal-Use Software (Subtopic 350-40): Customer’s Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement that is a Service Contract.” This standard aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software (and hosting arrangements that include an internal-use software license). The accounting for the service element of a hosting arrangement that is a service contract is not affected by the amendments to this update. This standard is effective for annual periods beginning after December 15, 2019, including interim periods within those fiscal years. The Company adopted this ASU during the first quarter of 2020 and the adoption of this ASU did not have a material impact on its financial position, results of operations and cash flows.

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

In June 2016, the FASB issued ASU 2016-13, “Financial Instruments-Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments.” This standard introduced the expected credit losses methodology for the measurement of credit losses on financial assets that are not measured at fair value through net income and replaces today’s “incurred loss” model with an “expected credit loss” model that requires consideration of a broader range of information to estimate expected credit losses over the lifetime of the asset. There have been several consequential subsequent amendments to this standard. This standard is effective for annual periods beginning after December 15, 2019, including interim periods within those fiscal years. The Company adopted this ASU during the first quarter of 2020 and the adoption of this ASU did not have a material impact on its financial position, results of operations and cash flows.

3) Leases

The Company has various operating leases for real estate and non-real estate items. The non-real estate leases are mainly comprised of automobiles but also include copiers, printers and other lower-valued items. The Company does not have any finance leases.

During the three months ended March 31, 2020, the Company recorded \$69.9 of right-of-use assets and lease liabilities related to two leases that commenced during the period.

The Company has existing leases that include variable lease and non-lease components that are not included in the right-of-use asset and lease liability, and are reflected as expenses in the periods incurred. Such payments primarily include common area maintenance charges and increases in rent payments that are driven by factors such as future changes in an index (e.g., the Consumer Price Index).

The elements of lease expense were as follows:

	Three Months Ended March 31, 2020	Three Months Ended March 31, 2019
Lease Cost:		
Operating lease cost ⁽¹⁾	\$ 7.3	\$ 5.0
Short-term lease	1.2	1.3
Total lease cost	\$ 8.5	\$ 6.3

(1) Operating lease cost includes an immaterial amount of variable expenses and sublease rental income.

The weighted average discount rate and the weighted average remaining lease term were 3.2% and 13.5 years, respectively, for the three months ended March 31, 2020. The weighted average discount rate and weighted average remaining lease term were 3.8% and 4.9 years, respectively, for the period ended March 31, 2019. Operating cash flows used for operating leases for the three months ended March 31, 2020 and 2019 were \$5.1 and \$5.7, respectively.

Future lease payments under non-cancelable leases as of March 31, 2020 are detailed as follows:

2020 (remaining)	\$ 3.7
2021	18.7
2022	13.3
2023	11.9
2024	11.3
Thereafter	107.4
Total lease payments	166.3
Less: imputed interest	36.5
Total operating lease liabilities	\$ 129.8

The remaining 2020 lease payment amount of \$3.7 is net of \$13.7 of tenant improvement allowances expected to be received in 2020. Amounts presented above do not include payments relating to immaterial leases excluded from the balance sheet as part of transition elections adopted upon implementation of ASU 2016-02, “Leases”, on January 1, 2019, as well as operating leases with terms of less than twelve months. Additionally, amounts presented above exclude approximately \$24.6 of lease payments (undiscounted basis) related to a lease that has not yet commenced. The lease commences later in 2020 with an expected lease term of 21 years.

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

4) Revenue from Contracts with Customers

Contract assets as of March 31, 2020 and December 31, 2019 were \$3.4 and \$3.5, respectively, and are included in other current assets.

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

	Three Months Ended March 31, 2020	Three Months Ended March 31, 2019
Beginning balance, January 1 ⁽¹⁾	\$ 24.8	\$ 17.5
Deferred revenue and customer advances in ESI Merger	—	3.3
Additions to deferred revenue and customer advances	17.7	17.2
Amount of deferred revenue and customer advances recognized in income	(17.1)	(13.9)
Ending balance, March 31 ⁽²⁾	<u>\$ 25.4</u>	<u>\$ 24.1</u>

(1) Beginning deferred revenue and customer advances as of December 31, 2019 included \$12.4 of current deferred revenue, \$3.3 of long-term deferred revenue and \$9.1 of current customer advances.

(2) Ending deferred revenue and customer advances as of March 31, 2020 included \$12.4 of current deferred revenue, \$3.5 of long-term deferred revenue and \$9.5 of current customer advances.

Disaggregation of Revenue

The following table summarizes revenue from contracts with customers:

	Three Months Ended March 31, 2020			
	Vacuum & Analysis	Light & Motion	Equipment & Solutions	Total
Net revenues:				
Products	\$ 276.2	\$ 149.7	\$ 35.3	\$ 461.2
Services	43.1	15.7	15.7	74.5
Total net revenues	<u>\$ 319.3</u>	<u>\$ 165.4</u>	<u>\$ 51.0</u>	<u>\$ 535.7</u>
	Three Months Ended March 31, 2019			
	Vacuum & Analysis	Light & Motion	Equipment & Solutions	Total
Net revenues:				
Products	\$ 192.7	\$ 178.7	\$ 26.0	\$ 397.4
Services	41.7	15.3	9.2	66.2
Total net revenues	<u>\$ 234.4</u>	<u>\$ 194.0</u>	<u>\$ 35.2</u>	<u>\$ 463.6</u>

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 for revenue by reportable segment, geography and product and service offerings.

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

5) Investments

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

As of March 31, 2020:	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
Short-term investments:				
Available-for-sale investments:				
Time deposits and certificates of deposit	\$ 10.4	\$ —	\$ —	\$ 10.4
Bankers' acceptance drafts	2.4	—	—	2.4
Commercial paper	26.4	—	(0.2)	26.2
U.S. treasury obligations	10.0	—	—	10.0
U.S. agency obligations	12.3	0.1	—	12.4
	<u>\$ 61.5</u>	<u>\$ 0.1</u>	<u>\$ (0.2)</u>	<u>\$ 61.4</u>

As of March 31, 2020:	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
Long-term investments:				
Available-for-sale investments:				
Group insurance contracts	\$ 5.4	\$ 0.6	\$ —	\$ 6.0

As of December 31, 2019:	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
Short-term investments:				
Available-for-sale investments:				
Time deposits and certificates of deposit	\$ 13.1	\$ —	\$ —	\$ 13.1
Bankers' acceptance drafts	4.0	—	—	4.0
Commercial paper	61.5	—	(0.3)	61.2
U.S. treasury obligations	5.0	—	—	5.0
U.S. agency obligations	26.1	—	—	26.1
	<u>\$ 109.7</u>	<u>\$ —</u>	<u>\$ (0.3)</u>	<u>\$ 109.4</u>

As of December 31, 2019:	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
Long-term investments:				
Available-for-sale investments:				
Group insurance contracts	\$ 5.2	\$ 0.6	\$ —	\$ 5.8

The tables above, which show the gross unrealized gains and (losses) aggregated by investment category for available-for-sale investments as of March 31, 2020 and December 31, 2019, 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 March 31, 2020 and December 31, 2019 were temporary.

Interest income is accrued as earned. Dividend income is recognized as income on the date the stock trades "ex-dividend." The cost of marketable securities sold is determined by the specific identification method. Realized gains or losses are reflected in income and were not material for the three months ended March 31, 2020 and 2019.

6) Fair Value Measurements

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

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

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

In certain cases, the inputs used to measure fair value may fall into different levels of the fair value hierarchy. In such cases, 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
(dollars in millions, except share and per share data)

Assets and liabilities of the Company are measured at fair value on a recurring basis as of March 31, 2020 and are summarized as follows:

Description	March 31, 2020	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	\$ 16.9	\$ 16.9	\$ —	\$ —
Commercial paper	33.8	—	33.8	—
U.S. treasury obligations	1.2	—	1.2	—
U.S. agency obligations	58.4	—	58.4	—
Available-for-sale investments:				
Time deposits and certificates of deposit	10.4	—	10.4	—
Bankers' acceptance drafts	2.4	—	2.4	—
Commercial paper	26.2	—	26.2	—
U.S. treasury obligations	10.0	—	10.0	—
U.S. agency obligations	12.4	—	12.4	—
Group insurance contracts	6.0	—	6.0	—
Derivatives – currency forward contracts	2.7	—	2.7	—
Funds in investments and other assets:				
Israeli pension assets	16.3	—	16.3	—
Deferred compensation plan assets:				
Mutual funds and exchange traded funds	1.2	—	1.2	—
Money market securities	0.1	—	0.1	—
Total assets	\$ 198.0	\$ 16.9	\$ 181.1	\$ —
Liabilities:				
Derivatives – currency forward contracts	\$ 0.5	\$ —	\$ 0.5	\$ —
Derivatives – interest rate hedge - current	0.5	—	0.5	—
Derivatives – interest rate hedge - non-current	15.2	—	15.2	—
Total liabilities	\$ 16.2	\$ —	\$ 16.2	\$ —
Reported as follows:				
Assets:				
Cash and cash equivalents(1)	\$ 110.3	\$ 16.9	\$ 93.4	\$ —
Short-term investments	61.4	—	61.4	—
Other current assets	2.7	—	2.7	—
Total current assets	\$ 174.4	\$ 16.9	\$ 157.5	\$ —
Long-term investments	\$ 6.0	\$ —	\$ 6.0	\$ —
Other assets	17.6	—	17.6	—
Total long-term assets	\$ 23.6	\$ —	\$ 23.6	\$ —
Liabilities:				
Other current liabilities	\$ 1.0	\$ —	\$ 1.0	\$ —
Other liabilities	\$ 15.2	\$ —	\$ 15.2	\$ —

(1) The cash and cash equivalent amounts presented in the table above do not include cash of \$331.7 as of March 31, 2020.

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Assets and liabilities of the Company are measured at fair value on a recurring basis as of December 31, 2019 and are summarized as follows:

Description	December 31, 2019	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	\$ 0.6	\$ 0.6	\$ —	\$ —
Time deposits and certificates of deposit	2.2	—	2.2	—
Commercial paper	42.6	—	42.6	—
U.S. treasury obligations	2.7	—	2.7	—
U.S. agency obligations	17.1	—	17.1	—
Available-for-sale securities:				
Time deposits and certificates of deposit	13.1	—	13.1	—
Bankers' acceptance drafts	4.0	—	4.0	—
Commercial paper	61.2	—	61.2	—
U.S. treasury obligations	5.0	—	5.0	—
U.S. agency obligations	26.1	—	26.1	—
Group insurance contracts	5.8	—	5.8	—
Derivatives – currency forward contracts	1.1	—	1.1	—
Derivatives – interest rate hedge - current	0.8	—	0.8	—
Funds in investments and other assets:				
Israeli pension assets	16.7	—	16.7	—
Deferred compensation plan assets:				
Mutual funds and exchange traded funds	2.0	—	2.0	—
Money market funds	0.5	—	0.5	—
Total assets	\$ 201.5	\$ 0.6	\$ 200.9	\$ —
Liabilities:				
Derivatives – currency forward contracts	\$ 0.3	\$ —	\$ 0.3	\$ —
Derivatives – interest rate hedge - non-current	6.5	—	6.5	—
Total liabilities	\$ 6.8	\$ —	\$ 6.8	\$ —
Reported as follows:				
Assets:				
Cash and cash equivalents ⁽¹⁾	\$ 65.2	\$ 0.6	\$ 64.6	\$ —
Short-term investments	109.4	—	109.4	—
Other current assets	1.9	—	1.9	—
Total current assets	\$ 176.5	\$ 0.6	\$ 175.9	\$ —
Long-term investments	\$ 5.8	\$ —	\$ 5.8	\$ —
Other assets	19.2	—	19.2	—
Total long-term assets	\$ 25.0	\$ —	\$ 25.0	\$ —
Liabilities:				
Other current liabilities	\$ 0.3	\$ —	\$ 0.3	\$ —
Other liabilities	\$ 6.5	\$ —	\$ 6.5	\$ —

(1) The cash and cash equivalent amounts presented in the table above do not include cash of \$349.4 as of December 31, 2019.

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

As of March 31, 2020, available-for-sale investments consisted of time deposits and drafts denominated in the Euro currency, certificates of deposit, bankers' acceptance drafts, commercial paper, 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 exchange 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.

7) Derivatives

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

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 approximately 50% of its then-outstanding balance under the 2016 Term Loan Facility, as described further in Note 11. 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 March 31, 2020. At March 31, 2020, the notional amount of this transaction was \$250.0 and it had a fair value liability of \$0.5. At December 31, 2019, the notional amount of this transaction was \$250.0 and it had a fair value asset of \$0.8.

On April 3, 2019, the Company entered into an interest rate swap agreement, which has a maturity date of March 31, 2023, to fix the rate on \$300.0 of the then-outstanding balance of the 2019 Incremental Term Loan Facility, as described further in Note 11. The rate was fixed at 2.309% per annum plus the applicable credit spread, which was 1.75% at March 31, 2020. At March 31, 2020, the notional amount of this transaction was \$300.0 and had a fair value liability of \$15.3. At December 31, 2019, the notional amount of this transaction was \$300.0 and had a fair value liability of \$6.5.

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The interest rate swaps are 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 these arrangements are no longer an effective hedge, any ineffectiveness measured in the hedging relationships is recorded in earnings in the period it occurs.

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. 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 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 March 31, 2020 and December 31, 2019, the Company had outstanding forward foreign exchange contracts with gross notional values of \$104.4 and \$154.7, respectively. The following tables provide a summary of the primary net hedging positions and corresponding fair values held as of March 31, 2020 and December 31, 2019:

Currency Hedged (Buy/Sell)	March 31, 2020	
	Gross Notional Value	Fair Value
U.S. Dollar/Japanese Yen	\$ 34.4	\$ (0.2)
U.S. Dollar/South Korean Won	32.5	1.8
U.S. Dollar/Euro	10.1	0.4
U.S. Dollar/U.K. Pound Sterling	5.3	0.3
U.S. Dollar/Taiwan Dollar	22.1	(0.1)
Total	<u>\$ 104.4</u>	<u>\$ 2.2</u>

Currency Hedged (Buy/Sell)	December 31, 2019	
	Gross Notional Value	Fair Value
U.S. Dollar/Japanese Yen	\$ 45.9	\$ 0.1
U.S. Dollar/South Korean Won	51.7	0.2
U.S. Dollar/Euro	15.7	0.2
U.S. Dollar/U.K. Pound Sterling	8.3	(0.2)
U.S. Dollar/Taiwan Dollar	33.1	(0.5)
Total	<u>\$ 154.7</u>	<u>\$ (0.2)</u>

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

Derivatives Designated as Hedging Instruments	March 31, 2020	December 31, 2019
Derivative assets:		
Foreign exchange contracts(1)	\$ 2.7	\$ 1.1
Foreign currency interest rate hedge(2)	—	0.8
Derivative liabilities:		
Foreign exchange contracts(1)	(0.5)	(1.3)
Foreign currency interest rate hedge(2)	(15.8)	(6.5)
Total net derivative liability designated as hedging instruments	<u>\$ (13.6)</u>	<u>\$ (5.9)</u>

(1) The derivative asset of \$2.7 and derivative liability of \$0.5 related to the forward foreign exchange contracts are classified in other current assets and other current liabilities in the consolidated balance sheet as of March 31, 2020. The derivative asset of \$1.1 and derivative liability of \$1.3 related to the forward foreign exchange contracts are classified in other current assets and other current liabilities in the consolidated balance sheet as of December 31, 2019. These

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forward 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 foreign currency interest rate hedge liability of \$0.5 is classified in other current liabilities in the consolidated balance sheet as of March 31, 2020. The foreign currency interest rate hedge asset of \$0.8 is classified in other current assets in the consolidated balance sheet as of December 31, 2019. The foreign currency interest rate hedge liability of \$15.3 is classified in other non-current liabilities in the consolidated balance sheet as of March 31, 2020. The foreign currency interest rate hedge liability of \$6.5 is classified in other non-current liabilities in the consolidated balance sheet as of December 31, 2019.

The net amount of existing gains as of March 31, 2020 that is expected to be reclassified from OCI into earnings within the next 12 months is immaterial.

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

<u>Derivatives Designated as Cash Flow Hedging Instruments</u>	Three Months Ended March 31,	
	2020	2019
Forward exchange contracts:		
Net gain (loss) recognized in accumulated OCI(1)	\$ (6.0)	\$ 0.1
Net gain (loss) reclassified from accumulated OCI into income(2)	\$ 0.7	\$ 0.9

- (1) Net change in the fair value of the effective portion classified in accumulated OCI.
(2) Effective portion classified in cost of products for the three months ended March 31, 2020 and 2019. The tax effect of the gains or losses reclassified from accumulated OCI into income is immaterial.

The following table provides a summary of the gain on derivatives not designated as hedging instruments:

<u>Derivatives Not Designated as Hedging Instruments</u>	Three Months Ended March 31,	
	2020	2019
Forward exchange contracts:		
Net gain recognized in income(1)	\$ 0.2	\$ 0.1

- (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.

8) Inventories

Inventories consist of the following:

	March 31, 2020	December 31, 2019
Raw materials	\$ 300.4	\$ 288.8
Work-in-process	81.0	79.3
Finished goods	92.8	94.0
	<u>\$ 474.2</u>	<u>\$ 462.1</u>

Inventory-related excess and obsolete charges of \$6.2 and \$5.1 were recorded in cost of products and services in the three months ended March 31, 2020 and 2019, respectively.

9) Acquisitions

Electro Scientific Industries, Inc.

On February 1, 2019, the Company completed its acquisition of Electro Scientific Industries, Inc. (“ESI”) pursuant to an Agreement and Plan of Merger, dated as of October 29, 2018 (the “Merger Agreement”), by and among the Company, EAS Equipment, Inc., formerly a Delaware corporation and a wholly-owned subsidiary of the Company, and ESI (the “ESI Merger”). At the effective time of the ESI Merger and pursuant to the terms and conditions of the Merger Agreement, each share of ESI’s common stock that was issued and outstanding immediately prior to the effective time of the ESI Merger was converted into the right to receive \$30.00 in cash, without interest and subject to deduction of any required withholding tax.

The Company funded the payment for ESI’s outstanding shares with a combination of the Company’s available cash on hand and the proceeds from the Company’s 2019 Incremental Term Loan Facility, as defined and as described further in Note 11.

ESI provides laser-based manufacturing systems solutions for the micro-machining industry that enable customers to optimize production. ESI’s market is composed primarily of flexible and rigid PCB processing/fabrication, semiconductor wafer processing and passive component manufacturing and testing. ESI solutions incorporate specialized laser technology and proprietary control software to efficiently process the materials and components that are an integral part of electronic devices and systems.

The purchase price of ESI consisted of the following:

Cash paid for outstanding shares ⁽¹⁾	\$ 1,032.7
Settlement of share-based compensation awards ⁽²⁾	30.6
Total purchase price	1,063.3
Less: Cash and cash equivalents acquired	(44.1)
Total purchase price, net of cash and cash equivalents acquired	\$ 1,019.2

(1) Represents cash paid of \$30.00 per share for approximately 34,422,361 shares of ESI common stock, without interest and subject to a deduction for any required withholding tax.

(2) Represents the vested but not issued portion of ESI share-based compensation awards as of the acquisition date of February 1, 2019.

Under the acquisition method of accounting, the total estimated acquisition consideration is allocated to the acquired tangible and intangible assets and assumed liabilities of ESI based on their fair values as of the acquisition date. Any excess of the acquisition consideration over the fair value of assets acquired and liabilities assumed is allocated to goodwill. None of the goodwill and intangible assets are deductible for tax purposes.

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

Current assets (excluding inventory)	\$ 208.0
Inventory	81.7
Intangible assets	316.2
Goodwill	474.0
Property, plant and equipment	65.5
Long-term assets	9.6
Total assets acquired	1,155.0
Current liabilities	51.5
Non-current deferred taxes	33.0
Other long-term liabilities	7.2
Total liabilities assumed	91.7
Fair value of assets acquired and liabilities assumed	1,063.3
Less: Cash and cash equivalents acquired	(44.1)
Total purchase price, net of cash and cash equivalents acquired	\$ 1,019.2

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The fair value write-up of acquired finished goods inventory was \$7.6, the amount of which was expensed over the period during which the acquired inventory was sold. Accordingly, for the three months ended March 31, 2019, the Company recorded a \$5.1 incremental cost of sales charge associated with the fair value write-up of inventory acquired in the ESI Merger.

The fair value write-up of acquired property, plant and equipment of \$39.3 will be amortized over the estimated useful life of the applicable assets, excluding the fair value write-up in the value of land. Property, plant and equipment is valued at its value-in-use, unless there was a known plan to dispose of the asset.

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

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

Completed technology - Laser	\$	255.7	12 years
Completed technology - Non-Laser		18.3	10 years
Trademarks and trade names		14.4	7 years
Customer relationships		25.4	10 years
Backlog		2.4	1 year
	<u>\$</u>	<u>316.2</u>	

The fair value of the acquired intangibles was determined using the income approach. In performing these valuations, the key underlying assumptions of the discounted cash flows were projected revenues, gross margin expectations and operating cost estimates. The valuations were based on the information that was available as of the acquisition date and the expectations and assumptions that have been deemed reasonable by the Company's management. There are inherent uncertainties and management judgment required in these determinations. This acquisition resulted in a purchase price that exceeded the estimated fair value of tangible and intangible assets, the excess amount of which was allocated to goodwill. The Company believes the amount of goodwill relative to identifiable intangible assets relates to several factors, including broadening its position in key industrial end markets to complementary solutions, and leveraging component and systems expertise to provide robust solutions to meet customer evolving technology needs.

The results of this acquisition were included in the Company's consolidated statement of operations beginning on February 1, 2019. ESI constitutes the Company's Equipment & Solutions reportable segment (see Note 17).

Certain executives from ESI had severance provisions in their respective ESI employment agreements. The agreements included terms that were accounted for as dual-trigger arrangements. Through the Company's acquisition accounting, the expense relating to these benefits was recognized in the combined entity's financial statements. The Company recorded costs of \$2.7 and \$14.0 in acquisition and integration costs as compensation expense and stock-based compensation expense, respectively, for the three months ended March 31, 2019 associated with these severance provisions. The restricted stock units and stock appreciation rights that were eligible for accelerated vesting if the executive exercised his or her rights but were not issued as of each reporting period-end, were excluded from the computation of basic earnings per share and included in the computation of diluted earnings per share for such reporting period.

Pro Forma Results

The following unaudited pro forma financial information presents the combined results of operations of the Company as if the ESI Merger had occurred on January 1, 2018. The unaudited pro forma financial information is not necessarily indicative of what the Company's condensed consolidated results of operations actually would have been had the acquisition occurred at the beginning of the year. In addition, the unaudited pro forma financial information does not attempt to project the future results of operations of the combined Company.

	Three Months Ended March 31, 2019	
Total net revenues	\$	478.1
Net income	\$	39.7
Net income per share:		
Basic	\$	0.72
Diluted	\$	0.72

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

- (1) Incremental amortization and depreciation expense related to the estimated fair value of identifiable intangible assets and property, plant and equipment, respectively from the purchase price allocation.
- (2) Revenue and cost of goods sold, adjustments as a result of the reduction in deferred revenue and the cost related to their estimated fair value.
- (3) Incremental interest expense related to the Company's Incremental Term Loan Facility.
- (4) The exclusion of acquisition costs and inventory and demonstration inventory step-up amortization from the three month period ended March 31, 2019.
- (5) The exclusion of debt issuance costs due to the modification of the Incremental Term Loan Facility from the three month period ended March 31, 2019.
- (6) The estimated tax impact of the above adjustments.

10) 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 January 1, 2019, 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. The Company also concluded that the fair value of each reporting unit exceeded its respective carrying value.

The changes in the carrying amount of goodwill and accumulated impairment loss during the three months ended March 31, 2020 and year ended December 31, 2019 were as follows:

	Three Months Ended March 31, 2020			Twelve Months Ended December 31, 2019		
	Gross Carrying Amount	Accumulated Impairment Loss	Net	Gross Carrying Amount	Accumulated Impairment Loss	Net
Beginning balance at January 1	\$ 1,202.8	\$ (144.3)	\$ 1,058.5	\$ 731.3	\$ (144.3)	\$ 587.0
Acquired goodwill	—	—	—	474.0	—	474.0
Foreign currency translation	(2.1)	—	(2.1)	(2.5)	—	(2.5)
Ending balance at March 31, 2020 and December 31, 2019	\$ 1,200.7	\$ (144.3)	\$ 1,056.4	\$ 1,202.8	\$ (144.3)	\$ 1,058.5

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Intangible Assets

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

<u>As of March 31, 2020:</u>	<u>Gross</u>	<u>Accumulated Impairment Charges</u>	<u>Accumulated Amortization</u>	<u>Foreign Currency Translation</u>	<u>Net</u>
Completed technology	\$ 446.4	\$ (0.1)	\$ (188.6)	\$ (0.4)	\$ 257.3
Customer relationships	308.2	(1.4)	\$ (89.1)	\$ (1.8)	\$ 215.9
Patents, trademarks, trade names and other	120.9	—	\$ (46.6)	\$ 0.2	\$ 74.5
	<u>\$ 875.5</u>	<u>\$ (1.5)</u>	<u>\$ (324.3)</u>	<u>\$ (2.0)</u>	<u>\$ 547.7</u>

<u>As of December 31, 2019:</u>	<u>Gross</u>	<u>Accumulated Impairment Charges</u>	<u>Accumulated Amortization</u>	<u>Foreign Currency Translation</u>	<u>Net</u>
Completed technology ⁽¹⁾	\$ 446.4	\$ (0.1)	\$ (178.3)	\$ (0.2)	\$ 267.8
Customer relationships ⁽¹⁾	308.2	(1.4)	(84.2)	(1.4)	221.2
Patents, trademarks, trade names and other ⁽²⁾	120.9	—	(45.5)	0.2	75.6
	<u>\$ 875.5</u>	<u>\$ (1.5)</u>	<u>\$ (308.0)</u>	<u>\$ (1.4)</u>	<u>\$ 564.6</u>

(1) During 2019, the Company recorded \$316.2 of separately identified intangible assets related to the ESI Merger, of which \$274.0 was completed technology, \$25.4 was customer relationships and \$16.8 was trademarks, trade names and backlog.

(2) During 2019, the Company reclassified \$6.4 of gross favorable lease assets and \$3.4 of related accumulated amortization from patents, trademarks, trade names and other to the right-of-use asset line in the balance sheet.

Aggregate amortization expense related to acquired intangibles for the three months ended March 31, 2020 and 2019 was \$16.3 and \$15.7, respectively. Aggregate net amortization expense related to acquired intangible assets for future years is as follows:

<u>Year</u>	<u>Amount</u>
2020 (remaining)	\$ 41.0
2021	\$ 46.1
2022	\$ 45.2
2023	\$ 44.9
2024	\$ 44.0
2025	\$ 43.6
Thereafter	\$ 227.0

The Company excluded \$55.9 of indefinite-lived trademarks and trade names that were not subject to amortization from the table above.

11) Debt

Senior Secured Term Loan Credit Facility

In connection with the completion of the acquisition of Newport Corporation ("Newport") in 2016 (the "Newport Merger"), the Company entered into a term loan credit agreement (the "Term Loan 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 a senior secured term loan credit facility in the original principal amount of \$780.0 (the "2016 Term Loan Facility"), subject to increase at the Company's option and subject to receipt of lender commitments in accordance with the Term Loan Credit Agreement (the 2016 Term Loan Facility, together with the 2019 Incremental Term Loan Facility and 2019 Term Loan Refinancing Facility (each as defined below), the "Term Loan Facility"). Prior to the effectiveness of Amendment No. 6 (as defined below), the 2016 Term Loan Facility had a maturity date of April 29, 2023. As of March 31, 2020, 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 London Interbank Offer Rate ("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 0.0%, plus an applicable margin. The Company has elected the interest rate as described in clause (b) of the foregoing sentence. The Term Loan Credit Agreement provides that, unless an alternate rate of interest is agreed, 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 2016 Term Loan Facility was issued with original issue discount of 1.00% of the principal amount thereof.

The Company subsequently entered into four separate repricing amendments to the 2016 Term Loan Facility, which decreased the applicable margin for LIBOR borrowings from 4.0% to 1.75%, with a LIBOR rate floor of 0.75%. As a consequence of the pricing of the 2019 Incremental Term Loan Facility (defined below), the applicable margin for the 2016 Term Loan Facility was increased to 2.00% (from 1.75%) with respect to LIBOR borrowings and 1.00% (from 0.75%) with respect to base rate borrowings.

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 \$335.0 of the then-outstanding balance of the 2016 Term Loan Facility. The rate was fixed at 1.198% per annum plus the applicable credit spread, which was 1.75% at March 31, 2020. At March 31, 2020, the notional amount of this transaction was \$250.0 and it had a fair value liability of \$0.5.

The Company incurred \$28.7 of deferred finance fees, original issue discount and repricing fees related to the term loans under the 2016 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.

On February 1, 2019, in connection with the completion of the ESI Merger, the Company entered into an amendment (“Amendment No. 5”) to the Term Loan Credit Agreement. Amendment No. 5 provided an additional tranche B-5 term loan commitment in the original principal amount of \$650.0 (the “2019 Incremental Term Loan Facility”), all of which was drawn down in connection with the closing of the ESI Merger. Pursuant to Amendment No. 5, the Company also effectuated certain amendments to the Term Loan Credit Agreement which make certain of the negative covenants and other provisions less restrictive. Prior to the effectiveness of Amendment No. 6 (as defined below), the 2019 Incremental Term Loan Facility had a maturity date of February 1, 2026 and bore interest at a rate per annum equal to, at the Company’s option, a base rate or LIBOR rate (as described above) plus, in each case, an applicable margin equal to 1.25% with respect to base rate borrowings and 2.25% with respect to LIBOR borrowings. The 2019 Incremental Term Loan Facility was issued with original issue discount of 1.00% of the principal amount thereof.

On April 3, 2019, the Company entered into an interest rate swap agreement, which has a maturity date of March 31, 2023, to fix the rate on \$300.0 of the then-outstanding balance of the 2019 Incremental Term Loan Facility. The rate was fixed at 2.309% per annum plus the applicable credit spread, which was 1.75% at March 31, 2020. At March 31, 2020, the notional amount of this transaction was \$300.0 and it had a fair value liability of \$15.3.

The Company incurred \$11.4 of deferred finance fees and original issue discount fees related to the term loans under the 2019 Incremental 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.

On September 27, 2019, the Company entered into an amendment (“Amendment No. 6”) to the Term Loan Credit Agreement. Amendment No. 6 refinanced all existing loans outstanding under the 2016 Term Loan Facility and 2019 Incremental Term Loan Facility (“Existing Term Loans”) for a tranche B-6 term loan commitment in the original principal amount of \$896.8 (“2019 Term Loan Refinancing Facility”). Each lender of the Existing Term Loans that elected to participate in the 2019 Term Loan Refinancing Facility was deemed to have exchanged the aggregate outstanding principal amount of its Existing Term Loans for an equal aggregate principal amount of tranche B-6 term loans under the 2019 Term Loan Refinancing Facility. On the effective date of Amendment No. 6 and immediately prior to the exchanges described above, the Company made a voluntary prepayment of \$50.0, which was applied to the Existing Term Loans on a pro rata basis.

The Company incurred \$2.2 of original issue discount fees related to the term loans under the 2019 Term Loan Refinancing 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.

As of March 31, 2020, the remaining balance of deferred finance fees and original issue discount of the Term Loan Facility was \$10.7. A portion of the deferred finance fees and original issue discount have been accelerated in connection with the various debt prepayments and extinguishments during 2016, 2017, 2018, 2019 and 2020.

The 2019 Term Loan Refinancing Facility matures on February 2, 2026, and bears interest at a rate per annum equal to, at the Company's option, a base rate or LIBOR rate (as described above) plus, in each case, an applicable margin equal to 0.75% with respect to base rate borrowings and 1.75% with respect to LIBOR borrowings. The 2019 Term Loan Refinancing Facility was issued with original issue discount of 0.25% of the principal amount thereof.

The Company is required to make scheduled quarterly payments each equal to 0.25% of the original principal amount of the 2019 Term Loan Refinancing Facility with the balance due on February 2, 2026.

As of March 31, 2020, after total principal prepayments of \$575.0 (which includes a \$50.0 prepayment made during the three months ended March 31, 2020) and regularly scheduled principal payments of \$14.9, the total outstanding principal balance of the Term Loan Facility was \$840.1 and the interest rate was 3.35%.

Under the Term Loan 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 of its asset sales, certain casualty and condemnation events and the incurrence or issuance of certain debt.

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 Term Loan 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 March 31, 2020, the Company was in compliance with all covenants under the Term Loan Credit Agreement.

Senior Secured Asset-Based Revolving Credit Facility

On February 1, 2019, in connection with the completion of the ESI Merger, the Company entered into an asset-based revolving credit agreement with Barclays Bank PLC, 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 Credit Agreement"), that provides a senior secured asset-based revolving credit facility of up to \$100.0, subject to a borrowing base limitation (the "ABL Facility"). On April 26, 2019, the Company entered into a First Amendment to the ABL Credit Agreement which amended the borrowing base calculation for eligible inventory prior to an initial field examination and appraisal requirements. The borrowing base for the ABL Facility at any time equals the sum of: (a) 85% of certain eligible accounts; plus (b) prior to certain notice and field examination and appraisal requirements, the lesser of (i) 20% of net book value of eligible inventory in the United States and (ii) 30% of the borrowing base, and after the satisfaction of such 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, in each case, subject to additional limitations and examination requirements for eligible accounts and eligible inventory acquired in an acquisition after February 1, 2019. The ABL Facility includes borrowing capacity in the form of letters of credit up to \$25.0.

Borrowings under the ABL Facility bear interest at a rate per annum equal to, at the Company's option, any of the following, plus, in each case, an applicable margin: (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 0.00%; 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, with a floor of 0.00%. The initial applicable margin for borrowings under the ABL Facility is 0.50% with respect to base rate borrowings and 1.50% with respect to LIBOR borrowings. 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.

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In addition to paying interest on any outstanding principal under the ABL Facility, the Company is required to pay a commitment fee in respect of the unused commitments thereunder equal to 0.25% per annum. The Company must also pay customary letter of credit fees and agency fees.

If at any time the aggregate amount of outstanding loans, protective advances, unreimbursed letter of credit drawings and undrawn letters of credit under the ABL Facility exceeds the lesser of (a) the commitment amount and (b) the borrowing base, the Company is required to repay outstanding loans and/or cash collateralize letters of credit, with no reduction of the commitment amount. During any period that the amount available under the ABL Facility is less than the greater of (i) \$8.5 and (ii) 10.0% of the lesser of (1) the commitment amount and (2) the borrowing base for three consecutive business days, until the time when excess availability has been at least the greater of (i) \$8.5 and (ii) 10.0% of the lesser of (1) the commitment amount and (2) the borrowing base, in each case, for 30 consecutive calendar days (a "Cash Dominion Period"), or during the continuance of an event of default, the Company is required to repay outstanding loans and/or cash collateralize letters of credit with the cash that it is required to deposit daily in a collection account maintained with the administrative agent under the ABL Facility. During a Cash Dominion Period, the Company may make borrowings under the ABL Facility subject to the satisfaction of customary funding conditions.

There is no scheduled amortization under the ABL Facility. The principal amount outstanding under the ABL Facility is due and payable in full on the fifth anniversary of the closing date.

All obligations under the ABL 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.

From the time when the Company has excess availability less than the greater of (a) 10.0% of the lesser of (1) the commitment amount and (2) the borrowing base and (b) \$8.5 until the time when the Company has excess availability equal to or greater than the greater of (a) 10.0% of the lesser of (1) the commitment amount and (2) the borrowing base and (b) \$8.5 for 30 consecutive days, or during the continuance of an event of default, the ABL Credit Agreement requires the Company to maintain a Fixed Charge Coverage Ratio (as defined in the ABL Credit Agreement) tested on the last day of each fiscal quarter of at least 1.0 to 1.0.

The ABL Credit Agreement also contains customary representations and warranties, affirmative covenants and provisions relating to events of default. If an event of default occurs, the lenders under the ABL Facility will be entitled to take various actions, including the acceleration of amounts due under the ABL Facility and all actions permitted to be taken by a secured creditor. The Company has not borrowed against the ABL Facility to date.

Lines of Credit and Short-Term Borrowing Arrangements

The Company's Japanese subsidiaries have lines of credit and a financing facility with various financial institutions, many of which generally expire and are renewed at three-month intervals with the remaining having no expiration date. The lines of credit and financing facility provided for aggregate borrowings as of March 31, 2020 of up to an equivalent of \$32.9 U.S. dollars. Total borrowings outstanding under these arrangements were \$5.3 and \$3.1 at March 31, 2020 and December 31, 2019.

	March 31, 2020	December 31, 2019
Short-term debt:		
Japanese lines of credit	\$ 4.1	\$ 2.5
Japanese receivables financing facility	1.2	0.6
Term Loan Facility	9.0	9.0
	<u>\$ 14.3</u>	<u>\$ 12.1</u>

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	March 31, 2020	December 31, 2019
Long-term debt:		
Term Loan Facility, net ⁽¹⁾	\$ 820.4	\$ 871.6
Other debt	—	0.1
	<u>\$ 820.4</u>	<u>\$ 871.7</u>

(1) Net of deferred financing fees, original issue discount and repricing fees of \$10.7 and \$11.8 as of March 31, 2020 and December 31, 2019, respectively.

The Company recognized interest expense of \$8.9 and \$9.1 for the three months ended March 31, 2020 and 2019, respectively.

Contractual maturities of the Company's debt obligations as of March 31, 2020 are as follows:

Year	Amount
2020 (remaining)	\$ 12.0
2021	9.0
2022	9.0
2023	9.0
2024	9.0
2025	9.0
Thereafter	\$ 788.4

12) Product Warranties

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

Product warranty activities were as follows:

	Three Months Ended March 31,	
	2020	2019
Beginning of period	\$ 14.9	\$ 10.4
Assumed product warranty liability from ESI Merger	—	7.2
Provision for product warranties	6.7	6.0
Direct and other charges to warranty liability	(6.3)	(6.7)
End of period ⁽¹⁾	<u>\$ 15.3</u>	<u>\$ 16.9</u>

(1) As of March 31, 2020, short-term product warranty of \$12.2 and long-term product warranty of \$3.1 were included within other current liabilities and other non-current liabilities, respectively, within the accompanying condensed consolidated balance sheet. As of March 31, 2019, short-term product warranty of \$13.8 and long-term product warranty of \$3.1 were included within other current liabilities and other non-current liabilities, respectively, within the accompanying condensed consolidated balance sheet.

13) Income Taxes

The Company's effective tax rates for the three months ended March 31, 2020 and 2019 were 15.0 % and 18.8%, respectively. The effective tax rates for the three months ended March 31, 2020 and 2019 were lower than the U.S. statutory tax rate due to the U.S. deduction for foreign derived intangible income, the federal tax credit for research activities and the geographic mix of income earned by the Company's international subsidiaries being taxed at rates lower than the U.S. statutory tax rate, offset by the U.S. global intangible low-taxed income inclusion, the \$1 million limitation on the deduction of executive compensation and state income taxes.

On March 27, 2020, the United States enacted the Coronavirus Aid, Relief, and Economic Security ("CARES") Act which contains numerous income tax provisions among other tax and non-tax provisions. Some of these income tax provisions have retroactive effect on years before the date of enactment. The Company has evaluated the CARES Act legislation in relation to income taxes and does not expect the CARES Act income tax provisions to have a material impact on its financial position, results of operations and cash flows.

As of March 31, 2020 and December 31, 2019 the total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately \$44.1 and \$43.5, respectively. As of March 31, 2020, if these benefits were recognized in a future period, the timing of which is not estimable, the net unrecognized tax benefit of \$36.1, 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 March 31, 2020 and December 31, 2019, the Company had accrued interest on unrecognized tax benefits of approximately \$0.6 and \$0.5, respectively.

Over the next 12 months it is reasonably possible that the Company may recognize approximately \$0.7 of previously net unrecognized tax benefits, excluding interest and penalties, related to various U.S. 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. statute of limitations remains open for tax years 2016 through the present. The statute of limitations for the Company's tax filings in other jurisdictions varies between fiscal years 2014 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.

14) Net Income Per Share

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

	Three Months Ended March 31,	
	2020	2019
Numerator:		
Net income	\$ 69.1	\$ 12.5
Denominator:		
Shares used in net income per common share – basic	54,918,000	54,147,000
Effect of dilutive securities:		
Restricted stock units, stock appreciation rights and shares issued under employee stock purchase plan	318,000	701,000
Shares used in net income per common share – diluted	55,236,000	54,848,000
Net income per common share:		
Basic	\$ 1.26	\$ 0.23
Diluted	\$ 1.25	\$ 0.23

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

For the three months ended March 31, 2020 and 2019, there were approximately 36,100 and 128,200 weighted-average restricted stock units, respectively, that would have had an anti-dilutive effect on EPS, and were excluded from the computation of diluted weighted-average shares.

15) Stock-Based Compensation

The Company grants 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 ESI Merger, the Company assumed:

- all RSUs that vest based solely on the satisfaction of service conditions, granted under any ESI equity plan, arrangement or agreement (“ESI Plan”) that were outstanding immediately prior to the effective time of the ESI Merger, and as to which shares of ESI common stock were not fully distributed in connection with the closing of the ESI Merger,
- all RSUs that were granted subject to vesting based on both the achievement of performance goals and the satisfaction of service conditions granted under any ESI Plan that were outstanding immediately prior to the effective time of the ESI Merger, and
- all SARs granted under any ESI Plan, whether vested or unvested, that were outstanding immediately prior to the effective time of the ESI Merger and held by an individual who was a service provider of ESI as of the date on which the effective time of the ESI Merger occurred.

As of the effective time of the ESI Merger, based on a formula in the ESI Merger Agreement, (a) such RSUs were converted automatically into RSUs with respect to 736,000 shares of the Company’s common stock (the “Assumed RSUs”), and (b) such SARs were converted automatically into SARs with respect to 13,000 shares of the Company’s common stock (the “Assumed SARs”).

Included in the total number of Assumed RSUs are 326,000 shares of the Company’s common stock for employees and outside directors that are part of the ESI Deferred Compensation plan (the “ESI DC Plan”). These shares will not become issued shares until their respective release dates.

The shares of the Company’s common stock that are subject to the Assumed SARs and the Assumed RSUs are issuable pursuant to the Company’s 2014 Plan.

The 749,000 shares of the Company’s common stock that are issuable pursuant to the Assumed RSUs and the Assumed SARs under the Company’s 2014 Plan were registered under the Securities Act of 1933 on the Registration Statement on Form S-8. These shares are in addition to the 18,000,000 shares of the Company’s common stock reserved for issuance under the 2014 Plan and previously registered under the Securities Act of 1933 on the Registration Statement on Form S-8.

During the three months ended March 31, 2020, the Company granted 88,000 RSUs with a weighted average grant date fair value of \$112.24. During the three months ended March 31, 2019, the Company granted 182,000 RSUs with a weighted average grant date fair value of \$82.58. There were no SARs granted during the three months ended March 31, 2020 or 2019.

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

	Three Months Ended March 31,	
	2020	2019
Cost of revenues	\$ 1.0	\$ 0.4
Research and development	1.1	0.8
Selling, general and administrative	5.9	8.0
Acquisition and integration cost	0.5	18.6
Total pre-tax stock-based compensation expense	<u>\$ 8.5</u>	<u>\$ 27.8</u>

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At March 31, 2020, 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 \$27.9, 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.

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

	Three Months Ended March 31, 2020	
	Outstanding RSUs	Weighted Average Grant Date Fair Value
RSUs – beginning of period	1,102,534	\$ 85.93
Accrued dividend shares	254	\$ 100.84
Granted	88,368	\$ 112.24
Vested	(446,503)	\$ 84.06
Forfeited	(41,642)	\$ 83.76
RSUs – end of period	<u>703,011</u>	<u>\$ 90.56</u>

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

	Three Months Ended March 31, 2020	
	Outstanding SARs	Weighted Average Grant Date Fair Value
SARs – beginning of period	108,854	\$ 29.05
Exercised	(16,216)	\$ 23.87
Forfeited or expired	—	\$ —
SARs Outstanding – end of period	<u>92,638</u>	<u>\$ 30.0</u>

16) 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 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. The Company has repurchased approximately 2,588,000 shares of common stock for approximately \$127 pursuant to the program since its adoption. During the three months ended March 31, 2020 and 2019, there were no repurchases of common stock.

Cash Dividends

Holder of the Company's common stock are entitled to receive dividends when they are declared by the Company's Board of Directors. In addition, the Company accrues dividend equivalents on the RSUs the Company assumed in the ESI Merger described in Note 15 above when dividends are declared by the Company's Board of Directors. During the three months ended March 31, 2020, the Company's Board of Directors declared a quarterly cash dividend of \$0.20 per share, which totaled \$11.0. During the three months ended March 31, 2019, the Company's Board of Directors declared a quarterly cash dividend of \$0.20 per share, which totaled \$10.8.

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 Term Loan Facility and ABL Facility, the Company may be restricted from paying dividends under certain circumstances.

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

The Company is a global provider of instruments, systems, 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, electronic control technology, reactive gas generation and delivery, power generation and delivery, vacuum technology, lasers, photonics, optics, precision motion control, vibration control and laser-based manufacturing systems solutions. The Company also provides services relating to the maintenance and repair of its products, installation services and training. The Company's primary served markets include semiconductor, industrial technologies, life and health sciences, 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. Effective February 1, 2019, in conjunction with its acquisition of ESI, the Company created a third reportable segment known as the Equipment & Solutions segment in addition to its two then-existing reportable segments: 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 the Company's core competencies in pressure measurement and control, flow measurement and control, gas and vapor delivery, gas composition analysis, electronic control technology, reactive gas generation and delivery, power generation and delivery 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, optics, precision motion control and vibration control.

The Equipment & Solutions segment provides laser-based manufacturing systems solutions for the micro-machining industry that enable customers to optimize production. The Equipment & Solutions segment's primary served markets include flexible and rigid PCB processing/fabrication, semiconductor wafer processing, and passive component manufacturing and testing. The Equipment & Solutions segment's systems incorporate specialized laser technology and proprietary control software to efficiently process the materials and components that are an integral part of electronic devices and systems.

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.

The following table sets forth net revenues by reportable segment:

	Three Months Ended March 31,	
	2020	2019
Vacuum & Analysis	\$ 319.3	\$ 234.4
Light & Motion	165.4	194.0
Equipment & Solutions	51.0	35.2
	<u>\$ 535.7</u>	<u>\$ 463.6</u>

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The following table sets forth a reconciliation of segment gross profit to consolidated net income:

	Three Months Ended March 31,	
	2020	2019
Gross profit by reportable segment:		
Vacuum & Analysis	\$ 140.8	\$ 98.1
Light & Motion	75.6	92.9
Equipment & Solutions	23.2	7.1
Total gross profit by reportable segment	239.6	198.1
Operating expenses:		
Research and development	42.4	38.9
Selling, general and administrative	87.2	82.5
Acquisition and integration costs	2.2	30.2
Restructuring and other	0.4	1.9
Fees and expenses related to repricing of Term Loan Facility	—	5.8
Amortization of intangible assets	16.3	15.7
Asset impairments	1.2	—
Income from operations	89.9	23.1
Interest income	0.7	1.7
Interest expense	8.9	9.1
Other expense, net	0.4	0.3
Income before income taxes	81.3	15.4
Provision for income taxes	12.2	2.9
Net income	\$ 69.1	\$ 12.5

The following table sets forth capital expenditures by reportable segment for the three months ended March 31, 2020 and 2019:

	Vacuum & Analysis	Light & Motion	Equipment & Solutions	Total
Three Months Ended March 31, 2020:				
Capital expenditures	\$ 4.1	\$ 4.0	\$ 1.9	\$ 10.0
Three Months Ended March 31, 2019:				
Capital expenditures	\$ 7.5	\$ 5.1	\$ 1.9	\$ 14.5

The following table sets forth depreciation and amortization by reportable segment for the three months ended March 31, 2020 and 2019:

	Vacuum & Analysis	Light & Motion	Equipment & Solutions	Total
Three Months Ended March 31, 2020:				
Depreciation and amortization	\$ 4.9	\$ 13.4	\$ 10.1	\$ 28.4
Three Months Ended March 31, 2019:				
Depreciation and amortization	\$ 4.1	\$ 14.1	\$ 7.0	\$ 25.2

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

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The following table sets forth segment assets by reportable segment:

March 31, 2020:	Vacuum & Analysis	Light & Motion	Equipment & Solutions	Corporate, Eliminations & Other	Total
Segment assets:					
Accounts receivable	\$ 196.1	\$ 158.6	\$ 57.7	\$ (31.4)	\$ 381.0
Inventory, net	227.2	174.5	72.4	0.1	474.2
Total segment assets	<u>\$ 423.3</u>	<u>\$ 333.1</u>	<u>\$ 130.1</u>	<u>\$ (31.3)</u>	<u>\$ 855.2</u>
December 31, 2019:	Vacuum & Analysis	Light & Motion	Equipment & Solutions	Corporate, Eliminations & Other	Total
Segment assets:					
Accounts receivable	\$ 185.9	\$ 147.2	\$ 40.1	\$ (32.1)	\$ 341.1
Inventory, net	224.8	163.7	73.5	0.1	462.1
Total segment assets	<u>\$ 410.7</u>	<u>\$ 310.9</u>	<u>\$ 113.6</u>	<u>\$ (32.0)</u>	<u>\$ 803.2</u>

The following is a reconciliation of segment assets to consolidated total assets:

	March 31, 2020	December 31, 2019
Total segment assets	\$ 855.2	\$ 803.2
Cash and cash equivalents and short-term investments	503.4	524.0
Other current assets	98.0	106.3
Property, plant and equipment, net	238.2	241.9
Right-of-use asset	127.1	64.5
Goodwill and intangible assets, net	1,604.1	1,623.1
Other assets	48.9	53.3
Consolidated total assets	<u>\$ 3,474.9</u>	<u>\$ 3,416.3</u>

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 March 31,	
	2020	2019
Net revenues:		
United States	\$ 231.5	\$ 224.4
South Korea	76.0	35.8
China	49.7	37.8
Japan	39.9	42.1
Germany	34.5	38.1
Other	104.1	85.4
	<u>\$ 535.7</u>	<u>\$ 463.6</u>

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

Long-lived assets:(1)	March 31, 2020	December 31, 2019
United States	\$ 273.3	\$ 208.3
Europe	37.7	41.4
Asia	84.2	89.6
	<u>\$ 395.2</u>	<u>\$ 339.3</u>

(1) Long-lived assets include property, plant and equipment, net, right-of-use assets, and certain other assets, and exclude goodwill, intangible assets and long-term tax-related accounts.

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

Reportable segment:	March 31, 2020	December 31, 2019
Vacuum & Analysis	\$ 196.1	\$ 196.7
Light & Motion	387.4	388.5
Equipment & Solutions	472.9	473.3
Total goodwill	<u>\$ 1,056.4</u>	<u>\$ 1,058.5</u>

Worldwide Product Information

The Company groups its product offerings into three groups based upon the similarity of product function as follows:

	Three Months Ended March 31,	
	2020	2019
Advanced Manufacturing Components	\$ 425.9	\$ 371.4
Global Service	74.5	66.2
Advanced Manufacturing Systems	35.3	26.0
	<u>\$ 535.7</u>	<u>\$ 463.6</u>

Advanced manufacturing components are comprised of product revenues from the Company's Vacuum & Analysis and Light & Motion segments. Global service is comprised of total service revenues for all three of the Company's reportable segments. Advanced manufacturing systems is comprised of product revenues for the Company's Equipment & Solutions segment.

Major Customers

For the three months ended March 31, 2020, the Company had two customers that each accounted for 10% or more of the Company's total net revenues. Net revenues from Applied Materials, Inc. and LAM Research Corporation constituted 11% and 10% of the Company's total net revenues for the period, respectively. For the three months ended March 31, 2019, no single customer accounted for 10% or more of the Company's total net revenues.

18) Restructuring and Other

Restructuring

The Company recorded restructuring charges of \$0.9 during the three months ended March 31, 2020, primarily related to duplicate facility costs. The Company recorded restructuring charges of \$0.2 during the three months ended March 31, 2019, primarily related to severance costs related to the consolidation of certain functions in Asia.

Restructuring activities were as follows:

	Three Months Ended March 31,	
	2020	2019
Beginning of period	\$ 3.7	\$ 2.6
Charged to expense	0.9	0.2
Payments and adjustments	(1.7)	(0.2)
End of period	<u>\$ 2.9</u>	<u>\$ 2.6</u>

Other

The Company received an insurance reimbursement of \$0.5 during the three months ended March 31, 2020 for costs recorded on a legal settlement from a contractual obligation assumed as part of the acquisition of Newport. The Company recorded a charge of \$1.7 during the three months ended March 31, 2019 related to a legal settlement from a contractual obligation we assumed as part of our acquisition of Newport.

19) Commitments and Contingencies

In 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 (“Newport Merger Agreement”) between the Company, Newport, and a wholly-owned subsidiary of the Company (“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 Court consolidated the actions, and plaintiffs later 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 Newport Merger Agreement. The amended complaint alleged Newport’s former board of directors breached their fiduciary duties to Newport’s stockholders and that the Company, Newport and Merger Sub had aided and abetted these breaches and sought monetary damages, including pre- and post-judgment interest. In June 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. On August 9, 2019, plaintiffs filed a motion for leave to file a third amended complaint, which was denied on October 10, 2019. On August 23, 2019, defendants filed a motion for summary judgment. On January 23, 2020, the court entered its findings of fact, conclusions of law, and order granting defendants’ motion for summary judgment. On February 18, 2020, plaintiffs filed a notice of appeal from the court’s order granting defendants’ motion for summary judgment, as well as from the court’s prior orders granting defendants’ motion for a bench trial and denying plaintiffs’ motion for leave to file an amended complaint. On March 20, 2020, plaintiffs filed a motion to retax and settle costs, and defendants filed a motion for attorneys’ fees. A hearing on both motions is scheduled for August 4, 2020.

The Company is 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 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 regarding the future financial performance, business prospects and growth of MKS. These statements are only predictions based on current assumptions and expectations. Any statements that are not statements of historical fact (including statements containing the words "will," "projects," "intends," "believes," "plans," "anticipates," "expects," "estimates," "forecasts," "continues" and similar expressions) should be considered to be forward-looking statements. Actual events or results may differ materially from those in the forward-looking statements set forth herein. Among the important factors that could cause actual events to differ materially from those in the forward-looking statements are the conditions affecting the markets in which MKS operates, including the fluctuations in capital spending in the semiconductor industry and other advanced manufacturing markets, fluctuations in sales to our major customers, the impact of the COVID-19 pandemic on the global economy and financial markets, including any restrictions on MKS' operations and the operations of MKS' customers and suppliers resulting from public health requirements and government mandates, the impact of new or proposed trade regulations, the terms of our Term Loan Facility, competition from larger or more established companies in MKS' markets; MKS' ability to successfully grow ESI's business; the challenges, risks and costs involved with integrating the operations of the companies we have acquired, the Company's ability to successfully grow our business, potential fluctuations in quarterly results, dependence on new product development, rapid technological and market change, acquisition strategy, manufacturing and sourcing risks, volatility of stock price, international operations, financial risk management, and the other factors described in MKS' most recent Annual Report on Form 10-K for the year ended December 31, 2019 and any subsequent Quarterly Reports on Form 10-Q, as filed with the SEC. MKS is under no obligation to, and expressly disclaims any obligation to, update or alter these forward-looking statements, whether as a result of new information, future events or otherwise after the date of this presentation.

The Management's Discussion and Analysis of Financial Condition and Results of Operations, or MD&A, describes principal factors affecting the results of our operations, financial condition and liquidity, as well as our critical accounting policies and estimates that require significant judgment and thus have the most significant potential impact on our Consolidated Financial Statements. This section provides an analysis of our financial results for the quarter ended March 31, 2020 compared to the quarter ended March 31, 2019. For the discussion and analysis covering the quarter ended March 31, 2019 compared to the quarter ended March 31, 2018, please refer to Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our Quarterly Report on Form 10-Q for the quarter ended March 31, 2019, as filed with the SEC on May 8, 2019.

Overview

We are a global provider of instruments, systems, 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 our customers. Our products are derived from our core competencies in pressure measurement and control, flow measurement and control, gas and vapor delivery, gas composition analysis, electronic control technology, reactive gas generation and delivery, power generation and delivery, vacuum technology, lasers, photonics, optics, precision motion control, vibration control and laser-based manufacturing systems solutions. We also provide services relating to the maintenance and repair of our products, installation services and training. Our primary served markets include semiconductor, industrial technologies, life and health sciences, research and defense.

Recent Events

Impact of COVID-19

The World Health Organization formally declared the outbreak of COVID-19 a pandemic in March 2020. This pandemic has impacted the global economy and we have devoted considerable resources to address the impact to our employees and manufacturing capacity, as well as how to manage government mandates reacting to the pandemic, supply chain disruptions, and changing demand from our customers for our products and services.

In January 2020, we created a global COVID-19 task force which oversees our corporate activities in response to the pandemic. Our response has focused on:

Health and Safety of our Workforce

- Expediting social distancing and facility sanitation measures
- Establishing work-from-home policy
- Implementing and applying key safety precautions

Continuity of Operations

- Securing critical components amidst disruptions to supply chain
- Addressing rapid changes in workforce availability to ensure timely response to customer needs
- Harnessing our global services footprint to respond to the repair and maintenance needs of our customers

While our operations and financial performance in certain areas of our business have been negatively impacted by the COVID-19 pandemic, the impact to our financial results for the first quarter 2020 was minimal due to strong demand for our products from our semiconductor customers. However, the situation remains dynamic and there remains significant uncertainty as to the length and severity of the pandemic, the actions that may be taken by government authorities, the impact to the business of our customers and suppliers, the long-term economic implications and other factors identified in Part II, Item IA “Risk Factors” in this Quarterly Report on Form 10-Q. We believe the longer the COVID-19 pandemic continues, the more material the adverse impact will be on our business, financial condition and operating results. We will continue to evaluate the nature and extent of the impact to our business, financial condition and operating results.

Segments and Markets

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, electronic control technology, reactive gas generation and delivery, power generation and delivery, 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, optics, precision motion control and vibration control.

The Equipment & Solutions segment was created in conjunction with the completion of our acquisition of Electro Scientific Industries, Inc. on February 1, 2019 (the “ESI Merger”). The Equipment & Solutions segment provides laser-based manufacturing systems solutions for the micro-machining industry that enable customers to optimize production. The primary served markets for the Equipment & Solutions segment include flexible and rigid printed circuit board (“PCB”) processing/fabrication, semiconductor wafer processing and passive component manufacturing and testing. The Equipment & Solutions segment’s systems incorporate specialized laser technology and proprietary control software to efficiently process the materials and components that are an integral part of electronic devices and systems.

We have a diverse base of customers. Approximately 42% and 52% of our net revenues, for the three months ended March 31, 2020 and 2019, respectively, were from sales to customers in our advanced markets. These include, but are not limited to, industrial technologies, life and health sciences, and research and defense.

Approximately 58% and 48% of our net revenues, for the three months ended March 31, 2020 and 2019, respectively, were from sales to semiconductor capital equipment manufacturers and semiconductor device manufacturers.

Net revenues from customers in our advanced markets decreased by \$20.1 million, or 8%, for the three months ended March 31, 2020, compared to the same period in the prior year, primarily due to a decrease of \$32.6 million from our Light & Motion segment. This decrease was offset by an increase of \$12.3 million in our Equipment & Solutions segment which includes three months of revenue for customers in our advanced markets compared with only two months of revenue in the same period in the prior year, as a result of the ESI Merger. The advanced markets industry experienced an overall modest decline in 2020 driven by a general slowdown in the industrial markets as well as our research end-market which was negatively impacted in the first quarter of 2020 by university and research lab closures resulting from COVID-19.

Net revenues from semiconductor capital equipment manufacture and semiconductor device manufacture customers increased by \$92.3 million, or 42%, for the three months ended March 31, 2020, compared to the same period in the prior year, primarily due to increases of \$84.7 million, \$4.0 million and \$3.6 million from our Vacuum & Analysis, Light & Motion and Equipment & Solutions segments, respectively. This increase is primarily driven by broad-based demand across foundry, logic and memory manufacturing activities. 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.

A significant portion of our net revenues is from sales to customers in international markets. For the three months ended March 31, 2020 and 2019, international net revenues accounted for approximately 57% and 52%, respectively, of our total net revenues. A significant portion of our international net revenues was from China, South Korea, Germany and Japan. We expect international net revenues will continue to represent a significant percentage of our total net revenues. Long-lived assets located in the United States were \$273.3 million and \$208.3 million, as of March 31, 2020 and December 31, 2019, respectively, excluding goodwill, intangible assets, and long-term tax-related accounts. Long-lived assets located outside of the United States were \$121.9 million and \$131.0 million, as of March 31, 2020 and December 31, 2019, respectively, excluding goodwill and intangibles, and long-term tax-related accounts.

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, 2019.

While we do not believe that the impact on the business to date of the COVID-19 pandemic has triggered the need to perform an impairment test on goodwill, we will continue to assess the impact on our business.

For further information about our critical accounting policies, please see the discussion of critical accounting policies in our Annual Report on Form 10-K for the year ended December 31, 2019 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 March 31,	
	2020	2019
Net revenues:		
Product	86.1%	85.7%
Services	13.9	14.3
Total net revenues	100.0	100.0
Cost of revenues:		
Product	47.8	49.6
Services	7.5	7.7
Total cost of revenues	55.3	57.3
Gross profit	44.7	42.7
Research and development	7.9	8.4
Selling, general and administrative	16.3	17.8
Acquisition and integration costs	0.4	6.5
Restructuring and other	0.1	0.4
Fees and expenses related to repricing of Term Loan Facility	—	1.2
Amortization of intangible assets	3.0	3.4
Asset impairments	0.2	—
Income from operations	16.8	5.0
Interest income	0.1	0.4
Interest expense	1.6	2.0
Other expense, net	0.1	0.1
Income before income taxes	15.2	3.3
Provision for income taxes	2.3	0.6
Net income	12.9%	2.7%

Net Revenues

	Three Months Ended March 31,	
	2020	2019
<i>(dollars in millions)</i>		
Product	\$ 461.2	\$ 397.4
Service	74.5	66.2
Total net revenues	\$ 535.7	\$ 463.6

Product revenues increased \$63.8 million during the three months ended March 31, 2020, compared to the same period in the prior year, due to volume increases in net product revenues from our semiconductor customers of \$90.3 million and a decrease in net product revenues from customers in our advanced markets of \$26.5 million.

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. Service revenues increased \$8.3 million during the three months ended March 31, 2020 compared to the same period in the prior year, of which \$6.4 million related to customers in our advanced markets. This increase in service revenue in our advanced markets was substantially all from our Equipment & Solutions segment.

Total international net revenues, including product and service, were \$304.2 million for the three months ended March 31, 2020 compared to \$239.2 million for the three months ended March 31, 2019. The increase of \$65.0 million was primarily due to increases in net revenues in South Korea and China.

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

<i>(dollars in millions)</i>	Three Months Ended March 31,	
	2020	2019
Net revenues:		
Vacuum & Analysis	\$ 319.3	\$ 234.4
Light & Motion	165.4	194.0
Equipment & Solutions	51.0	35.2
Total net revenues	\$ 535.7	\$ 463.6

Net revenues from our Vacuum & Analysis segment increased \$84.9 million for the three months ended March 31, 2020, compared to the same period in the prior year, primarily due to volume increases in net revenues from semiconductor customers of \$84.7 million.

Net revenues from our Light & Motion segment decreased \$28.6 million for the three months ended March 31, 2020, compared to the same period in the prior year. The decrease was primarily attributed to a decrease in net revenues from customers in our advanced markets of \$32.6 million, primarily from customers in our research and defense and process and industrial technologies markets, offset by an increase of \$4.0 million from semiconductor customers.

Net revenues from our Equipment & Solutions segment increased \$15.8 million for the three months ended March 31, 2020, compared to the same period in the prior year. The increase was primarily attributed to an increase in net revenues from customers in our advanced markets of \$12.2 million, primarily from customers in our process and industrial technologies market, and an increase of \$3.6 million from semiconductor customers. As a result of the ESI Merger, the Equipment & Solutions segment included three months of revenue in the three months ended March 31, 2020 compared with only two months of revenue in the same period in the prior year.

Gross Profit

	Three Months Ended March 31,		% Points Change
	2020	2019	
Gross profit as a percentage of net revenues:			
Product	44.5%	42.2%	2.3%
Service	46.3	46.0	0.3
Total gross profit	44.7%	42.7%	2.0%

Gross profit as a percentage of net product revenues increased by 2.3 percentage points for the three months ended March 31, 2020, compared to the same period in the prior year, primarily due to higher revenue volumes.

Gross profit as a percentage of net service revenues increased by 0.3 percentage points for the three months ended March 31, 2020, compared to the same period in the prior year, primarily due to favorable product mix partially offset by unfavorable absorption.

The following table sets forth gross profit as a percentage of net revenues by reportable segment:

	Three Months Ended March 31,		% Points Change
	2020	2019	
Gross profit as a percentage of net revenues:			
Vacuum & Analysis	44.1%	41.7%	2.4%
Light & Motion	45.5	47.8	(2.3)
Equipment & Solutions	45.6	20.6	25.0
Total gross profit	44.7%	42.7%	2.0%

Gross profit for our Vacuum & Analysis segment increased by 2.4 percentage points for the three months ended March 31, 2020, compared to the same period in the prior year, primarily due to higher revenue volumes.

Gross profit for our Light & Motion segment decreased by 2.3 percentage points for the three months ended March 31, 2020, compared to the same period in the prior year, primarily due to lower revenue volumes and unfavorable product mix.

Gross profit for our Equipment & Solutions segment increased by 25.0 percentage points for the three months ended March 31, 2020, compared to the same period in the prior year. The gross margin for the three months ended March 31, 2019 was lower than normal partly due to the amortization of the inventory step-up adjustment to fair value from purchase accounting of \$5.1 million. Excluding this adjustment, the gross margin for the three months ended March 31, 2019 would have been 35.1%. In addition, gross margin for the three months ended March 31, 2019 was negatively impacted by negative product mix and higher freight and duty costs compared to the three months ended March 31, 2020.

Research and Development

<i>(dollars in millions)</i>	Three Months Ended March 31,	
	2020	2019
Research and development expenses	\$ 42.4	\$ 38.9

Research and development expenses increased \$3.5 million for the three months ended March 31, 2020, compared to the same period in the prior year. The increase was primarily related to an increase of \$3.0 million in compensation related costs and \$0.4 million in professional fees.

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 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 March 31,	
	2020	2019
Selling, general and administrative expenses	\$ 87.2	\$ 82.5

Selling, general and administrative expenses increased \$4.7 million for the three months ended March 31, 2020, compared to the same period in the prior year. The increase was primarily related to an increase of \$1.3 million in professional fees, \$1.2 million in compensation related costs, \$1.2 million in information technology costs and \$1.5 million in insurance and software costs. These costs were offset by a \$1.0 million decrease in travel and entertainment costs mainly as a result of COVID-19.

Acquisition and Integration Costs

<i>(dollars in millions)</i>	Three Months Ended March 31,	
	2020	2019
Acquisition and integration costs	\$ 2.2	\$ 30.2

We recorded acquisition and integration costs related to the ESI Merger, which closed on February 1, 2019, during the three months ended March 31, 2020 and 2019. The costs for the three months ended March 31, 2019 consisted primarily of compensation costs for certain executives from ESI who had change in control provisions in their respective ESI employment agreements that were accounted for as dual-trigger arrangements and other stock vesting accelerations, as well as consulting and professional fees associated with the ESI Merger.

Restructuring and Other

<i>(dollars in millions)</i>	Three Months Ended March 31,	
	2020	2019
Restructuring and other	\$ 0.4	\$ 1.9

We recorded restructuring and other related costs during the three months ended March 31, 2020, primarily related to duplicate facility costs attributed to entering into new facility leases, partially offset by an insurance reimbursement for costs recorded on a legal settlement from a contractual obligation we assumed as part of our acquisition of Newport Corporation (the "Newport Merger").

We recorded restructuring costs during the three months ended March 31, 2019, which were primarily comprised of severance costs related to the consolidation of certain functions in Asia. In addition, we recorded a charge for a legal settlement from a contractual obligation we assumed as part of the Newport Merger.

Fees and Expenses Related to repricing of Term Loan Facility

<i>(dollars in millions)</i>	Three Months Ended March 31,	
	2020	2019
Fees and expenses related to repricing of Term Loan Facility	\$ —	\$ 5.8

We recorded fees and expenses related to Amendment No. 5 to our Term Loan Credit Agreement, as defined and as described further below, which provided for the 2019 Incremental Term Loan Facility, as defined and as described further below, and which related to the ESI Merger, during the three months ended March 31, 2019.

Amortization of Intangible Assets

<i>(dollars in millions)</i>	Three Months Ended March 31,	
	2020	2019
Amortization of intangible assets	\$ 16.3	\$ 15.7

Amortization of intangible assets increased by \$0.6 million during the three months ended March 31, 2020, compared to the same period in the prior year, primarily due to the amortization of intangible assets acquired as part of the ESI Merger.

Asset Impairments

<i>(dollars in millions)</i>	Three Months Ended March 31,	
	2020	2019
Asset impairments	\$ 1.2	\$ —

We recorded an asset impairment charge during the three months ended March 31, 2020, as a result of the write-down of long-lived assets related to the pending closure of a facility.

Interest Expense, Net

<i>(dollars in millions)</i>	Three Months Ended March 31,	
	2020	2019
Interest expense, net	\$ 8.2	\$ 7.4

Interest expense, net, increased by \$0.8 million for the three months ended March 31, 2020, compared to the same period in the prior year, primarily due to lower interest income as a result of lower investment balances and lower interest rates.

Other Expense, Net

<i>(dollars in millions)</i>	Three Months Ended March 31,	
	2020	2019
Other expense, net	\$ 0.4	\$ 0.3

The changes in other expense, net, for the three months ended March 31, 2020 and 2019, primarily related to changes in foreign exchange rates.

Provision for Income Taxes

<i>(dollars in millions)</i>	Three Months Ended March 31,	
	2020	2019
Provision for income taxes	\$ 12.2	\$ 2.9

Our effective tax rates for the periods ended March 31, 2020 and 2019 were 15.0% and 18.8%, respectively. Our effective tax rates for the three months ended March 31, 2020 and 2019 were lower than the U.S. statutory tax rate mainly due to the U.S. deduction for foreign derived intangible income, the U.S. credit for research activities and the geographic mix of income earned by the international subsidiaries being taxed at rates lower than the U.S. statutory tax rate, offset by the global intangible low-taxed income inclusion, the \$1 million limitation on the deduction of executive compensation and state income taxes.

As of March 31, 2020 and December 31, 2019 the total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately \$44.1 million and \$43.5 million, respectively. As of March 31, 2020, if these benefits were recognized in a future period, the timing of which is not estimable, the net unrecognized tax benefit of \$36.1 million, excluding interest and penalties, would impact our effective tax rate.

Over the next 12 months it is reasonably possible that we may recognize approximately \$0.7 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 2016 through present. The statute of limitations for our tax filings in other jurisdictions varies between fiscal years 2014 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.

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.

On March 27, 2020, the United States enacted the Coronavirus Aid, Relief, and Economic Security ("CARES") Act which contains numerous income tax provisions among other tax and non-tax provisions. Some of these income tax provisions have retroactive effect on years before the date of enactment. We have evaluated the CARES Act legislation in relation to income taxes and do not expect the CARES Act income tax provisions to have a material impact on our financial position, results of operations and cash flows.

Our future effective tax rate depends on various factors, including further interpretations and guidance from federal, foreign and state governments, the geographic composition of our pre-tax income, the results of tax audits 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. 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 and short-term marketable investments totaled \$503.4 million at March 31, 2020, compared to \$524.0 million at December 31, 2019. The primary driver in our current and anticipated future cash flows is and will continue to be cash generated from operations, consisting primarily of our net income, excluding non-cash changes and changes in operating assets and liabilities. In periods when our sales are growing, higher sales to customers will result in increased trade receivables, and inventories will generally increase as we build products for future sales. This may result in lower cash generated from operations. Conversely, in periods when our sales are declining, our trade accounts receivable and inventory balances will generally decrease, resulting in increased cash from operations.

Net cash provided by operating activities was \$74.9 million for the three months ended March 31, 2020 and resulted from net income of \$69.1 million, which included non-cash charges of \$46.1 million, offset by a net increase in working capital of \$40.3 million. The net increase in working capital was primarily due to an increase in accounts receivable of \$42.5 million due to higher revenue levels, an increase in inventories of \$20.3 million and a decrease of \$19.3 million in accrued compensation, partially offset by an increase in accounts payable of \$22.7 million, an increase in other liabilities of \$8.0 million and a decrease in other assets of \$10.1 million.

Net cash provided by investing activities was \$38.0 million for the three months ended March 31, 2020 and was primarily due to the net sales and maturities of short-term investments of \$48.0 million partially offset by the purchases of production-related equipment of \$10.0 million.

Net cash used in financing activities was \$81.5 million for the three months ended March 31, 2020 and was primarily due to repayment of our Term Loan Facility of \$52.3 million, payments on short-term borrowings of \$9.9 million, net payments related to tax payments on the vesting of employee stock awards of \$20.4 million, and dividend payments of \$11.0 million. These uses were partially offset by proceeds from short-term borrowings of \$12.1 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. We have repurchased approximately 2.6 million shares of common stock for approximately \$127 million pursuant to the program since its adoption. During the three months ended March 31, 2020 and 2019, there were no repurchases of common stock.

Holders of our common stock are entitled to receive dividends when and if they are declared by our Board of Directors. In addition, we accrue dividend equivalents on the RSUs we assumed in the ESI Merger when dividends are declared by the Company's Board of Directors. Our Board of Directors declared a cash dividend of \$0.20 per share during the first quarter of 2020, which totaled \$11.0 million. Our Board of Directors declared a cash dividend of \$0.20 per share during the first quarter of 2019, which totaled \$10.8 million.

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 Term Loan Facility and ABL Facility, we may be restricted from paying dividends under certain circumstances.

Senior Secured Term Loan Credit Facility

In connection with the completion of the acquisition of Newport Corporation ("Newport") in April 2016 (the "Newport Merger"), we entered into a term loan credit agreement (the "Term Loan 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 a senior secured term loan credit facility in the original principal amount of \$780.0 million (the "2016 Term Loan Facility"), subject to increase at our option and subject to receipt of lender commitments in accordance with the Term Loan Credit Agreement (the 2016 Term Loan Facility, together with the 2019 Incremental Term Loan Facility and 2019 Term Loan Refinancing Facility (each as

defined below), the “Term Loan Facility”). Prior to the effectiveness of Amendment No. 6 (as defined below), the 2016 Term Loan Facility had a maturity date of April 29, 2023. As of March 31, 2020, borrowings under the Term Loan Facility bear interest per annum at one of the following rates selected by us: (a) a base rate determined by reference to the highest of (1) the federal funds effective rate plus 0.50%, (2) the “prime rate” quoted in *The Wall Street Journal*, (3) a London Interbank Offer Rate (“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 0.0%, plus an applicable margin. We have elected the interest rate as described in clause (b) of the foregoing sentence. The Term Loan Credit Agreement provides that, unless an alternate rate of interest is agreed, 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 2016 Term Loan Facility was issued with original issue discount of 1.00% of the principal amount thereof.

We subsequently entered into four separate repricing amendments to the 2016 Term Loan Facility, which decreased the applicable margin for LIBOR borrowings from 4.0% to 1.75%, with a LIBOR rate floor of 0.75%. As a consequence of the pricing of the 2019 Incremental Term Loan Facility (defined below), the applicable margin for the 2016 Term Loan Facility was increased to 2.00% (from 1.75%) with respect to LIBOR borrowings and 1.00% (from 0.75%) with respect to base rate borrowings.

On September 30, 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 of the 2016 Term Loan Facility. The rate was fixed at 1.198% per annum plus the applicable credit spread, which was 1.75% at March 31, 2020. At March 31, 2020, the notional amount of this transaction was \$250.0 million and it had a fair value liability of \$0.5 million.

We incurred \$28.7 million of deferred finance fees, original issue discount and repricing fees related to the term loans under the 2016 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.

On February 1, 2019, in connection with the completion of the ESI Merger, we entered into an amendment (“Amendment No. 5”) to the Term Loan Credit Agreement. Amendment No. 5 provided an additional tranche B-5 term loan commitment in the original principal amount of \$650.0 million (the “2019 Incremental Term Loan Facility”), all of which was drawn down in connection with the closing of the ESI Merger. Pursuant to Amendment No. 5, we also effectuated certain amendments to the Term Loan Credit Agreement which make certain of the negative covenants and other provisions less restrictive. Prior to the effectiveness of Amendment No. 6 (as defined below), the 2019 Incremental Term Loan Facility had a maturity date of February 1, 2026 and bore interest at a rate per annum equal to, at our option, a base rate or LIBOR rate (as described above) plus, in each case, an applicable margin equal to 1.25% with respect to base rate borrowings and 2.25% with respect to LIBOR borrowings. The 2019 Incremental Term Loan Facility was issued with original issue discount of 1.00% of the principal amount thereof.

On April 3, 2019, we entered into an interest rate swap agreement, which has a maturity date of March 31, 2023, to fix the rate on \$300.0 million of the then-outstanding balance of the 2019 Incremental Term Loan Facility. The rate was fixed at 2.309% per annum plus the applicable credit spread, which was 1.75% at March 31, 2020. At March 31, 2020, the notional amount of this transaction was \$300.0 million and it had a fair value liability of \$15.3 million.

We incurred \$11.4 million of deferred finance fees and original issue discount fees related to the term loans under the 2019 Incremental 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.

On September 27, 2019, we entered into an amendment (“Amendment No. 6”) to the Term Loan Credit Agreement. Amendment No. 6 refinanced all existing loans outstanding under the 2016 Term Loan Facility and 2019 Incremental Term Loan Facility (“Existing Term Loans”) for a tranche B-6 term loan commitment in the original principal amount of \$896.8 million (“2019 Term Loan Refinancing Facility”). Each lender of the Existing Term Loans that elected to participate in the 2019 Term Loan Refinancing Facility was deemed to have exchanged the aggregate outstanding principal amount of its Existing Term Loans for an equal aggregate principal amount of tranche B-6 term loans under the 2019 Term Loan Refinancing Facility. On the effective date of Amendment No. 6 and immediately prior to the exchanges described above, we made a voluntary prepayment of \$50.0 million, which was applied to the Existing Term Loans on a pro rata basis.

We incurred \$2.2 million of original issue discount fees related to the term loans under the 2019 Term Loan Refinancing 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.

As of March 31, 2020, the remaining balance of deferred finance fees and original issue discount of the Term Loan Facility was \$10.7 million. A portion of the deferred finance fees and original issue discount have been accelerated in connection with the various debt prepayments and extinguishments between 2016 and 2020.

The 2019 Term Loan Refinancing Facility matures on February 2, 2026, and bears interest at a rate per annum equal to, at our option, a base rate or LIBOR rate (as described above) plus, in each case, an applicable margin equal to 0.75% with respect to base rate borrowings and 1.75% with respect to LIBOR borrowings. The 2019 Term Loan Refinancing Facility was issued with original issue discount of 0.25% of the principal amount thereof.

We are required to make scheduled quarterly payments each equal to 0.25% of the original principal amount of the 2019 Term Loan Refinancing Facility with the balance due on February 2, 2026.

As of March 31, 2020, after total principal prepayments of \$575.0 million (which includes a \$50.0 million repayment made during the three months ended March 31, 2020) and regularly scheduled principal payments of \$14.9 million, the total outstanding principal balance of the Term Loan Facility was \$840.1 million and the interest rate was 3.35%.

Under the Term Loan 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 of our asset sales, certain casualty and condemnation events and the incurrence or issuance of certain debt.

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

The Term Loan 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 March 31, 2020, we were in compliance with all covenants under the Term Loan Credit Agreement.

Senior Secured Asset-Based Revolving Credit Facility

On February 1, 2019, in connection with the completion of the ESI Merger, we entered into an asset-based revolving credit agreement with Barclays Bank PLC, 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 Credit Agreement"), that provides a senior secured asset-based revolving credit facility of up to \$100.0 million, subject to a borrowing base limitation (the "ABL Facility"). On April 26, 2019, we entered into a First Amendment to the ABL Credit Agreement which amended the borrowing base calculation for eligible inventory prior to an initial field examination and appraisal requirements. The borrowing base for the ABL Facility at any time equals the sum of: (a) 85% of certain eligible accounts; plus (b) prior to certain notice and field examination and appraisal requirements, the lesser of (i) 20% of net book value of eligible inventory in the United States and (ii) 30% of the borrowing base, and after the satisfaction of such 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, in each case, subject to additional limitations and examination requirements for eligible accounts and eligible inventory acquired in an acquisition after February 1, 2019. The ABL Facility includes borrowing capacity in the form of letters of credit up to \$25.0 million.

Borrowings under the ABL Facility bear interest at a rate per annum equal to, at our option, any of the following, plus, in each case, an applicable margin: (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 0.00%; 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, with a floor of 0.00%. The initial applicable margin for borrowings under the ABL Facility is 0.50% with respect to base rate borrowings and 1.50% with respect to LIBOR borrowings. Commencing with the completion of the first fiscal quarter ending after the closing of the ABL Facility, the applicable margin for borrowings thereunder is subject to upward or downward adjustment each fiscal quarter, based on the average historical excess availability during the preceding quarter.

In addition to paying interest on any outstanding principal under the ABL Facility, we are required to pay a commitment fee in respect of the unutilized commitments thereunder equal to 0.25% per annum. We must also pay customary letter of credit fees and agency fees.

If at any time the aggregate amount of outstanding loans, protective advances, unreimbursed letter of credit drawings and undrawn letters of credit under the ABL Facility exceeds the lesser of (a) the commitment amount and (b) the borrowing base, we are required to repay outstanding loans and/or cash collateralize letters of credit, with no reduction of the commitment amount. During any period that the amount available under the ABL Facility is less than the greater of (i) \$8.5 million and (ii) 10.0% of the lesser of (1) the commitment amount and (2) the borrowing base for three consecutive business days, until the time when excess availability has been at least the greater of (i) \$8.5 million and (ii) 10.0% of the lesser of (1) the commitment amount and (2) the borrowing base, in each case, for 30 consecutive calendar days (a “Cash Dominion Period”), or during the continuance of an event of default, we are required to repay outstanding loans and/or cash collateralize letters of credit with the cash that it is required to deposit daily in a collection account maintained with the administrative agent under the ABL Facility. During a Cash Dominion Period, we may make borrowings under the ABL Facility subject to the satisfaction of customary funding conditions.

There is no scheduled amortization under the ABL Facility. The principal amount outstanding under the ABL Facility is due and payable in full on the fifth anniversary of the closing date.

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

From the time when we have excess availability less than the greater of (a) 10.0% of the lesser of (1) the commitment amount and (2) the borrowing base and (b) \$8.5 million, until the time when we have excess availability equal to or greater than the greater of (a) 10.0% of the lesser of (1) the commitment amount and (2) the borrowing base and (b) \$8.5 million for 30 consecutive days, or during the continuance of an event of default, the ABL Credit Agreement requires us to maintain a Fixed Charge Coverage Ratio (as defined in the ABL Credit Agreement) tested on the last day of each fiscal quarter of at least 1.0 to 1.0.

The ABL Credit Agreement also contains customary representations and warranties, affirmative covenants and provisions relating to events of default. If an event of default occurs, the lenders under the ABL Facility will be entitled to take various actions, including the acceleration of amounts due under the ABL Facility and all actions permitted to be taken by a secured creditor. We have not borrowed against the ABL Facility to date.

Lines of Credit and Short-Term Borrowing Arrangements

Our Japanese subsidiaries have lines of credit and a financing facility with various financial institutions, many of which generally expire and are renewed at three-month intervals with the remaining having no expiration date. The lines of credit and financing facility provided for aggregate borrowings as of March 31, 2020 of up to an equivalent of \$32.9 million U.S. dollars. Total borrowings outstanding under these arrangements were \$5.3 million and \$3.1 million at March 31, 2020 and December 31, 2019, respectively.

Off-Balance Sheet Arrangements

We do not have any financial partnerships with unconsolidated entities, such as entities often referred to as structured finance, special purpose entities or variable interest entities, which are often established for the purpose of facilitating off-balance sheet arrangements or 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

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, 2019.

Recently Issued Accounting Pronouncements

In March 2020, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) No. 2020-04, “Reference Rate Reform (Topic 848): Facilitation of the Effects of Reference Rate Reform on Financial Reporting.” This standard provides temporary optional expedients and exceptions to accounting guidance on contract modifications and hedge accounting to ease entities’ financial reporting burdens as the market transitions from the LIBOR and other interbank offered rates to alternative reference rates. The standard was effective upon issuance and generally can be applied through December 31, 2022. We are uncertain the effects of this standard will have on our financial position, results of operations and cash flows.

In December 2019, the FASB issued ASU 2019-12, “Income Taxes (Topic 740).” This standard simplifies the accounting for income taxes by removing certain exceptions to the general principles in Topic 740. The amendments also improve consistent application and simplify U.S. GAAP for other areas of Topic 740 by clarifying and amending existing guidance. This standard is effective for annual periods beginning after December 15, 2021, including interim periods within those fiscal years beginning after December 15, 2022. We evaluated the requirements of this ASU and the impact of pending adoption on our consolidated financial statements. We do not expect that the impact of these changes will be material to our financial position, results of operations and cash flows.

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, 2019 filed with the Securities and Exchange Commission on February 28, 2020. As of March 31, 2020, there were no material changes in our exposure to market risk from December 31, 2019.

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 March 31, 2020. 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 March 31, 2020, 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 March 31, 2020, 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 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 Corporation (“Newport”) for claims related to the merger agreement (“Newport Merger Agreement”) between the Company, Newport, and a wholly-owned subsidiary of the Company (“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 Court consolidated the actions, and plaintiffs later 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 Newport Merger Agreement. The amended complaint alleged that members of Newport’s board of directors breached their fiduciary duties to Newport’s stockholders and that the Company, Newport and Merger Sub had aided and abetted these breaches and sought monetary damages, including pre- and post-judgment interest. In June 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. On August 9, 2019, plaintiffs filed a motion for leave to file a third amended complaint, which was denied on October 10, 2019. On August 23, 2019, defendants filed a motion for summary judgment. On January 23, 2020, the court entered its findings of fact, conclusions of law, and order granting defendants’ motion for summary judgment. On February 18, 2020, plaintiffs filed a notice of appeal from the court’s order granting defendants’ motion for summary judgment, as well as from the court’s prior orders granting defendants’ motion for a bench trial and denying plaintiffs’ motion for leave to file an amended complaint. On March 20, 2020, plaintiffs filed a motion to retax and settle costs, and defendants filed a motion for attorneys’ fees. A hearing on both motions is scheduled for August 4, 2020.

The Company is 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, 2019 (the “Annual Report”) in the section entitled “Risk Factors.” The COVID-19 pandemic has heightened, and in some cases manifested, certain of the risks we normally face in operating our business, including those disclosed in the Annual Report, and the risk factor disclosure in the Annual Report is qualified by the information relating to the COVID-19 pandemic that is described in this Quarterly Report on Form 10-Q, including the new risk factors set forth below. Furthermore, the risk factor disclosure in the Annual Report is qualified by a new risk factor related to export license requirements related to China set forth below. There have been no other material changes to the risk factors as described in Part 1, Item 1A, “Risk Factors” in our Annual Report.

Risks Related to the COVID-19 Pandemic

The COVID-19 pandemic may have a materially adverse effect on our business, financial condition and operating results, as well as on the operations and financial performance of our customers and suppliers. We are unable to predict the extent to which the pandemic and related restrictions will impact our business, operations, financial performance and the achievement of our strategic objectives.

Our operations and financial performance in certain areas of our business have been negatively impacted by the COVID-19 pandemic. The COVID-19 pandemic has caused, and is expected to continue to cause, the global slowdown of economic activity, disruptions in global supply chains and significant volatility in and disruption of financial markets. Because the severity, magnitude and duration of the COVID-19 pandemic and its economic consequences are uncertain, rapidly changing and difficult to predict, the pandemic’s impact on our operations and financial performance, and its impact on our ability to successfully execute our strategic business goals, remain uncertain and difficult to predict. Further, the ultimate impact of the COVID-19 pandemic on our operations

and financial performance depends on many factors that are outside our control, including, but not limited to: governmental, business and individuals' actions that have been and continue to be taken in response to the pandemic, including restrictions on manufacturing, transport, travel and workforce; the impact of the pandemic on global and regional economies; financial market volatility; the pace of recovery when the COVID-19 pandemic subsides; and potential for recurrence of the pandemic.

The COVID-19 pandemic has subjected our operations, financial performance and financial condition to a number of risks, including, but not limited to, those discussed below.

Impact of Governmental Regulatory Actions to Combat the COVID-19 Pandemic

As a result of the COVID-19 pandemic, governmental authorities across the world have implemented and are continuing to implement numerous and constantly evolving mandates to try to contain the virus, including manufacturing restrictions, limits on gatherings, quarantines, shelter-in-place orders, and business shutdowns. Mandates providing for business shutdowns generally exclude certain essential services, and those essential services commonly include critical infrastructure and the businesses that support such critical infrastructure, as well as healthcare related businesses and defense. These regulatory mandates have impacted and may further impact our workforce and operations, as well as those of our customers and suppliers. While virtually all of our facilities are currently operational, in some cases they operate at a diminished capacity, as certain portions of our business do not meet applicable exclusion requirements, and have been temporarily halted. Some customers have highly limited operations during the pandemic. For example, our research market was negatively impacted in the first quarter of 2020 by university and research lab closures resulting from COVID-19. Further, some of our facilities, and those of our suppliers, have been constricted by government mandates restricting the number of, or percentage of, personnel that are permitted to work at a facility. Although many government mandates have had specific expiration dates, some of those mandates have already been extended more than once. In addition, even after government mandates have been lifted, some COVID-19 experts predict future outbreaks, which could result in the reactivation of such government mandates. As a result, there is considerable uncertainty regarding the duration of such government mandates and potential future restrictions, and complexity in ensuring compliance. Restrictions on our manufacturing, support operations or workforce, or similar limitations for our vendors and suppliers, could limit our ability to meet customer demand and could have a material adverse effect on our business, financial condition and operating results.

Impact of the COVID-19 Pandemic on the Global Economy

Some analysts predict that the COVID-19 pandemic will cause declines in industry and global economic conditions or a global recession, resulting in globally pervasive adverse economic conditions. In the event of a recession or other downturn in the worldwide economy, demand for our products would likely decline and our business would likely be adversely affected. Our revenue is primarily dependent upon demand from semiconductor manufacturers and other industrial technologies manufacturers. These markets are largely driven by the current and anticipated demand for electronic products. If anticipated declines in the worldwide economy and consumer electronics industry occur, demand for our products will likely decrease, and our business, financial condition and operating results could be adversely affected.

Operations-Related Risks

Across all of our business units, we are facing increased operational challenges stemming from the need to protect our employees' health and safety, site shutdowns, workplace disruptions and restrictions on the movement of people, raw materials and goods, both at our own facilities and at the facilities of our customers and suppliers. A substantial portion of our shipments occurs shortly after an order is received, and therefore we generally operate with a relatively low level of backlog. While orders to date have been strong, the high volume of orders may be attributable to customers increasing their inventory to reduce their exposure to risks of future supply disruptions, which could result in a sudden and significant decrease in future customer demand for our products. Our failure to anticipate any sudden decrease in order patterns, and reduce our costs accordingly, could result in significant excess inventory, and our business, financial condition and operating results could be harmed. We may also experience customer requests for order delays or cancellations, payment deferrals or other contract modifications, supply chain liquidity issues, delayed deliveries and billing milestones and other factors related directly and indirectly to the COVID-19 pandemic. The constraints and limits imposed on our operations may slow or diminish our research and development activities and qualification activities with our customers. In addition, any inability to timely perform our obligations under any contract due to government restrictions, or otherwise as a result of the pandemic, could harm our relationship with customers, result in lost business to unconstrained competitors or expose us to disputes or potential litigation, which could be costly and have an adverse effect on our business. We expect that the longer the period of economic and global supply chain and disruption continues, the more material the adverse impact will be on our business, financial condition and operation results.

Supply Chain Risks

We have experienced supply chain interruptions as a result of the COVID-19 pandemic. We expect that these interruptions will continue and may increase. Certain of our suppliers have faced difficulties maintaining operations in light of government-ordered restrictions and shelter-in-place mandates. If our suppliers or sub-suppliers are unable to maintain their operations or operating restrictions become more severe, we may encounter difficulties obtaining supplies, which may cause us to fail to meet customer demand or require us to pay higher prices for these materials, either of which could harm our business and profitability. For example, some of our key suppliers located in Malaysia and Mexico have experienced capacity restrictions as a result of government mandates limiting employee headcount in order to maintain social distancing, as well as employee absenteeism due to fear of contracting COVID-19. Further, we rely on sole and limited source suppliers for some of our components and subassemblies that are critical to the manufacturing of our products due to unique component designs as well as specialized quality and performance requirements needed to manufacture our products, which increases our exposure to supply chain disruptions of these components. Additionally, an economic slowdown caused by the COVID-19 pandemic could harm the financial health of our suppliers and sub-suppliers. Although we regularly monitor the financial health of the companies in our supply chain, financial hardship on our suppliers or sub-suppliers or their bankruptcy, liquidation or closure, could disrupt our ability to obtain raw materials or components required to manufacture our products, adversely affecting our operations. Such incidents could also require us to alter our payment terms with certain suppliers to include certain unfavorable terms to us, including prepaying for raw materials, which could restrict our cash flow.

Employee Productivity Risks

In response to the COVID-19 pandemic, we have modified our business practices with respect to our employees, including restricting employee travel, requiring employees to telecommute if they can perform their jobs from home, implementing social distancing measures, enhancing sanitary measures in our facilities, implementing shift changes, and cancelling attendance at events and conferences. Many of our suppliers, and service providers have made similar modifications. Further, we have required self-isolation for personnel who were, or may have been, exposed to the COVID-19 virus and required facility closures in order to implement additional sanitary measures, thus reducing our on-site capacity at these facilities for periods of time. There is no certainty that these measures will be sufficient to mitigate the risks posed by the virus, in which case our employees may contract the COVID-19 virus, our ability to perform critical functions could be harmed, and we may be unable to respond to the needs of our global business. With respect to those employees who are now working remotely, the resources available to them may not enable them to maintain the same level of productivity and efficiency, and these and other employees may face additional demands on their time, such as increased responsibilities resulting from school closures or the illness of family members. While we have experienced only limited absenteeism from those employees who are required to be on-site to perform their jobs, absenteeism may increase in the future and may harm our productivity. Additionally, in many cases during mandatory full or partial facility closures, we have currently elected to continue to pay employees who are not able to provide services and thus are incurring costs that do not contribute to business productivity. Further, our increased reliance on remote access to our information systems increases our exposure to potential cybersecurity breaches. We may take further restrictive actions to mitigate the spread of COVID-19 as government authorities require or recommend or as we determine to be in the best interests of our employees, customers, partners and suppliers, which actions may negatively impact our business and results of operations.

Stock Price Risk

The COVID-19 pandemic has already caused significant disruptions in the financial markets, and may continue to cause such disruptions, which could adversely affect the trading price of our common stock. Additionally, the price of our common stock may show greater volatility in the future, particularly in light of the significant increase in volatility in the stock market in general as a result of the impact of the COVID-19 pandemic and ensuing governmental actions and economic disruption.

Risk Related to New Export License Requirements

Our China sales could be adversely affected by new export license requirements.

As noted in Part I, Item 1A, "Risk Factors" in our Annual Report, we are subject to trade compliance laws in the United States and in other foreign jurisdictions where we operate that require us to obtain certain export licenses prior to product shipment. For products and technology subject to the U.S. Export Administration Regulations administered by the U.S. Department of Commerce's Bureau of Industry and Security, the requirement for an export license is dependent on the type, end use and destination of the product and technology, and the identity, location, and nationality of the end user. On April 28, 2020, the U.S. Department of Commerce published rules in the Federal Register that will expand export license requirements for U.S. companies and their foreign subsidiaries that export or re-export certain products to entities in China that are known to have operations that support or contribute to production of military items and civil or dual-use items intended for military end uses. These requirements will apply even if the products sold by the U.S. companies are for civilian end users and will expand the types of products that are subject to export license requirements. Exports from third countries that include U.S.-origin content may also be affected. When effective, this rule may require us to apply for

additional export licenses for certain of our products sold to certain customers in China, which license applications could be denied by the U.S. Department of Commerce. China is a significant market for the semiconductor equipment industry and is therefore an area of anticipated long-term growth for our business. Obtaining export licenses can be difficult, costly and time-consuming, and the failure of the U.S. Government to approve such export licenses may have severe consequences. Failure to obtain export licenses could reduce our net revenues, harm our relationships with our customers and adversely affect our business, financial condition and operating results. In addition, the absence of comparable export license requirements on our non-U.S. competitors may adversely affect our competitive position.

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
+4.1 (5)	Specimen certificate representing the Common Stock
+10.1* (5)	Employment Agreement, dated as of August 6, 2019, between James Schreiner and the Registrant
10.2*	MKS Instruments, Inc. Annual Profit Improvement Bonus Plan
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	Inline XBRL Instance Document – the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document
101.SCH	Inline XBRL Taxonomy Extension Schema Document
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document
104	Cover Page Interactive Data File (formatted as inline XBRL with applicable taxonomy extension information contained in Exhibits 101)

+ Previously filed

* Management contract or compensatory plan arrangement

- (1) Incorporated by reference to the Registration Statement on Form S-4 (File No. 333-49738), filed with the Securities and Exchange Commission on November 13, 2000.
- (2) Incorporated by reference to the Registrant’s Quarterly Report on Form 10-Q for the quarter ended June 30, 2001 (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.
- (5) Incorporated by reference to the Registrant’s Annual Report on Form 10-K for the year ended December 31, 2019 (File No. 000-23621), filed with the Securities and Exchange Commission on February 28, 2020.

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: May 6, 2020

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



MKS Instruments, Inc.
Annual Profit Improvement Bonus Plan
(as approved by the Board of Directors on February 10, 2020)

1. Purpose:

The Annual Profit Improvement Bonus Plan (the “Profit Improvement Bonus Plan”) provides those employees of MKS Instruments, Inc. and its affiliates (“MKS” or the “Company”) who are eligible to participate in the MKS Instruments, Inc. Management and Key Employee Bonus Plan (the “Annual Bonus Plan”) for the applicable calendar year (the “Participants”) with the opportunity to benefit financially for achieving specified Company profit enhancements or cost reductions for such year (the “Performance Period”).

2. Annualized Profitability Initiative:

In order to receive any payout under this Profit Improvement Bonus Plan, the Company must achieve specified profit enhancements or cost reductions by the end of the Performance Period. Subject to certain limitations set forth in Section 3 below, Participants will be eligible to receive the maximum payout under this Profit Improvement Bonus Plan if the Company achieves the then applicable annual goal (“Annual Goal”)¹ (which shall be determined annually by the Compensation Committee of the Board of Directors of the Company (the “Compensation Committee”)) of Annualized Profitability Initiatives by the conclusion of the Performance Period. An Annualized Profitability Initiative is defined as any profit enhancement or cost reduction program approved by the Company’s Chief Executive Officer that results, on an annualized basis, in a quantified and measured benefit to the Company’s financial performance.

3. Determination of a Participant’s Bonus Amount:

A Participant’s payout under this Profit Improvement Bonus Plan will be determined by multiplying the Participant’s Target Bonus Amount, as defined in the Annual Bonus Plan, by a percentage equal to the dollar value of the Annualized Profitability Initiatives achieved during the Performance Period (up to the applicable Annual Goal) divided by 1 million. For example, if the Company achieves \$13 million in Annualized Profitability Initiatives for the Performance Period, a Participant’s bonus amount under this plan would equal the Participant’s Target Bonus Amount multiplied by 13% (\$13 million/\$1 million). Subject to the limitation set forth below, payouts are capped when the Company achieves the then applicable Annual Goal of Annualized Profitability Initiatives. Notwithstanding the above, a Participant is only eligible to receive a payout under this plan if Company performance achievement under the Annual Bonus Plan is less than 100% for the Performance Period, and any payout under this plan shall be further capped such that a Participant’s combined payout under the Annual Bonus Plan plus this plan shall not exceed an amount equal to 100% of a Participant’s target bonus under the Annual Bonus Plan. Following the conclusion of the Performance Period, the Compensation Committee shall review and approve the Company’s performance achievement under the Annual Bonus Plan and the Company’s achievement of Annualized Profitability Initiatives under this plan.

¹ For 2020, the Annual Goal shall be \$25 million.

4. Clawback:

Any bonus payment made hereunder shall be subject to potential cancellation, recoupment, rescission, payback or other action in accordance with the terms of any applicable Company clawback policy (the “Clawback Policy”) or any applicable law, as may be in effect from time to time. The Participant hereby acknowledges and consents to the Company’s application, implementation and enforcement of (i) any applicable Clawback Policy in effect at the time the Participant is notified of his or her eligibility to receive the award under this Plan and (ii) any provision of applicable law relating to cancellation, recoupment, rescission or payment of compensation, and agrees that the Company may take such actions as may be necessary to effectuate the Clawback Policy without further consideration or action.

5. Bonus Payment Date:

Bonus payouts hereunder shall be made as soon as possible after the performance assessment has been completed with respect to the applicable Performance Period and reviewed by the Compensation Committee, but in no event later than March 15th following the applicable Performance Period.

6. Administration:

The Profit Improvement Bonus Plan will be administered by the Compensation Committee. The Compensation Committee shall have authority to adopt, amend and repeal such administrative rules, guidelines and practices relating to the Plan as it shall deem advisable. The Compensation Committee may construe and interpret the terms of the Profit Improvement Bonus Plan. The Compensation Committee may correct any defect, supply any omission or reconcile any inconsistency in the Profit Improvement Bonus Plan in the manner and to the extent it shall deem expedient and it shall be the sole and final judge of such expediency. All decisions by the Compensation Committee shall be made in the Compensation Committee’s sole discretion and shall be final and binding on all persons having or claiming any interest in this Profit Improvement Bonus Plan.

7. Amendment and Termination:

The Compensation Committee may amend, suspend or terminate the Profit Improvement Bonus Plan or any portion thereof at any time. The Profit Improvement Bonus Plan shall remain in effect until terminated.

8. Miscellaneous:

8.1 No Right to Employment:

In no way does participation in the Profit Improvement Bonus Plan create a contract or a right of employment.

8.2 Tax Withholding:

The Company shall have the right to deduct from all payments under the Profit Improvement Bonus Plan any federal, state or local taxes required by law to be withheld with respect to such payments.

8.3 Governing Law:

The provisions of the Profit Improvement Bonus Plan and all awards made hereunder shall be governed by and interpreted in accordance with the laws of the Commonwealth of Massachusetts, excluding choice-of-law principles of the law of such state that would require the application of the laws of a jurisdiction other than the Commonwealth of Massachusetts.

8.4 Limitations on Liability:

Notwithstanding any other provisions of the Profit Improvement Bonus Plan, no individual acting as a director, officer, employee or agent of the Company will be liable to any Participant, former Participant, spouse, beneficiary, or any other person for any claim, loss, liability, or expense incurred in connection with the Profit Improvement Bonus Plan, nor will such individual be personally liable with respect to the Profit Improvement Bonus Plan because of any contract or other instrument he or she executes in his or her capacity as a director, officer, employee or agent of the Company. The Company will indemnify and hold harmless each director, officer, employee or agent of the Company to whom any duty or power relating to the administration or interpretation of the Profit Improvement Bonus Plan has been or will be delegated, against any cost or expense (including attorneys' fees) or liability (including any sum paid in settlement of a claim with the approval of the Company's Board of Directors) arising out of any act or omission to act concerning the Profit Improvement Bonus Plan unless arising out of such person's own fraud or bad faith.

8.5 Participants are Unsecured Creditors:

Participants and their heirs, successors and assigns shall have no legal or equitable rights, interest or claims in any property or assets of the Company by virtue of participation in the Profit Improvement Bonus Plan. The Company's obligation under the Profit Improvement Bonus Plan shall be that of an unfunded and unsecured promise of the Company to pay money in the future.

8.6 IRC Section 409A:

The Profit Improvement Bonus Plan is intended to either be exempt from, or to comply with, all provisions of IRC Section 409A and to the maximum extent possible shall be so interpreted and administered. Without limiting the generality of the foregoing, to the extent that any amount that becomes payable to any Participant by reason of such Participant's separation from service, as defined in the IRC Section 409A, is subject to IRC Section 409A, and that such Participant is a "specified employee" as defined in IRC Section 409A at the time of such separation from service, such amount shall not be paid until the earlier of (i) the first day of the seventh month following the month that includes the separation from service or (ii) the date of the Participant's death. Notwithstanding the foregoing, in no event shall the Company be liable to any Participant for any tax or penalty imposed upon the Participant pursuant to IRC Section 409A or otherwise.

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, John T.C. Lee, certify that:

1. I have reviewed this annual 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 annual 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 changes 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.

Dated: May 6, 2020

/s/ John T.C. Lee

John T.C. Lee
President and 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 annual 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 annual 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 changes 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.

Dated: May 6, 2020

/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 March 31, 2020 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, John T.C. Lee, President and 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: May 6, 2020

/s/ John T.C. Lee

John T.C. Lee

President and Chief Executive Officer

(Principal Executive Officer)

Dated: May 6, 2020

/s/ Seth H. Bagshaw

Seth H. Bagshaw

Senior Vice President, Chief Financial Officer and Treasurer