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, 2021

or

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

For the transition period from ___________ to ___________

Commission file number 0-23621

MKS INSTRUMENTS, INC.

(Exact name of registrant as specified in its charter)

Massachusetts **(State or other jurisdiction of incorporation or organization)**	**04-2277512** **(I.R.S. Employer Identification No.)**
2 Tech Drive, Suite 201, Andover, Massachusetts **(Address of principal executive offices)**	**01810** **(Zip Code)**

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

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
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	☒	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
		Emerging growth company	☐

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

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

As of April 27, 2021, the registrant had 55,356,545 shares of common stock outstanding.

MKS INSTRUMENTS, INC.
FORM 10-Q
INDEX

PART I. FINANCIAL INFORMATION

ITEM 1. FINANCIAL STATEMENTS.

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

	March 31, 2021	December 31, 2020
ASSETS		
Current assets:		
Cash and cash equivalents	$ 699.8	$ 608.3
Short-term investments	209.7	227.7
Trade accounts receivable, net of allowance for doubtful accounts of $2.2 and $2.0 at March 31, 2021 and December 31, 2020, respectively	420.8	392.7
Inventories	515.2	501.4
Other current assets	77.0	74.3
Total current assets	1,922.5	1,804.4
Property, plant and equipment, net	297.0	284.3
Right-of-use asset	182.7	184.4
Goodwill	1,062.1	1,066.4
Intangible assets, net	498.4	512.2
Long-term investments	6.5	6.5
Other assets	48.7	45.6
Total assets	$ 4,017.9	$ 3,903.8
LIABILITIES AND STOCKHOLDERS’ EQUITY		
Current liabilities:		
Short-term debt	$ 9.3	$ 14.5
Accounts payable	146.7	110.6
Accrued compensation	76.3	117.9
Income taxes payable	19.9	18.3
Lease liability	13.8	15.8
Deferred revenue and customer advances	35.4	31.2
Other current liabilities	70.5	65.6
Total current liabilities	371.9	373.9
Long-term debt, net	813.3	815.0
Non-current deferred taxes	71.2	59.2
Non-current accrued compensation	47.4	49.5
Non-current lease liability	191.7	187.4
Other non-current liabilities	53.4	57.9
Total liabilities	1,548.9	1,542.9
Commitments and contingencies (Note 18)		
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; 55,257,268 and 55,196,501 shares issued and outstanding at March 31, 2021 and December 31, 2020, respectively	0.1	0.1
Additional paid-in capital	877.9	873.2
Retained earnings	1,598.5	1,487.3
Accumulated other comprehensive (loss) income	(7.5)	0.3
Total stockholders’ equity	2,469.0	2,360.9
Total liabilities and stockholders’ equity	$ 4,017.9	$ 3,903.8

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, 2021	Three Months Ended March 31, 2020
Net revenues:		
Products	$ 605.0	$ 461.2
Services	88.9	74.5
Total net revenues	693.9	535.7
Cost of revenues:		
Cost of products	322.6	256.1
Cost of services	49.2	40.0
Total cost of revenues (exclusive of amortization shown separately below)	371.8	296.1
Gross profit	322.1	239.6
Research and development	47.2	42.4
Selling, general and administrative	95.9	87.2
Acquisition and integration costs	6.2	2.2
Restructuring and other	4.9	0.4
Amortization of intangible assets	12.4	16.3
Asset impairment	—	1.2
Income from operations	155.5	89.9
Interest income	0.2	0.7
Interest expense	6.4	8.9
Other expense, net	1.1	0.4
Income before income taxes	148.2	81.3
Provision for income taxes	25.9	12.2
Net income	$ 122.3	$ 69.1
Other comprehensive income, net of tax:		
Changes in value of financial instruments designated as hedges	$ 11.0	$ (6.0)
Foreign currency translation adjustments	(18.8)	(11.2)
Unrecognized pension (loss) gain	(0.4)	0.1
Unrealized gain on investments	0.4	0.1
Total comprehensive income	$ 114.5	$ 52.1
Net income per share:		
Basic	$ 2.21	$ 1.26
Diluted	$ 2.20	$ 1.25
Weighted average common shares outstanding:		
Basic	55.3	54.9
Diluted	55.6	55.2

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 Income/(Loss)	Total Stockholders' Equity
	Shares	Amount				
Balance at December 31, 2020	55,196,501	$ 0.1	$ 873.2	$ 1,487.3	$ 0.3	$ 2,360.9
Net issuance under stock-based plans	60,767		(5.3)			(5.3)
Stock-based compensation			10.0			10.0
Cash dividend ($0.20 per common share)				(11.1)		(11.1)
Comprehensive income (net of tax):						
Net income				122.3		122.3
Other comprehensive loss					(7.8)	(7.8)
Balance at March 31, 2021	55,257,268	$ 0.1	$ 877.9	$ 1,598.5	$ (7.5)	$ 2,469.0

	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	54,872,983	$ 0.1	$ 852.4	$ 1,239.3	$ (39.3)	$ 2,052.5

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,	
	2021	2020
Cash flows provided by operating activities:		
Net income	$ 122.3	$ 69.1
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	23.8	28.4
Amortization of debt issuance costs, original issue discount, and soft call premium	0.5	1.1
Stock-based compensation	10.0	8.5
Provision for excess and obsolete inventory	4.9	6.2
Provision for doubtful accounts	(0.3)	0.2
Deferred income taxes	9.5	0.6
Asset impairment	—	1.2
Other	0.1	(0.1)
Changes in operating assets and liabilities:		
Trade accounts receivable	(33.1)	(42.5)
Inventories	(24.1)	(20.3)
Other current and non-current assets	6.3	10.1
Accounts payable	36.8	22.7
Accrued compensation	(41.9)	(19.3)
Income taxes payable	0.3	1.0
Other current and non-current liabilities	11.8	8.0
Net cash provided by operating activities	126.9	74.9
Cash flows (used in) provided by investing activities:		
Purchases of investments	(185.7)	(30.2)
Maturities of investments	95.3	49.5
Sales of investments	107.7	28.7
Purchases of property, plant and equipment	(26.5)	(10.0)
Net cash (used in) provided by investing activities	(9.2)	38.0
Cash flows used in financing activities:		
Net proceeds from borrowings	0.5	12.1
Payments on short-term borrowings	(5.4)	(9.9)
Payments on long-term borrowings	(2.2)	(52.3)
Dividend payments	(11.1)	(11.0)
Net payments related to employee stock awards	(5.3)	(20.4)
Net cash used in financing activities	(23.5)	(81.5)
Effect of exchange rate changes on cash and cash equivalents	(2.7)	(4.0)
Increase in cash and cash equivalents	91.5	27.4
Cash and cash equivalents at beginning of period	608.3	414.6
Cash and cash equivalents at end of period	$ 699.8	$ 442.0

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, 2021, and for the three months ended March 31, 2021 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, 2020 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, 2020 filed with the Securities and Exchange Commission on February 23, 2021.

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, inventory valuation, warranty costs, stock-based compensation, intangible assets, goodwill, other long-lived assets and other acquisition expenses and income taxes. Management bases its estimates and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

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. In January 2021, the FASB issued ASU 2021-01, “Reference Rate Reform (Topic 848): Scope.” The amendments in this update clarify that certain optional expedients and exceptions in Topic 848 for contract modifications and hedge accounting apply to derivative instruments that use an interest rate for margining, discounting, or contract price alignment that is modified as a result of reference rate reform. Amendments in this update to the expedients and exceptions in Topic 848 capture the incremental consequences of the scope clarification and tailor the existing guidance to derivative instruments affected by the discounting transition. The amendments in this update do not apply to contract modifications made after December 31, 2022, new hedging relationships entered into after December 31, 2022, and existing hedging relationships evaluated for effectiveness in periods after December 31, 2022, except for hedging relationships existing as of December 31, 2022, that apply certain optional expedients in which the accounting effects are recorded through the end of the hedging relationship (including periods after December 31, 2022). The Company is in the process of evaluating the requirements of this standard and has not yet determined the impact of adoption on its consolidated financial statements.

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, and interim periods within those fiscal years, beginning after December 15, 2020. The Company adopted this ASU during the first quarter of 2021 and the adoption of this ASU did not have a material impact on its financial position, results of operations and cash flows.

3) Revenue from Contracts with Customers

Contract assets as of March 31, 2021 and December 31, 2020 were $3.5 and $3.7, respectively, and are included in other current assets.

(in millions, except share and per share data)

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

	Three Months Ended March 31, 2021	Three Months Ended March 31, 2020
Beginning balance, January 1(1)	$ 36.7	$ 24.8
Additions to deferred revenue and customer advances	25.5	17.7
Amount of deferred revenue and customer advances recognized in income	(22.3)	(17.1)
Ending balance, March 31(2)	$ 39.9	$ 25.4

(1) Beginning deferred revenue and customer advances as of January 1, 2021 included $18.4 of current deferred revenue, $5.5 of long-term deferred revenue and $12.8 of current customer advances.

(2) Ending deferred revenue and customer advances as of March 31, 2021 included $17.3 of current deferred revenue, $4.5 of long-term deferred revenue and $18.1 of current customer advances.

Disaggregation of Revenue

The following table summarizes revenue from contracts with customers:

	Three Months Ended March 31, 2021			
	Vacuum & Analysis	Light & Motion	Equipment & Solutions	Total
Net revenues:				
Products	$ 379.2	$ 165.0	$ 60.8	$ 605.0
Services	56.6	17.0	15.3	88.9
Total net revenues	$ 435.8	$ 182.0	$ 76.1	$ 693.9

	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	$ 319.3	$ 165.4	$ 51.0	$ 535.7

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 16 for revenue by reportable segment, geographic area and groupings of similar products.

4) Investments

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

As of March 31, 2021:	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
Short-term investments:				
Available-for-sale investments:				
Time deposits and certificates of deposit	$ 12.8	$ —	$ —	$ 12.8
Bankers' acceptance drafts	4.2	—	—	4.2
Commercial paper	60.9	—	—	60.9
U.S. treasury obligations	131.8	—	—	131.8
	$ 209.7	$ —	$ —	$ 209.7

(in millions, except share and per share data)

As of March 31, 2021:	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
Long-term investments:				
Available-for-sale investments:				
Group insurance contracts	$ 5.6	$ 0.9	$ —	$ 6.5

As of December 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	$ 0.7	$ —	$ —	$ 0.7
Bankers' acceptance drafts	3.8	—	—	3.8
U.S. treasury obligations	223.2	—	—	223.2
	$ 227.7	$ —	$ —	$ 227.7

As of December 31, 2020:	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
Long-term investments:				
Available-for-sale investments:				
Group insurance contracts	$ 5.6	$ 0.9	$ —	$ 6.5

The tables above, which show the gross unrealized gains and (losses) aggregated by investment category for available-for-sale investments as of March 31, 2021 and December 31, 2020, 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.

Interest income is accrued as earned. Dividend income is recognized as income on the date the security 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, 2021 and March 31, 2020.

5) Fair Value Measurements

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

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

Level 1 Quoted prices in active markets for identical assets or liabilities 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.

(in millions, except share and per share data)

Level 3 Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities. Level 3 assets and liabilities include financial instruments whose value is determined using pricing models, discounted cash flow methodologies, or similar techniques, as well as instruments for which the determination of fair value requires significant management judgment or estimation.

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

Assets and liabilities of the Company are measured at fair value on a recurring basis as of March 31, 2021 and are summarized as follows:

		Fair Value Measurements at Reporting Date Using		
Description	March 31, 2021	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	$ 1.3	$ 1.3	$ —	$ —
Commercial paper	57.2	—	57.2	—
U.S. treasury obligations	48.4	—	48.4	—
Available-for-sale investments:				
Time deposits and certificates of deposit	12.8	—	12.8	—
Bankers' acceptance drafts	4.2	—	4.2	—
Commercial paper	60.9	—	60.9	—
U.S. treasury obligations	131.8	—	131.8	—
Group insurance contracts	6.5	—	6.5	—
Derivatives – foreign exchange forward contracts	2.2	—	2.2	—
Derivatives – interest rate hedge-non-current	5.1	—	5.1	
Funds in investments and other assets:				
Israeli pension assets	18.2	—	18.2	—
Deferred compensation plan assets:				
Mutual funds and exchange traded funds	1.4	—	1.4	—
Total assets	$ 350.0	$ 1.3	$ 348.7	$ —
Liabilities:				
Derivatives – foreign exchange forward contracts	$ 1.9	$ —	$ 1.9	$ —
Derivatives – interest rate hedge - non-current	10.6	—	10.6	—
Total liabilities	$ 12.5	$ —	$ 12.5	$ —
Reported as follows:				
Assets:				
Cash and cash equivalents(1)	$ 106.9	$ 1.3	$ 105.6	$ —
Short-term investments	209.7	—	209.7	—
Other current assets	2.2	—	2.2	—
Total current assets	$ 318.8	$ 1.3	$ 317.5	$ —
Long-term investments	$ 6.5	$ —	$ 6.5	$ —
Other assets	24.7	—	24.7	—
Total long-term assets	$ 31.2	$ —	$ 31.2	$ —
Liabilities:				
Other current liabilities	$ 1.9	$ —	$ 1.9	$ —
Other liabilities	$ 10.6	$ —	$ 10.6	$ —

(1) The cash and cash equivalent amounts presented in the table above do not include cash of $592.9 as of March 31, 2021.

(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 December 31, 2020 and are summarized as follows:

Description	December 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	$ 1.3	$ 1.3	$ —	$ —
Commercial paper	0.3	$ —	0.3	—
U.S. treasury obligations	62.1	—	62.1	—
Available-for-sale securities:				
Time deposits and certificates of deposit	0.7	—	0.7	—
Bankers' acceptance drafts	3.8	—	3.8	—
U.S. treasury obligations	223.2	—	223.2	—
Group insurance contracts	6.5	—	6.5	—
Funds in investments and other assets:				
Israeli pension assets	18.8	—	18.8	—
Deferred compensation plan assets:				
Mutual funds and exchange traded funds	1.7	—	1.7	—
Total assets	$ 318.4	$ 1.3	$ 317.1	$ —
Liabilities:				
Derivatives – foreign exchange forward contracts	$ 6.5	$ —	$ 6.5	$ —
Derivatives – interest rate hedge - non-current	14.0	—	14.0	—
Total liabilities	$ 20.5	$ —	$ 20.5	$ —
Reported as follows:				
Assets:				
Cash and cash equivalents(1)	$ 63.7	$ 1.3	$ 62.4	$ —
Short-term investments	227.7	—	227.7	—
Total current assets	$ 291.4	$ 1.3	$ 290.1	$ —
Long-term investments	$ 6.5	$ —	$ 6.5	$ —
Other assets	20.5	—	20.5	—
Total long-term assets	$ 27.0	$ —	$ 27.0	$ —
Liabilities:				
Other current liabilities	$ 6.5	$ —	$ 6.5	$ —
Other liabilities	$ 14.0	$ —	$ 14.0	$ —

(1) The cash and cash equivalent amounts presented in the table above do not include cash of $544.6 as of December 31, 2020.

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, 2021 and December 31, 2020, available-for-sale investments consisted of time deposits, certificates of deposit, bankers’ acceptance drafts, commercial paper, U.S. treasury 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.

(in millions, except share and per share data)

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 of the Company's Israeli subsidiaries. These funds are classified within Level 2 of the fair value hierarchy.

Derivatives

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

6) Derivatives

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

Foreign Exchange Forward Contracts

The Company hedges a portion of its forecasted foreign currency-denominated intercompany sales of inventory, over a maximum period of eighteen months, using foreign exchange forward contracts accounted for as cash-flow hedges related to British, Euro, Japanese, South Korean and Taiwanese currencies. To the extent these derivatives are effective in off-setting the variability of the hedged cash flows, and otherwise meet the hedge accounting criteria, changes in the derivatives' fair value are not included in current earnings but are included in other comprehensive income ("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 condensed 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, 2021 and December 31, 2020, the Company had outstanding foreign exchange forward contracts with gross notional values of $169.3 and $176.2, respectively. The following tables provide a summary of the primary net hedging positions and corresponding fair values held as of March 31, 2021 and December 31, 2020:

	March 31, 2021	
Currency Hedged (Buy/Sell)	Gross Notional Value	Fair Value (1)
U.S. dollar/Japanese yen	$ 58.7	$ 1.6
U.S. dollar/South Korean won	58.2	(0.8)
U.S. dollar/euro	12.8	(0.1)
U.S. dollar/U.K. pound sterling	6.5	(0.2)
U.S. dollar/Taiwan dollar	33.1	(0.2)
Total	$ 169.3	$ 0.3

(in millions, except share and per share data)

	December 31, 2020	
Currency Hedged (Buy/Sell)	Gross Notional Value	Fair Value (1)
U.S. dollar/Japanese yen	$ 61.5	$ (1.1)
U.S. dollar/South Korean won	62.2	(3.1)
U.S. dollar/euro	13.1	(0.6)
U.S. dollar/U.K. pound sterling	6.1	(0.3)
U.S. dollar/Taiwan dollar	33.3	(1.4)
Total	$ 176.2	$ (6.5)

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

Interest Rate Swap Agreements

The Company entered into various interest rate swap agreements that exchange the variable LIBOR interest rate to a fixed rate in order to manage the exposure to interest rate fluctuations associated with the variable LIBOR interest rate paid on the outstanding balance of the 2019 Incremental Term Loan Facility, as described further in Note 10. The table below summarizes the various interest rate hedges entered into by the Company:

Swap	Trade Date	Effective Date	Maturity	Fixed Rate	Notional Amount at Effective Date	March 31, 2021 Notional Amount	March 31, 2021 Fair Value Asset (Liability)	December 31, 2020 Fair Value Asset (Liability)
1	April 3, 2019	April 5, 2019	March 31, 2023	2.309%	$ 300.0	$ 300.0	(10.6)	(12.4)
2	October 29, 2020	October 26, 2021	February 28, 2025	0.485%	$ 200.0	$ —	3.1	(0.7)
3	October 29, 2020	March 31, 2022	February 28, 2025	0.623%	$ 100.0	$ —	2.0	(0.9)
						Total	$ (5.5)	$ (14.0)

The interest rate swaps are recorded at fair value on the balance sheet and changes in the fair value are recognized in OCI. To the extent that these arrangements are no longer effective hedges, any ineffectiveness measured in the hedging relationships is recorded immediately in earnings in the period it occurs.

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

Derivatives Designated as Hedging Instruments	March 31, 2021	December 31, 2020
Derivative assets:		
Foreign exchange forward contracts(1)	$ 2.2	$ —
Interest rate hedge(2)	5.1	—
Derivative liabilities:		
Foreign exchange forward contracts(1)	(1.9)	(6.5)
Interest rate hedge(2)	(10.6)	(14.0)
Total net derivative liability designated as hedging instruments	$ (5.2)	$ (20.5)

(1) The derivative asset of $2.2 and derivative liability of $1.9 related to the foreign exchange forward contracts are classified in other current assets and other current liabilities in the condensed consolidated balance sheet as of March 31, 2021. The derivative liability of $6.5 related to the foreign exchange forward contracts is classified in other current liabilities in the condensed consolidated balance sheet as of December 31, 2020. These foreign exchange forward contracts are subject to a master netting agreement with one financial institution. However, the Company has elected to record these contracts on a gross basis in the balance sheet.

(2) The interest rate hedge asset of $5.1 is classified in other non-current assets in the condensed consolidated balance sheet as of March 31, 2021. The interest rate hedge liabilities of $10.6 and $14.0 are classified in other non-current liabilities in the condensed consolidated balance sheet as of March 31, 2021 and December 31, 2020, respectively.

(in millions, except share and per share data)

The net amount of existing gains as of March 31, 2021 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 gains (losses) on derivatives designated as cash flow hedging instruments:

	Three Months Ended March 31,	
Derivatives Designated as Cash Flow Hedging Instruments	2021	2020
Foreign exchange forward contracts:		
Net gain (loss) recognized in accumulated OCI(1)	$ 11.0	$ (6.0)
Net (loss) gain reclassified from accumulated OCI into income(2)	$ (1.5)	$ 0.7

(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, 2021 and 2020. The tax effect of the gains or losses reclassified from accumulated OCI into income is immaterial.

The following table provides a summary of the (loss) gain on derivatives not designated as cash flow hedging instruments:

	Three Months Ended March 31,	
Derivatives Not Designated as Cash Flow Hedging Instruments	2021	2020
Foreign exchange forward contracts:		
Net (loss) gain recognized in income(1)	$ (0.8)	$ 0.2

(1) The Company enters into foreign exchange forward 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 cash flow hedging instruments and gains or losses from these derivatives are recorded in other (expense) income in the periods in which they occur.

7) Inventories

Inventories consist of the following:

	March 31, 2021	December 31, 2020
Raw materials	$ 336.7	$ 321.3
Work-in-process	78.4	76.7
Finished goods	100.1	103.4
	$ 515.2	$ 501.4

8) 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 office equipment and other lower-valued items. The Company does not have any finance leases. As most of the Company’s leases do not provide an implicit rate, an incremental borrowing rate is used based on the estimated rate of interest for collateralized borrowing over a similar term of the lease payments at commencement date.

Some of the Company’s real estate lease agreements include Company options to either extend and/or terminate the lease. The cost of these options is included in our operating lease liabilities to the extent that such options are reasonably certain of being exercised. Leases with renewal options allow the Company to extend the lease term typically between 1 to 10 years. When determining the lease term, renewal options reasonably certain of being exercised are included in the lease term. When determining if a renewal option is reasonably certain of being exercised, the Company considers several economic factors, including but not limited to, the significance of leasehold improvements made to the property, whether the physical space is difficult to replace, underlying contractual obligations, and specific characteristics unique to that particular lease that would make it reasonably certain that the Company would exercise such an option.

(in millions, except share and per share data)

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, 2021	2020
Lease cost:		
Operating lease cost[1]	$ 7.7	$ 7.3
Short-term lease	1.1	1.2
Total lease cost	$ 8.8	$ 8.5

(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 2.9% and 14.8 years, respectively, as of March 31, 2021. The weighted average discount rate and weighted average remaining lease term were 3.2% and 13.5 years, respectively, as of March 31, 2020. Operating cash flows used for operating leases for the three months ended March 31, 2021 and 2020 were $3.8 and $5.1, respectively. Operating cash flows used for operating leases for the three months ended March 31, 2021 of $3.8 was net of $2.8 in tenant improvement allowance receipts.

Future lease payments under non-cancelable leases as of March 31, 2021 are detailed as follows:

2021 (remaining)	$ 14.4
2022	22.0
2023	19.3
2024	18.1
2025	17.1
Thereafter	166.6
Total lease payments	257.5
Less: imputed interest	52.0
Total operating lease liabilities	$ 205.5

The remaining 2021 lease payment amount of $14.4 is net of tenant improvement allowances of $3.6. 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.

9) Goodwill and Intangible Assets

Goodwill

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

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

(in millions, except share and per share data)

The changes in the carrying amount of goodwill and accumulated impairment loss during the three months ended March 31, 2021 and year ended December 31, 2020 were as follows:

	Three Months Ended March 31, 2021			Twelve Months Ended December 31, 2020		
	Gross Carrying Amount	Accumulated Impairment Loss	Net	Gross Carrying Amount	Accumulated Impairment Loss	Net
Beginning balance at January 1	$ 1,211.8	$ (145.4)	$ 1,066.4	$ 1,202.8	$ (144.3)	$ 1,058.5
Impairment of goodwill(1)	—	—	—	—	(1.1)	(1.1)
Foreign currency translation	(4.3)	—	(4.3)	9.0	—	9.0
Ending balance at March 31, 2021 and December 31, 2020	$ 1,207.5	$ (145.4)	$ 1,062.1	$ 1,211.8	$ (145.4)	$ 1,066.4

(1) During the twelve months ended December 31, 2020, the Company recorded $1.1 of goodwill impairment charges related to the pending closure of a facility in Europe.

Intangible Assets

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

As of March 31, 2021:	Gross	Accumulated Impairment Charges	Accumulated Amortization	Foreign Currency Translation	Net
Completed technology	$ 446.4	$ (0.1)	$ (216.4)	$ (0.1)	$ 229.8
Customer relationships	308.2	(1.4)	(109.8)	0.3	197.3
Patents, trademarks, trade names and other	120.9	—	(49.4)	(0.2)	71.3
	$ 875.5	$ (1.5)	$ (375.6)	$ —	$ 498.4

As of December 31, 2020:	Gross	Accumulated Impairment Charges	Accumulated Amortization	Foreign Currency Translation	Net
Completed technology	$ 446.4	$ (0.1)	$ (209.8)	$ (0.1)	$ 236.4
Customer relationships	308.2	(1.4)	(104.8)	1.7	203.7
Patents, trademarks, trade names and other	120.9	—	(48.6)	(0.2)	72.1
	$ 875.5	$ (1.5)	$ (363.2)	$ 1.4	$ 512.2

Aggregate amortization expense related to acquired intangible assets for the three months ended March 31, 2021 and 2020 was $12.4 and $16.3, respectively. Aggregate net amortization expense related to acquired intangible assets for future years is as follows:

Year	Amount
2021 (remaining)	$ 35.6
2022	$ 45.5
2023	$ 45.1
2024	$ 44.2
2025	$ 43.2
2026	$ 132.8
Thereafter	$ 96.1

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

10) 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, 2021, borrowings under the Term Loan Facility bear interest per annum at one of the following rates selected by the Company: (a) a base rate determined by reference to the highest of (1) the federal funds effective rate plus 0.50%, (2) the "prime rate" quoted in *The Wall Street Journal*, (3) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for an interest period of one month adjusted for certain additional costs, plus 1.00%, and (4) a floor of 1.75%, plus, in each case, an applicable margin; or (b) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for the interest period relevant to such borrowing adjusted for certain additional costs, subject to a LIBOR rate floor of 0.0%, 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.

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 condensed 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 acquisition of Electro Scientific Industries, Inc. (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 made 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.

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 condensed 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, 2021, the remaining balance of deferred finance fees and original issue discount of the Term Loan Facility was $8.9. 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 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, 2021, after total principal prepayments of $575.0 and regularly scheduled principal payments of $23.9, the total outstanding principal balance of the Term Loan Facility was $831.1 and the interest rate was 1.9%.

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, 2021, the Company was in compliance with all covenants under the Term Loan Credit Agreement.

Interest Rate Swap Agreements

The Company entered into various interest rate swap agreements as described further in Note 6 that exchange the variable LIBOR interest rate to a fixed rate in order to manage the exposure to interest rate fluctuations associated with the variable LIBOR interest rate paid on the outstanding balance of the 2019 Incremental Term Loan Facility.

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.

(in millions, except share and per share data)

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 unutilized commitments thereunder equal to 0.25% per annum. The Company must also pay customary letter of credit fees and agency fees.

Under the ABL Facility, we are required to prepay amounts outstanding under the ABL Facility (1) if amounts outstanding under the ABL Facility exceed the lesser of (a) the commitment amount and (b) the borrowing base, in an amount required to reduce such shortfall, (2) if amounts outstanding under the ABL Facility in any currency other than U.S. dollars exceed the sublimit for such currency, in an amount required to reduce such shortfall, and (3) during any period in which we have excess availability less than the greater of (a) 10.0% of the lesser of (x) the commitment amount and (y) the borrowing base and (b) $8.5 for 3 consecutive business days, until the time when we have excess availability equal to or greater than the greater of (A) 10.0% of the lesser of (i) the commitment amount and (ii) the borrowing base and (B) $8.5 for 30 consecutive days, or during the continuance of an event of default, with immediately available funds in its blocked accounts.

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 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, 2021 of up to an equivalent of $30.4 U.S. dollars. Total borrowings outstanding under these arrangements were $0.3 and $5.5 at March 31, 2021 and December 31, 2020, respectively.

	March 31, 2021	December 31, 2020
Short-term debt:		
Japanese lines of credit	$ 0.3	$ 5.4
Japanese receivables financing facility	—	0.1
Term Loan Facility	9.0	9.0
	$ 9.3	$ 14.5

	March 31, 2021	December 31, 2020
Long-term debt:		
Term Loan Facility, net(1)	$ 813.2	$ 815.0
Other debt	0.1	—
	$ 813.3	$ 815.0

(1) Net of deferred financing fees, original issuance discount and repricing fees in the aggregate of $8.9 and $9.4 as of March 31, 2021 and December 31, 2020, respectively.

(in millions, except share and per share data)

The Company recognized interest expense of $6.4 and $8.9 for the three months ended March 31, 2021 and 2020, respectively.

Contractual maturities of the Company's debt obligations as of March 31, 2021 are as follows:

Year	Amount
2021 (remaining)	$ 7.0
2022	9.0
2023	9.0
2024	9.0
2025	9.0
2026	9.0
Thereafter	$ 779.5

11) 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 obligations are 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,	
	2021	2020
Beginning of period	$ 18.4	$ 14.9
Provision for product warranties	10.7	6.7
Direct and other charges to warranty liabilities	(7.5)	(6.3)
End of period(1)	$ 21.6	$ 15.3

(1) As of March 31, 2021, short-term product warranties of $18.4 and long-term product warranties of $3.2 were included within other current liabilities and other non-current liabilities, respectively, within the accompanying condensed consolidated balance sheet. As of March 31, 2020, short-term product warranties of $12.2 and long-term product warranties of $3.1 were included within other current liabilities and other non-current liabilities, respectively, within the accompanying condensed consolidated balance sheet.

12) Income Taxes

The Company's effective tax rates for the three months ended March 31, 2021 and 2020 were 17.5% and 15.0%, respectively. The effective tax rate and related income tax expense for the three months ended March 31, 2021 was lower than the U.S. statutory tax rate due to the U.S. deduction for foreign derived intangible income 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 and additional withholding taxes on inter-company distributions due to the United Kingdom's departure from the European Union.

The Company's effective tax rate and related income tax expense for the three months ended March 31, 2020, was 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.

As of March 31, 2021 and December 31, 2020, the total amount of gross unrecognized tax benefits, which excludes interest and penalties, was $46.5 and $47.0, respectively. 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, 2021 and December 31, 2020, the Company had accrued interest on unrecognized tax benefits of approximately $0.7 and $0.7, respectively.

(in millions, except share and per share data)

Over the next 12 months it is reasonably possible that the Company may recognize approximately $4.0 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. federal statute of limitations remains open for tax years 2017 through the present. The statute of limitations for the Company's tax filings in other jurisdictions varies between fiscal years 2015 through present. The Company has certain federal credit carry-forwards and state tax loss and credit carry-forwards that are open to examination for tax years 2000 through the present.

13) Net Income Per Share

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

	Three Months Ended March 31, 2021	Three Months Ended March 31, 2020
Numerator:		
Net income	$ 122.3	$ 69.1
Denominator:		
Shares used in net income per common share – basic	55,275,000	54,918,000
Effect of dilutive securities	362,000	318,000
Shares used in net income per common share – diluted	55,637,000	55,236,000
Net income per common share:		
Basic	$ 2.21	$ 1.26
Diluted	$ 2.20	$ 1.25

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, 2021, there were no weighted-average restricted stock units that would have had an anti-dilutive effect on EPS and were excluded from the computation of diluted weighted-average shares. For the three months ended March 31, 2020, there were approximately 36,100 weighted-average restricted stock units that would have had an anti-dilutive effect on EPS and were excluded from the computation of diluted weighted-average shares.

14) 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.

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

	Three Months Ended March 31, 2021	Three Months Ended March 31, 2020
Cost of revenues	$ 1.0	$ 1.0
Research and development	1.1	1.1
Selling, general and administrative	7.9	5.9
Acquisition and integration costs	—	0.5
Total pre-tax stock-based compensation expense	$ 10.0	$ 8.5

(in millions, except share and per share data)

At March 31, 2021, 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 $36.7. The Company determines the fair value of RSUs based on the closing market price of the Company's common stock on the date of the award and estimates the fair value of SARs and employee stock purchase plan rights using the Black-Scholes valuation model. Such values are recognized as expense on a straight-line basis for time-based awards and using the accelerated graded vesting method for performance-based awards, both over the requisite service periods.

The following table presents the activity for RSUs under the 2014 Plan:

	Three Months Ended March 31, 2021	
	Outstanding RSUs	Weighted Average Grant Date Fair Value
RSUs – beginning of period	606,085	$ 93.26
Accrued dividend shares	79	$ 153.00
Granted	101,668	$ 170.60
Vested	(78,506)	$ 97.20
Forfeited	(7,381)	$ 102.00
RSUs – end of period	621,945	$ 105.31

The following table presents the activity for SARs under the 2014 Plan:

	Three Months Ended March 31, 2021	
	Outstanding SARs	Weighted Average Grant Date Fair Value
SARs – beginning of period	51,589	$ 30.64
Exercised	(15,921)	$ 29.92
SARs – end of period	35,668	$ 30.96

15) Stockholders' Equity

Share Repurchase Program

On July 25, 2011, the Company's Board of Directors approved a share repurchase program for the repurchase of up to an aggregate of $200 of its outstanding common stock from time to time in open market purchases, privately negotiated transactions or through other appropriate means. The timing and quantity of any shares repurchased depends upon a variety of factors, including business conditions, stock market conditions 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, 2021 and 2020, there were no repurchases of common stock.

Cash Dividends

Holders of the Company's common stock are entitled to receive dividends when they are declared by the Company's Board of Directors. In addition, the Company accrues dividend equivalents on the RSUs the Company assumed in the ESI Merger when dividends are declared by the Company's Board of Directors. During the three months ended March 31, 2021, the Company's Board of Directors declared a cash dividend of $0.20 per share, which totaled $11.1. During the three months ended March 31, 2020, the Company's Board of Directors declared a cash dividend of $0.20 per share, which totaled $11.0.

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.

(in millions, except share and per share data)

16) Business Segment, Geographic Area, 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, and research and defense.

The Company's Chief Operating Decision Maker ("CODM"), which is the Company's Chief Executive Officer, 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.

Reportable Segments

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 a range of products including laser-based systems for PCB manufacturing, which includes flexible interconnect PCB processing systems and high density interconnect solutions for rigid PCB manufacturing and substrate processing and multi-layer ceramic capacitor test 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 groups its similar products within its three reportable segments.

The following table sets forth net revenues by reportable segment:

	Three Months Ended March 31,	
	2021	2020
Vacuum & Analysis	$ 435.8	$ 319.3
Light & Motion	182.0	165.4
Equipment & Solutions	76.1	51.0
	$ 693.9	$ 535.7

(in millions, except share and per share data)

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

	Three Months Ended March 31, 2021	Three Months Ended March 31, 2020
Gross profit by reportable segment:		
Vacuum & Analysis	$ 205.0	$ 140.8
Light & Motion	82.1	75.6
Equipment & Solutions	35.0	23.2
Total gross profit by reportable segment	322.1	239.6
Operating expenses:		
Research and development	47.2	42.4
Selling, general and administrative	95.9	87.2
Acquisition and integration costs	6.2	2.2
Restructuring and other	4.9	0.4
Amortization of intangible assets	12.4	16.3
Asset impairment	—	1.2
Income from operations	155.5	89.9
Interest income	0.2	0.7
Interest expense	6.4	8.9
Other expense, net	1.1	0.4
Income before income taxes	148.2	81.3
Provision for income taxes	25.9	12.2
Net income	$ 122.3	$ 69.1

The following table sets forth capital expenditures by reportable segment for the three months ended March 31, 2021 and 2020:

Capital expenditures:	Vacuum & Analysis	Light & Motion	Equipment & Solutions	Total
Three Months Ended March 31, 2021	$ 8.6	$ 11.6	$ 6.3	$ 26.5
Three Months Ended March 31, 2020	$ 4.1	$ 4.0	$ 1.9	$ 10.0

The following table sets forth depreciation and amortization by reportable segment for the three months ended March 31, 2021 and 2020:

Depreciation and amortization:	Vacuum & Analysis	Light & Motion	Equipment & Solutions	Total
Three Months Ended March 31, 2021	$ 5.8	$ 9.0	$ 9.0	$ 23.8
Three Months Ended March 31, 2020	$ 4.9	$ 13.4	$ 10.1	$ 28.4

Total income tax expense is not presented by reportable segment because the necessary information is not available nor used by the CODM.

The following table sets forth segment assets by reportable segment:

March 31, 2021	Vacuum & Analysis	Light & Motion	Equipment & Solutions	Corporate, Eliminations & Other	Total
Segment assets:					
Accounts receivable	$ 247.4	$ 132.9	$ 61.5	$ (21.0)	$ 420.8
Inventory, net	290.5	157.4	69.9	(2.6)	515.2
Total segment assets	$ 537.9	$ 290.3	$ 131.4	$ (23.6)	$ 936.0

(in millions, except share and per share data)

December 21, 2020	Vacuum & Analysis	Light & Motion	Equipment & Solutions	Corporate, Eliminations & Other	Total
Segment assets:					
Accounts receivable	$ 229.1	$ 122.6	$ 51.7	$ (10.7)	$ 392.7
Inventory, net	273.3	166.1	63.7	(1.7)	501.4
Total segment assets	$ 502.4	$ 288.7	$ 115.4	$ (12.4)	$ 894.1

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

	March 31, 2021	December 31, 2020
Total segment assets	$ 936.0	$ 894.1
Cash and cash equivalents and short-term investments	909.5	836.0
Other current assets	77.0	74.3
Property, plant and equipment, net	297.0	284.3
Right-of-use asset	182.7	184.4
Goodwill and intangible assets, net	1,560.5	1,578.6
Other assets and long-term investments	55.2	52.1
Consolidated total assets	$ 4,017.9	$ 3,903.8

Geographic Area

Information about the Company’s operations by geographic area is presented in the tables below. Net revenues from unaffiliated customers are based on the location in which the sale originated. Intercompany sales between geographic areas are at tax transfer prices and have been eliminated from consolidated net revenues.

	Three Months Ended March 31,	
	2021	2020
Net revenues:		
United States	$ 282.8	$ 231.5
South Korea	97.9	76.0
China	81.3	49.7
Taiwan	59.4	25.3
Japan	48.0	40.0
Other Asia	70.1	58.9
Europe	54.4	54.3
	$ 693.9	$ 535.7

Long-lived assets:(1)	March 31, 2021	December 31, 2020
United States	$ 379.7	$ 364.0
Europe	37.3	94.8
Asia	101.3	45.1
	$ 518.3	$ 503.9

(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.

(in millions, except share and per share data)

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

	March 31, 2021	December 31, 2020
Reportable segment:		
Vacuum & Analysis	$ 195.7	$ 196.2
Light & Motion	391.9	395.3
Equipment & Solutions	474.5	474.9
Total goodwill	$ 1,062.1	$ 1,066.4

Major Customers

The following customers represented greater than 10% of the Company's net revenues as follows:

	Three Months Ended March 31,	
	2021	2020
Lam Research Corporation	13%	10%
Applied Materials, Inc.	11%	11%

17) Restructuring and Other

Restructuring

The Company recorded restructuring charges of $2.8 during the three months ended March 31, 2021, primarily related to severance costs due to a global cost saving initiative.

The Company recorded restructuring charges of $0.2 during the three months ended March 31, 2020, primarily related to the closure of a facility in Europe.

Restructuring activities were as follows:

	Three Months Ended March 31,	
	2021	2020
Beginning of period	$ 0.3	$ 3.7
Charged to expense	2.8	0.2
Payments and adjustments	(1.1)	(1.0)
End of period	$ 2.0	$ 2.9

Other

The Company recorded charges of $2.1 and $0.7 during the three months ended March 31, 2021 and 2020, respectively, related to duplicate facility costs.

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 Newport Merger.

18) 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 District 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 District 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 District Court dismissed the Company and Newport from the action. The second amended complaint seeks monetary damages, including pre- and post-judgment interest. The District 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 District 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 District Court's order granting defendants' motion for summary judgment, as well as from the District Court's prior orders granting defendants' motion for a bench trial and denying plaintiffs' motion for leave to file an amended complaint. On November 30, 2020, plaintiffs filed their opening brief in the Nevada Supreme Court in support of their appeal from the District Court's orders. On January 29, 2021, defendants filed their answering brief, and on March 30, 2021, plaintiffs filed their reply brief. The Nevada Supreme Court has not yet reached a decision on the appeal.

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

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

This Quarterly Report on Form 10-Q contains "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995, Section 27A of the Securities Act of 1933 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 ability to anticipate and meet customer demand, manufacturing and sourcing risks, including supply chain disruptions and component shortages, the terms of our Term Loan Facility, competition from larger or more established companies in MKS' markets, MKS' ability to successfully grow its business and particularly the business of ESI, which it acquired in February 2019, the challenges, risks and costs involved with integrating the operations of the companies we have acquired, potential fluctuations in quarterly results, dependence on new product development, rapid technological and market change, acquisition strategy, volatility of stock price, international operations, financial risk management, and the other factors described in MKS' Annual Report on Form 10-K for the year ended December 31, 2020 and any subsequent Quarterly Reports on Form 10-Q, as filed with the U.S. Securities and Exchange Commission (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 report.

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 three months ended March 31, 2021 compared to the three months ended March 31, 2020.

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, and research and defense.

Segments and Markets

The Vacuum & Analysis ("V&A") 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 ("L&M") segment was created in conjunction with our acquisition of Newport Corporation in 2016 (the "Newport Merger"). The L&M 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 ("E&S") segment was created in conjunction with our acquisition of Electro Scientific Industries, Inc. in 2019 (the "ESI Merger"). The E&S segment provides a range of products including laser-based systems for printed circuit board ("PCB") manufacturing, which include flexible interconnect PCB processing systems and high-density interconnect solutions for rigid PCB manufacturing and substrate processing and multi-layer ceramic capacitor test systems.

Semiconductor Market

A significant portion of our sales is derived from products sold to semiconductor capital equipment manufacturers and semiconductor device manufacturers. Our products are used in major semiconductor processing steps, such as depositing thin films of material onto silicon wafer substrates, etching, cleaning, lithography, metrology and inspection.

Approximately 59% and 58% of our net revenues for the three months ended March 31, 2021 and 2020, respectively, were from sales to semiconductor capital equipment manufacturers and semiconductor device manufacturers.

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

Net revenues in our semiconductor market increased by $99.0 million, or 32%, for the three months ended March 31, 2021, compared to the same period in the prior year, primarily due to an increase of $106.2 million and $1.7 million from our V&A and L&M segments, respectively, offset by a decrease of $8.9 million from our E&S segment.

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.

Advanced Markets

In addition to the semiconductor market, our products are used in the industrial technologies, life and health sciences, and research and defense markets.

Industrial Technologies

Industrial technologies encompasses a wide range of diverse applications, such as flexible and rigid PCB processing/fabrication, glass coating, laser marking, measurement and scribing, natural gas and oil production, environmental monitoring and electronic thin films. Electronic thin films are a primary component of numerous electronic products including flat panel displays, light emitting diodes, solar cells and data storage media. Industrial technologies manufacturers are located in developed and developing countries across the globe.

Life and Health Sciences

Our products for life and health sciences are used in a diverse array of applications, including bioimaging, medical instrument sterilization, medical device manufacturing, analytical, diagnostic and surgical instrumentation, consumable medical supply manufacturing and pharmaceutical production. Our life and health sciences customers are located globally.

Research and Defense

Our products for research and defense are sold to government, university and industrial laboratories for applications involving research and development in materials science, physical chemistry, photonics, optics and electronics materials. Our products are also sold for monitoring and defense applications including surveillance, imaging and infrastructure protection. Major equipment providers and research laboratories are concentrated in China, Europe, Japan, South Korea, Taiwan, and the United States.

Approximately 41% and 42% of our net revenues for the three months ended March 31, 2021 and 2020, respectively, were from advanced markets.

Net revenues from customers in our advanced markets increased by $59.2 million, or 27%, for the three months ended March 31, 2021, compared to the same period in the prior year, primarily due to increases of $33.9 million, $15.0 million and $10.3 million from our E&S, L&M and V&A segments, respectively. The increases were primarily due to increases in net revenues from our industrial technologies and research and defense markets.

International Markets

A significant portion of our net revenues is from sales to customers in international markets. For the three months ended March 31, 2021 and 2020, international revenues accounted for approximately 59% and 57%, respectively, of our total net revenues. A significant portion of our international net revenues was from China, Japan, South Korea and Taiwan. We expect international net revenues will continue to represent a significant percentage of our total net revenues for the foreseeable future.

Long-lived assets located outside of the United States accounted for approximately 27% and 31% of our total long-lived assets as of March 31, 2021 and 2020, respectively. 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.

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, 2020.

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, 2020 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 condensed consolidated statements of operations and comprehensive income data.

	Three Months Ended March 31, 2021	Three Months Ended March 31, 2020
Net revenues:		
Products	87.2%	86.1%
Services	12.8	13.9
Total net revenues	100.0	100.0
Cost of revenues:		
Products	46.5	47.8
Services	7.1	7.5
Total cost of revenues	53.6	55.3
Gross profit	46.4	44.7
Research and development	6.8	7.9
Selling, general and administrative	13.8	16.3
Acquisition and integration costs	0.9	0.4
Restructuring and other	0.7	0.1
Amortization of intangible assets	1.8	3.0
Asset impairment	—	0.2
Income from operations	22.4	16.8
Interest income	—	0.1
Interest expense	0.9	1.6
Other expense, net	0.2	0.1
Income before income taxes	21.3	15.2
Provision for income taxes	3.7	2.3
Net income	17.6%	12.9%

Net Revenues

(dollars in millions)	Three Months Ended March 31, 2021	Three Months Ended March 31, 2020
Products	$ 605.0	$ 461.2
Services	88.9	74.5
Total net revenues	$ 693.9	$ 535.7

Net product revenues increased $143.8 million during the three months ended March 31, 2021, compared to the same period in the prior year, due to an increase of $86.5 million in net product revenues from our semiconductor customers, primarily due to volume increases, and an increase in net product revenues of $57.3 million from customers in our advanced markets, primarily due to an increase in net revenues from our customers in our industrial technologies market.

Net 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. Net service revenues increased $14.4 million during the three months ended March 31, 2021, compared to the same period in the prior year, primarily due to an increase of $12.5 million in net service revenues from our semiconductor customers.

Total international net revenues, including product and service, were $411.1 million for the three months ended March 31, 2021, compared to $304.2 million for the three months ended March 31, 2020. The increase was primarily attributed to increases in net revenues in China, South Korea and Taiwan.

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

(dollars in millions)	Three Months Ended March 31, 2021	Three Months Ended March 31, 2020
Net revenues:		
Vacuum & Analysis	$ 435.8	$ 319.3
Light & Motion	182.0	165.4
Equipment & Solutions	76.1	51.0
Total net revenues	$ 693.9	$ 535.7

Net revenues from our V&A segment increased $116.5 million for the three months ended March 31, 2021, compared to the same period in the prior year, due to volume increases in net revenues from our semiconductor customers of $106.2 million for the three months ended March 31, 2021, and increases in net revenues from customers in our advanced markets of $10.3 million, primarily from customers in our industrial technologies market.

Net revenues from our L&M segment increased $16.6 million for the three months ended March 31, 2021, compared to the same period in the prior year, primarily due to increases in net revenues from customers in our advanced markets of $15.0 million, primarily from customers in our research and defense market.

Net revenues from our E&S segment increased $25.1 million for the three months ended March 31, 2021, compared to the same period in the prior year, due to increases in net revenues from customers in our advanced markets of $33.9 million, primarily from customers in our industrial technologies market, partially offset by decreases in net revenues from our semiconductor customers of $8.8 million.

Gross Margin

	Three Months Ended March 31, 2021	Three Months Ended March 31, 2020	% Points Change
Gross margin as a percentage of net revenues:			
Products	46.7%	44.5%	2.2%
Services	44.7	46.3	(1.6)
Total gross margin	46.4%	44.7%	1.7%

Gross margin for our products increased by 2.2 percentage points for the three months ended March 31, 2021, compared to the same period in the prior year, primarily due to higher revenue volumes, partially offset by higher freight and duty costs, and unfavorable absorption.

Gross margin for our services decreased by 1.6 percentage points for the three months ended March 31, 2021, compared to the same period in the prior year, primarily due to unfavorable mix of products serviced and higher variable compensation costs, partially offset by favorable absorption.

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

	Three Months Ended March 31, 2021	Three Months Ended March 31, 2020	% Points Change
Gross margin as a percentage of net revenues:			
Vacuum & Analysis	47.0%	44.1%	2.9%
Light & Motion	45.1	45.5	(0.4)
Equipment & Solutions	46.1	45.6	0.5
Total gross margin	46.4%	44.7%	1.7%

Gross margin for our V&A segment increased by 2.9 percentage points for the three months ended March 31, 2021, compared to the same period in the prior year, primarily due to higher revenue volumes and favorable product mix.

Gross margin for our L&M segment decreased by 0.4 percentage points for the three months ended March 31, 2021, compared to the same period in the prior year, primarily due to unfavorable absorption and higher variable compensation, partially offset by higher revenue volumes.

Gross margin for our E&S segment increased by 0.5 percentage points for the three months ended March 31, 2021, compared to the same period in the prior year, primarily due to favorable absorption, partially offset by unfavorable product mix, and higher freight and duty costs.

Research and Development

	Three Months Ended March 31,	
(dollars in millions)	2021	2020
Research and development	$ 47.2	$ 42.4

Research and development expenses increased $4.8 million for the three months ended March 31, 2021, compared to the same period in the prior year. The increase was primarily related to an increase of $4.8 million in compensation-related costs, an increase of $0.6 million in project materials and an increase of $0.4 million in consulting and professional fees, partially offset by a decrease of $0.3 million in travel costs and $0.3 million in depreciation expense.

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 products have continuously advanced as we strive to meet our customers' evolving needs. We have developed, and continue to develop, new products to address industry trends, such as the shrinking of integrated circuit critical dimensions and technology inflections, and, in the flat panel display and solar markets, the transition to larger substrate sizes, which require more advanced processing and process control technology, the continuing drive toward more complex and accurate components and devices within the handset and tablet market, the transition to 5G for both devices and infrastructure, supporting the growth in units and via counts of the high density interconnect PCB drilling market, and the industry transition to electric cars in the automotive market. In addition, we have developed, and continue to develop, products that support the migration to new classes of materials, ultra-thin layers, and 3D structures that are used in small geometry manufacturing. 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 and advanced market applications. 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

	Three Months Ended March 31,	
(dollars in millions)	2021	2020
Selling, general and administrative	$ 95.9	$ 87.2

Selling, general and administrative expenses increased $8.7 million for the three months ended March 31, 2021, compared to the same period in the prior year. The increase was primarily related to an increase of $10.8 million in compensation-related costs and $1.0 million in commissions expense, partially offset by a decrease of $1.5 million in travel costs, mainly as a result of the COVID-19 pandemic, a $0.5 million decrease in occupancy costs and a $1.0 million decrease in marketing and demo expenses.

Acquisition and Integration Costs

(dollars in millions)	Three Months Ended March 31, 2021		2020	
Acquisition and integration costs	$	6.2	$	2.2

Acquisition and integration costs during the three months ended March 31, 2021 primarily related to consulting and professional fees related to our proposed acquisition of Coherent, Inc. Acquisition and integration costs during the three months ended March 31, 2020 related to integration costs related to the ESI Merger, consisting primarily of cash bonus and stock-based compensation for certain ESI executives assisting in the integration process.

Restructuring and Other

(dollars in millions)	Three Months Ended March 31, 2021		2020	
Restructuring and other	$	4.9	$	0.4

Restructuring and other costs during the three months ended March 31, 2021 primarily related to severance costs due to a global cost saving initiative and duplicate facility costs attributed to entering into new leases. Restructuring and other costs during the three months ended March 31, 2020 primarily related to duplicate facility costs attributed to entering into new leases, costs related to the exit of certain product groups and costs related to the closure of a facility in Europe. Such costs for the three months ended March 31, 2020 were offset by an insurance reimbursement related to a legal settlement.

Amortization of Intangible Assets

(dollars in millions)	Three Months Ended March 31, 2021		2020	
Amortization of intangible assets	$	12.4	$	16.3

Amortization of intangible assets decreased by $3.9 million during the three months ended March 31, 2021, compared to the same period in the prior year, primarily due to certain intangible assets in our Light & Motion segment that became fully amortized.

Asset Impairment

(dollars in millions)	Three Months Ended March 31, 2021		2020	
Asset impairment	$	—	$	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 in Europe.

Interest Expense, Net

(dollars in millions)	Three Months Ended March 31, 2021		2020	
Interest expense, net	$	6.2	$	8.2

Interest expense, net, decreased by $2.0 million for the three months ended March 31, 2021, compared to the same period in the prior year, primarily due to lower interest rates and lower average debt balances as a result of payments made.

Other Expense, Net

(dollars in millions)	Three Months Ended March 31, 2021	Three Months Ended March 31, 2020
Other expense, net	$ 1.1	$ 0.4

Other expense, net, increased by $0.7 million for the three months ended March 31, 2021, compared to the same period in the prior year, related to changes in foreign exchange rates.

Provision for Income Taxes

(dollars in millions)	Three Months Ended March 31, 2021	Three Months Ended March 31, 2020
Provision for income taxes	$ 25.9	$ 12.2

Our effective tax rates for the periods ended March 31, 2021 and 2020 were 17.5% and 15.0%, respectively. Our effective tax rate for the three months ended March 31, 2021, and related income tax expense, was lower than the U.S. statutory tax rate due to the U.S. deduction for foreign derived intangible income 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 and additional withholding taxes on inter-company distributions due to the United Kingdom's departure from the EU.

On March 11, 2021, President Biden signed into law the American Rescue Plan Act of 2021 ("ARPA"). The act contains numerous income tax provisions among other tax and non-tax provisions to provide COVID-19 pandemic relief. We have evaluated the ARPA legislation in relation to income taxes and we do not expect the ARPA income tax provisions effective in the current year to have a material impact on our financial statements. The ARPA income tax provisions effective in future years are being evaluated and we have not yet determined the impact on our consolidated financial statements.

In addition, on April 7, 2021, the Biden administration proposed a tax plan that would, among other things, raise the U.S. corporate income tax rate from 21% to 28%. If this tax plan is enacted in its current form, we expect our income tax expense would materially increase.

As of March 31, 2021 and December 31, 2020, the total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately $46.5 million and $47.0 million, respectively.

Over the next 12 months it is reasonably possible that we may recognize approximately $4.0 million of previously net unrecognized tax benefits, excluding interest and penalties, related to U.S. federal, state and foreign tax positions as a result of the expiration of statutes of limitation. The U.S. federal statute of limitations remains open for tax years 2017 through present. The statute of limitations for our tax filings in other jurisdictions varies between fiscal years 2015 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.

Our future effective tax rate depends on various factors, including the impact of tax legislation, further interpretations and guidance from U.S. federal and state governments on the impact of proposed regulations issued by the Interal Revenue Service, further interpretations and guidance from foreign governments, the geographic composition of our pre-tax income, and changes in income tax reserves for unrecognized tax benefits. We monitor these factors and timely adjust our estimates of the effective tax rate accordingly. We expect that the geographic mix of pre-tax income will continue to have a favorable impact on our effective tax rate. However, the geographic mix of pre-tax income can change based on multiple factors, resulting in changes to the effective tax rate in future periods. 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 $909.5 million at March 31, 2021, compared to $836.0 million at December 31, 2020. 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 charges 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 $126.9 million for the three months ended March 31, 2021 and resulted from net income of $122.3 million, which included non-cash charges of $48.5 million, offset by a net increase in working capital of $43.9 million. The net increase in working capital was primarily due to a decrease in accrued compensation of $41.9 million, an increase in trade accounts receivable of $33.1 million and an increase in inventories of $24.1 million, partially offset by an increase in accounts payable of $36.8 million, an increase in other current and non-current liabilities of $11.8 million and a decrease in other current and non-current assets of $6.3 million.

Net cash used in investing activities was $9.2 million for the three months ended March 31, 2021 and was due to purchases of production-related equipment of $26.5 million, offset by net sales and maturities of investments of $17.3 million.

Net cash used in financing activities was $23.5 million for the three months ended March 31, 2021 and was primarily due to dividend payments of $11.1 million, net payments on short- and long-term borrowings of $7.1 million, and net payments related to tax payments on the vesting of employee stock awards of $5.3 million.

On July 25, 2011, our Board of Directors approved a share repurchase program for the repurchase of up to an aggregate of $200 million of our 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, 2021 and 2020, 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 restricted stock units we assumed in the ESI Merger when dividends are declared by our Board of Directors. Our Board of Directors declared a cash dividend of $0.20 per share during the first quarter of 2021, which totaled $11.1 million, or $0.20 per share. Our Board of Directors declared a cash dividend of $0.20 per share during the first quarter of 2020, which totaled $11.0 million, or $0.20 per share.

Future dividend declarations, if any, as well as the record and payment dates for such dividends, are subject to the final determination of our Board of Directors. In addition, under the terms of our Term Loan Facility and ABL Facility, each as defined and described further below, we may be restricted from paying dividends under certain circumstances.

Senior Secured Term Loan Credit Facility

In connection with the completion of 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, 2021, borrowings under the Term Loan Facility bear interest per annum at one of the following rates selected by us: (a) a base rate determined by reference to the highest of (1) the federal funds effective rate plus 0.50%, (2) the “prime rate” quoted in *The Wall Street Journal*, (3) a LIBOR rate determined by reference to the costs of funds for U.S. dollar deposits for an interest period of one month adjusted for certain additional costs, plus 1.00%, and (4) a floor of 1.75%, plus, in each case, an applicable margin; 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.

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 made 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.

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, 2021, the remaining balance of deferred finance fees and original issue discount of the Term Loan Facility was $8.9 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, 2021, after total principal prepayments of $575.0 million and regularly scheduled principal payments of $23.9 million, the total outstanding principal balance of the Term Loan Facility was $831.1 million and the interest rate was 1.9%.

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, 2021, we were in compliance with all covenants under the Term Loan Credit Agreement.

Interest Rate Swap Agreements

We entered into various interest rate swap agreements, as described further in Note 6 to the Notes to the Condensed Consolidated Financial Statements, that exchange the variable LIBOR interest rate to a fixed rate, in order to manage the exposure to interest rate fluctuations associated with the variable LIBOR interest rate paid on the outstanding balance of the 2019 Incremental Term Loan Facility.

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.

Under the ABL Facility, we are required to prepay amounts outstanding under the ABL Facility (1) if amounts outstanding under the ABL Facility exceed the lesser of (a) the commitment amount and (b) the borrowing base, in an amount required to reduce such shortfall, (2) if amounts outstanding under the ABL Facility in any currency other than U.S. dollars exceed the sublimit for such currency, in an amount required to reduce such shortfall, and (3) during any period in which we have excess availability less than the greater of (a) 10.0% of the lesser of (x) the commitment amount and (y) the borrowing base and (b) $8.5 million for 3 consecutive business days, until the time when we have excess availability equal to or greater than the greater of (A) 10.0% of the lesser of (i) the commitment amount and (ii) the borrowing base and (B) $8.5 million for 30 consecutive days, or during the continuance of an event of default, with immediately available funds in its blocked accounts.

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, the majority 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, 2021 of up to an equivalent of $30.4 million U.S. dollars. Total borrowings outstanding under these arrangements were $0.3 million and $5.5 million at March 31, 2021 and December 31, 2020, 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 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, 2020.

Recently Issued Accounting Pronouncements

In March 2020, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") 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. In January 2021, the FASB issued ASU 2021-01, "Reference Rate Reform (Topic 848): Scope." The amendments in this update clarify that certain optional expedients and exceptions in Topic 848 for contract modifications and hedge accounting apply to derivative instruments that use an interest rate for margining, discounting, or contract price alignment that is modified as a result of reference rate reform. Amendments in this update to the expedients and exceptions in Topic 848 capture the incremental consequences of the scope clarification and tailor the existing guidance to derivative instruments affected by the discounting transition. The amendments in this update do not apply to contract modifications made after December 31, 2022, new hedging relationships entered into after December 31, 2022, and existing hedging relationships evaluated for effectiveness in periods after December 31, 2022, except for hedging relationships existing as of December 31, 2022, that apply certain optional expedients in which the accounting effects are recorded through the end of the hedging relationship (including periods after December 31, 2022). We are in the process of evaluating the requirements of this standard and have not yet determined the impact of adoption on our consolidated financial statements.

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, 2020 filed with the Securities and Exchange Commission on February 23, 2021. As of March 31, 2021, there were no material changes in our exposure to market risk from December 31, 2020.

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, 2021. 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, 2021, 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, 2021, 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.

For a description of our material pending legal proceedings, see Note 18 to the Notes to the Condensed Consolidated Financial Statements contained in Part 1, Item 1 of this Quarterly Report on Form 10-Q.

ITEM 1A. RISK FACTORS.

Information regarding risk factors affecting the Company's business are discussed in the section entitled "Risk Factors" in the Company's Annual Report on Form 10-K for the year ended December 31, 2020 (the "Annual Report") filed with the Securities and Exchange Commission on February 23, 2021. There have been no material changes to the risk factors as described in our Annual Report.

ITEM 6. EXHIBITS.

Exhibit No.	Exhibit Description
+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
+10.1(5)*	Employment Agreement, effective February 18, 2021, between Mark Gitin, the Registrant and Newport Corporation
+10.2(5)*	Employment Agreement, effective February 17, 2021, between Eric Taranto and the Registrant
31.1	Certification of Principal Executive Officer pursuant to Rule 13a-14(a)/Rule 15d-14(a) of the Securities Exchange Act of 1934, as amended
31.2	Certification of Principal Financial Officer pursuant to Rule 13a-14(a)/Rule 15d-14(a) of the Securities Exchange Act of 1934, as amended
32.1	Certification of Chief Executive Officer and Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101.INS	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.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document
101.PRE	Inline XBRL Taxonomy Extension Presentation 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, 2020 (File No. 000-23621), filed with the Securities and Exchange Commission on February 23, 2021.

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 4, 2021	By:	/s/ Seth H. Bagshaw
		Seth H. Bagshaw
		Senior Vice President, Chief Financial Officer and Treasurer
		(Principal Financial Officer)

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

I, John T.C. Lee, certify that:

1. I have reviewed this quarterly report on Form 10-Q of MKS Instruments, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant’s other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):

   a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

   b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Dated: May 4, 2021

/s/ John T.C. Lee

John T.C. Lee
President and Chief Executive Officer
(Principal Executive Officer)

EXHIBIT 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

I, Seth H. Bagshaw, certify that:

1. I have reviewed this quarterly report on Form 10-Q of MKS Instruments, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

    a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

    b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

    c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

    d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

    a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

    b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Dated: May 4, 2021

/s/ Seth H. Bagshaw

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

EXHIBIT 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

In connection with the Quarterly Report on Form 10-Q of MKS Instruments, Inc. (the "Company") for the period ended March 31, 2021 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 4, 2021

/s/ John T.C. Lee
John T.C. Lee
President and Chief Executive Officer
(Principal Executive Officer)

Dated: May 4, 2021

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