UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 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 June 27, 2020

OR

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

For the transition period from __________ to __________

Commission file number: 001-32598

Entegris, Inc.
(Exact name of registrant as specified in its charter)

Delaware	**41-1941551**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
129 Concord Road, Billerica, Massachusetts	**01821**
(Address of principal executive offices)	**(Zip Code)**

(978) 436-6500
(Registrant's telephone number, including area code)

None
(Former name, former address and former fiscal year, if changed since last report)

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, $0.01 par value per share	**ENTG**	**The Nasdaq Stock Market LLC**

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. (Check one):

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 July 20, 2020, there were 134,818,927 shares of the registrant's common stock outstanding.

ENTEGRIS, INC. AND SUBSIDIARIES
FORM 10-Q
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FOR THE QUARTER ENDED JUNE 27, 2020

Cautionary Statements

This Quarterly Report on Form 10-Q contains “forward-looking statements.” The words “believe,” “expect,” “anticipate,” “intend,” “estimate,” “forecast,” “project,” “should,” “may,” “will,” “would” or the negative thereof and similar expressions are intended to identify such forward-looking statements. These forward-looking statements may include statements about future period guidance or projections; the Company’s performance relative to its markets, including the drivers of such performance; market and technology trends, including the duration and drivers of any growth trends and the impact of the COVID-19 pandemic; the development of new products and the success of their introductions; the focus of the Company’s engineering, research and development projects; the Company’s ability to execute on its business strategies; the Company’s capital allocation strategy, which may be modified at any time for any reason, including share repurchases, dividends, debt repayments and potential acquisitions; the impact of the acquisitions the Company has made and commercial partnerships the Company has established; future capital and other expenditures, including estimates thereof; the Company’s expected tax rate; the impact, financial or otherwise, of any organizational changes; the impact of accounting pronouncements; quantitative and qualitative disclosures about market risk; and other matters. These forward-looking statements are based on current management expectations and assumptions only as of the date of this Quarterly Report, are not guarantees of future performance and involve substantial risks and uncertainties that are difficult to predict and that could cause actual results to differ materially from the results expressed in, or implied by, these forward-looking statements. These risks and uncertainties include, but are not limited to, risks related to the COVID-19 pandemic on the global economy and financial markets, as well as on the Company, our customers and suppliers, which may impact our sales, gross margin, customer demand and our ability to supply our products to our customers; weakening of global and/or regional economic conditions, generally or specifically in the semiconductor industry, which could decrease the demand for the Company’s products and solutions; the Company’s ability to meet rapid demand shifts; the Company’s ability to continue technological innovation and introduce new products to meet customers’ rapidly changing requirements; the Company’s concentrated customer base; the Company’s ability to identify, effect and integrate acquisitions, joint ventures or other transactions; the Company’s ability to effectively implement any organizational changes; the Company’s ability to protect and enforce intellectual property rights; operational, political and legal risks of the Company’s international operations; the Company’s dependence on sole source and limited source suppliers; the increasing complexity of certain manufacturing processes; raw material shortages, supply constraints and price increases; changes in government regulations of the countries in which the Company operates; fluctuation of currency exchange rates; fluctuations in the market price of the Company's stock; the level of, and obligations associated with, the Company's indebtedness; and other risk factors and additional information described in the Company's filings with the Securities and Exchange Commission, including under the heading "Risks Factors" in Item 1A of the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2019, filed on February 7, 2020, under the heading "Risk Factors" in Item 1A of this Quarterly Report and in the Company's other periodic filings. Except as required under the federal securities laws and the rules and regulations of the Securities and Exchange Commission, the Company undertakes no obligation to update publicly any forward-looking statements or information contained herein, which speak as of their respective dates.

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PART 1. FINANCIAL INFORMATION
Item 1. Financial Statements

ENTEGRIS, INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED BALANCE SHEETS
(Unaudited)

(In thousands, except share and per share data)	June 27, 2020	December 31, 2019
ASSETS		
Current assets:		
Cash and cash equivalents	$ 532,667	$ 351,911
Trade accounts and notes receivable, net of allowance for doubtful accounts of $3,066 and $1,145	275,557	234,409
Inventories, net	332,885	287,098
Deferred tax charges and refundable income taxes	20,291	24,552
Other current assets	27,447	34,427
Total current assets	1,188,847	932,397
Property, plant and equipment, net of accumulated depreciation of $558,433 and $522,424	475,202	479,544
Other assets:		
Right-of-use assets	47,911	50,160
Goodwill	725,678	695,044
Intangible assets, net of accumulated amortization of $437,450 and $409,328	342,258	333,952
Deferred tax assets and other noncurrent tax assets	11,772	11,245
Other	12,372	13,744
Total assets	$ 2,804,040	$ 2,516,086
LIABILITIES AND EQUITY		
Current liabilities:		
Long-term debt, current maturities	$ —	$ 4,000
Accounts payable	80,359	84,207
Accrued payroll and related benefits	61,884	62,340
Accrued interest payable	12,607	9,653
Other accrued liabilities	58,626	78,125
Income taxes payable	24,479	26,108
Total current liabilities	237,955	264,433
Long-term debt, excluding current maturities, net of unamortized discount and debt issuance costs of $11,008 and $9,516	1,183,992	932,484
Pension benefit obligations and other liabilities	37,106	37,867
Deferred tax liabilities and other noncurrent tax liabilities	71,494	71,586
Long-term lease liability	41,704	43,827
Commitments and contingent liabilities	—	—
Equity:		
Preferred stock, par value $.01; 5,000,000 shares authorized; none issued and outstanding as of June 27, 2020 and December 31, 2019	—	—
Common stock, par value $.01; 400,000,000 shares authorized; issued and outstanding shares as of June 27, 2020: 134,948,625 and 134,746,225, respectively; issued and outstanding shares as of December 31, 2019: 134,929,768 and 134,727,368, respectively	1,349	1,349
Treasury stock, at cost: 202,400 shares held as of June 27, 2020 and December 31, 2019	(7,112)	(7,112)
Additional paid-in capital	838,739	842,784
Retained earnings	447,590	366,127
Accumulated other comprehensive loss	(48,777)	(37,259)
Total equity	1,231,789	1,165,889
Total liabilities and equity	$ 2,804,040	$ 2,516,086

See the accompanying notes to condensed consolidated financial statements.

ENTEGRIS, INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS
(Unaudited)

(In thousands, except per share data)	Three months ended June 27, 2020	Three months ended June 29, 2019	Six months ended June 27, 2020	Six months ended June 29, 2019
Net sales	$ 448,405	$ 378,874	$ 860,732	$ 769,921
Cost of sales	241,033	212,600	467,882	426,254
Gross profit	207,372	166,274	392,850	343,667
Selling, general and administrative expenses	66,872	64,150	125,763	146,404
Engineering, research and development expenses	32,572	30,624	62,204	59,615
Amortization of intangible assets	13,216	16,591	29,427	35,248
Operating income	94,712	54,909	175,456	102,400
Interest expense	13,005	11,315	23,564	22,199
Interest income	(213)	(1,623)	(534)	(2,848)
Other (income) expense, net	(477)	(122,015)	401	(122,263)
Income before income tax expense	82,397	167,232	152,025	205,312
Income tax expense	14,361	43,235	22,983	48,657
Net income	$ 68,036	$ 123,997	$ 129,042	$ 156,655
Basic earnings per common share	$ 0.51	$ 0.92	$ 0.96	$ 1.16
Diluted earnings per common share	$ 0.50	$ 0.91	$ 0.95	$ 1.15
Weighted shares outstanding:				
Basic	134,700	135,378	134,722	135,338
Diluted	136,007	136,581	136,188	136,637

See the accompanying notes to condensed consolidated financial statements.

ENTEGRIS, INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(Unaudited)

	Three months ended		Six months ended	
(In thousands)	**June 27, 2020**	**June 29, 2019**	**June 27, 2020**	**June 29, 2019**
Net income	$ 68,036	$ 123,997	$ 129,042	$ 156,655
Other comprehensive loss, net of tax				
Foreign currency translation adjustments	(2,176)	(1,712)	(11,537)	(4,499)
Pension liability adjustments	9	(14)	19	10
Other comprehensive loss	(2,167)	(1,726)	(11,518)	(4,489)
Comprehensive income	$ 65,869	$ 122,271	$ 117,524	$ 152,166

See the accompanying notes to condensed consolidated financial statements.

ENTEGRIS, INC. AND SUBSIDIARIES

CONDENSED CONSOLIDATED STATEMENTS OF EQUITY

(Unaudited)

(In thousands)	**Common shares outstanding**	**Common stock**	**Treasury shares**	**Treasury stock**	**Additional paid-in capital**	**Retained earnings**	**Foreign currency translation adjustments**	**Defined benefit pension adjustments**	**Total**
Balance at December 31, 2018	136,179	$ 1,362	(202)	$ (7,112)	$ 837,658	$ 213,753	$ (32,776)	$ (860)	$ 1,012,025
Shares issued under stock plans	572	5	—	—	(6,817)	—	—	—	(6,812)
Share-based compensation expense	—	—	—	—	4,653	—	—	—	4,653
Repurchase and retirement of common stock	(1,035)	(10)	—	—	(6,364)	(23,413)	—	—	(29,787)
Dividends declared ($0.07 per share)	—	—	—	—	7	(9,517)	—	—	(9,510)
Pension liability adjustment	—	—	—	—	—	—	—	24	24
Foreign currency translation	—	—	—	—	—	—	(2,787)	—	(2,787)
Net income	—	—	—	—	—	32,658	—	—	32,658
Balance at March 30, 2019	135,716	$ 1,357	(202)	$ (7,112)	$ 829,137	$ 213,481	$ (35,563)	$ (836)	$ 1,000,464
Shares issued under stock plans	49	—		—	(572)	—	—	—	(572)
Share-based compensation expense	—	—	—	—	4,936	—	—	—	4,936
Repurchase and retirement of common stock	(422)	(4)	—	—	(2,579)	(12,417)	—	—	(15,000)
Dividends declared ($0.07 per share)	—	—	—	—	—	(9,550)	—	—	(9,550)
Pension liability adjustment	—	—	—	—	—	—	—	(14)	(14)
Foreign currency translation	—	—	—	—	—	—	(1,712)	—	(1,712)
Net income	—	—	—	—	—	123,997	—	—	123,997
Balance at June 29, 2019	135,343	$ 1,353	(202)	$ (7,112)	$ 830,922	$ 315,511	$ (37,275)	$ (850)	$ 1,102,549

(In thousands)	**Common shares outstanding**	**Common stock**	**Treasury shares**	**Treasury stock**	**Additional paid-in capital**	**Retained earnings**	**Foreign currency translation adjustments**	**Defined benefit pension adjustments**	**Total**
Balance at December 31, 2019	134,930	$ 1,349	(202)	$ (7,112)	$ 842,784	$ 366,127	$ (36,468)	$ (791)	$ 1,165,889
Shares issued under stock plans	483	5	—	—	(10,894)	—	—	—	(10,889)
Share-based compensation expense	—	—	—	—	4,994	—	—	—	4,994
Repurchase and retirement of common stock	(604)	(6)	—	—	(3,740)	(25,818)	—	—	(29,564)
Dividends declared ($0.08 per share)	—	—	—	—	15	(10,773)	—	—	(10,758)
Pension liability adjustment	—	—	—	—	—	—	—	10	10
Foreign currency translation	—	—	—	—	—	—	(9,361)	—	(9,361)
Net income	—	—	—	—	—	61,006	—	—	61,006
Balance at March 28, 2020	134,809	$ 1,348	(202)	$ (7,112)	$ 833,159	$ 390,542	$ (45,829)	$ (781)	$ 1,171,327
Shares issued under stock plans	139	1		—	(83)	—	—	—	(82)
Share-based compensation expense	—	—	—	—	5,655	—	—	—	5,655
Dividends declared ($0.08 per share)	—	—	—	—	8	(10,988)	—	—	(10,980)
Pension liability adjustment	—	—	—	—	—	—	—	9	9
Foreign currency translation	—	—	—	—	—	—	(2,176)	—	(2,176)
Net income	—	—	—	—	—	68,036	—	—	68,036
Balance at June 27, 2020	134,948	$ 1,349	(202)	$ (7,112)	$ 838,739	$ 447,590	$ (48,005)	$ (772)	$ 1,231,789

See the accompanying notes to condensed consolidated financial statements.

ENTEGRIS, INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(Unaudited)

(In thousands)	Six months ended June 27, 2020	Six months ended June 29, 2019
Operating activities:		
Net income	$ 129,042	$ 156,655
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation	41,287	35,317
Amortization	29,427	35,248
Share-based compensation expense	10,649	9,589
Provision for deferred income taxes	(859)	(2,157)
Charge for excess and obsolete inventory	8,393	3,315
Other	5,361	4,982
Changes in operating assets and liabilities:		
Trade accounts and notes receivable	(42,087)	5,436
Inventories	(55,362)	3,709
Accounts payable and accrued liabilities	5,643	(52,707)
Other current assets	4,871	13,028
Income taxes payable and refundable income taxes	4,412	15,391
Other	647	557
Net cash provided by operating activities	141,424	228,363
Investing activities:		
Acquisition of property, plant and equipment	(46,873)	(60,101)
Acquisition of businesses, net of cash acquired	(75,645)	(49,267)
Other	211	197
Net cash used in investing activities	(122,307)	(109,171)
Financing activities:		
Proceeds from short-term borrowings and long-term debt	617,000	—
Payments of long-term debt	(368,000)	(2,000)
Payments for debt issuance costs	(3,964)	—
Payments for dividends	(21,652)	(18,964)
Issuance of common stock	1,749	917
Repurchase and retirement of common stock	(29,564)	(50,321)
Taxes paid related to net share settlement of equity awards	(12,720)	(8,301)
Deferred acquisition payments	(16,125)	—
Other	(2,891)	(497)
Net cash provided by (used in) financing activities	163,833	(79,166)
Effect of exchange rate changes on cash and cash equivalents	(2,194)	(706)
Increase in cash and cash equivalents	180,756	39,320
Cash and cash equivalents at beginning of period	351,911	482,062
Cash and cash equivalents at end of period	$ 532,667	$ 521,382

Supplemental Cash Flow Information
(unaudited)
(In thousands)

	Six months ended			
	June 27, 2020		June 29, 2019	
Non-cash transactions:				
Deferred acquisition payments	$	2,033	$	14,001
Contingent consideration obligation		—		686
Equipment purchases in accounts payable		4,860		5,974
Dividends payable		86		96
Schedule of interest and income taxes paid:				
Interest paid		19,365		21,637
Income taxes paid, net of refunds received		19,315		31,653

See the accompanying notes to condensed consolidated financial statements.

ENTEGRIS, INC. AND SUBSIDIARIES
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Unaudited)

1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Nature of Operations Entegris, Inc. (“Entegris”, “the Company”, “us”, “we”, or “our”) is a leading global developer, manufacturer and supplier of microcontamination control products, specialty chemicals and advanced materials handling solutions for manufacturing processes in the semiconductor and other high-technology industries.

Principles of Consolidation The condensed consolidated financial statements include the accounts of the Company and its majority-owned subsidiaries. Intercompany profits, transactions and balances have been eliminated in consolidation.

Use of Estimates The preparation of condensed consolidated financial statements in conformity with accounting principles generally accepted in the United States requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, particularly receivables, inventories, property, plant and equipment, right-of-use assets, goodwill, intangibles, accrued expenses, short-term and long-term lease liability, income taxes and related accounts, and disclosure of contingent assets and liabilities at the date of the condensed consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Basis of Presentation The condensed consolidated financial statements have been prepared in accordance with accounting principles generally accepted in the United States and contain all adjustments considered necessary, and are of a normal recurring nature, to present fairly the financial position as of June 27, 2020 and December 31, 2019, and the results of operations and comprehensive income for the three and six months ended June 27, 2020 and June 29, 2019, the equity statements as of and for the three and six months ended June 27, 2020 and June 29, 2019, and cash flows for the six months ended June 27, 2020 and June 29, 2019.

The condensed consolidated financial statements and accompanying notes are presented as permitted by Form 10-Q and do not contain certain information included in the Company’s annual consolidated financial statements and notes. The information included in this Form 10-Q should be read in conjunction with Management’s Discussion and Analysis and consolidated financial statements and notes thereto included in the Company’s Form 10-K for the year ended December 31, 2019. The results of operations for the three and six months ended June 27, 2020 are not necessarily indicative of the results to be expected for the full year.

Fair Value of Financial Instruments The carrying value of cash equivalents, accounts receivable, accounts payable, accrued payroll and related benefits, and other accrued liabilities approximates fair value due to the short maturity of those items. The fair value of long-term debt, including current maturities, was $1,194.2 million at June 27, 2020, compared to the carrying amount of long-term debt, including current maturities, of $1,184.0 million at June 27, 2020.

Recent Accounting Pronouncements Adopted in 2020 In June 2016, the FASB issued ASU 2016-13, Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments. ASU 2016-13 changes the impairment model for most financial assets and certain other instruments. For trade and other receivables, held-to-maturity debt securities, loans and other instruments, entities are required to use a new forward-looking “expected loss” model that replaces the current “incurred loss” model and generally will result in the earlier recognition of allowances for losses.

The Company adopted ASU No. 2016-13 on January 1, 2020, and there was no material effect on its condensed consolidated financial statements.

Recent Accounting Pronouncements
In December 2019, the FASB issued ASU No. 2019-12, “Simplifying the Accounting for Income Taxes” under ASC 740, which simplifies the accounting for income taxes by removing certain exceptions to the general principles in Topic 740 and amends existing guidance to improve consistent application. This guidance is effective for fiscal years beginning after December 15, 2021, including interim periods within that fiscal year. Early adoption is permitted. The Company is in the process of evaluating the impacts of this guidance on its consolidated financial statements and related disclosures.

2. REVENUES

Revenue Recognition Revenue is measured based on consideration specified in a contract with a customer, and excludes any sales incentives and amounts collected on behalf of third parties. The Company recognizes revenue when it satisfies a performance obligation by transferring control over a product or service to a customer.

Taxes assessed by a governmental authority that are both imposed on and concurrent with a specific revenue-producing transaction, that are collected by the Company from a customer, are excluded from revenue.

Shipping and handling costs associated with outbound freight after control over a product has transferred to a customer are accounted for as a fulfillment cost and are included in cost of goods sold.

The Company recognizes the incremental costs of obtaining contracts as an expense when incurred if the amortization period of the assets that the Company otherwise would have recognized is one year or less.

When the Company receives consideration, or such consideration is unconditionally due, from a customer prior to transferring goods or services to the customer under the terms of a sales contract, the Company records deferred revenue, which represents a contract liability. Such deferred revenue typically results from advance payments received on sales of the Company's products. The Company makes the required disclosures below.

The Company does not disclose information about remaining performance obligations that have original expected durations of one year or less.

Nature of goods and services The following is a description of principal activities from which the Company generates its revenues. The Company has three reportable segments. For more detailed information about reportable segments, see note 10 to the condensed consolidated financial statements. For each of the three reportable segments, the recognition of revenue regarding the nature of goods and services provided by the segments are similar and described below. The Company recognizes revenue for product sales at a point in time following the transfer of control of such products to the customer, which generally occurs upon shipment or delivery, depending on the terms of the underlying contracts. For product sales contracts that contain multiple performance obligations, the Company allocates the transaction price to each performance obligation identified in the contract based on relative standalone selling prices, or estimates of such prices, and recognizes the related revenue as control of each individual product is transferred to the customer, in satisfaction of the corresponding performance obligations.

The Company generally recognizes revenue for sales of services when the Company has satisfied the performance obligation.

The Company also enters into arrangements to license its intellectual property. These arrangements typically permit the customer to use a specialized manufacturing process and in return the Company receives a royalty fee. If applicable, the Company recognizes revenue when the subsequent sale or usage occurs.

The Company offers certain customers cash discounts and volume rebates as sales incentives. The discounts and volume rebates are recorded as a reduction in sales at the time revenue is recognized in an amount estimated based on historical experience and contractual obligations. The Company periodically reviews the assumptions underlying its estimates of discounts and volume rebates and adjusts its revenues accordingly.

In addition, the Company offers free product rebates to certain customers. The Company utilizes an adjusted market approach to estimate the stand-alone selling price of the loyalty program and allocates a portion of the consideration received to the free product offering. The free product offering is redeemable upon future purchases of the Company's products. The amount associated with free product rebates is deferred in the balance sheet and is recognized as revenue when the free product is redeemed or when the likelihood of redemption is remote. The Company deems the amount immaterial for disclosure.

The Company provides for the estimated costs of fulfilling our obligations under product warranties at the time the related revenue is recognized. The Company estimates the costs based on historical failure rates, projected repair costs, and knowledge of specific product failures (if any). The specific warranty terms and conditions vary depending upon the product sold and the country in which we do business, but generally include parts and labor over a period generally ranging from 90 days to one year. The Company regularly reevaluates its estimates to assess the adequacy of the recorded warranty liabilities and adjust the amounts as necessary.

The Company's contracts are generally short-term in nature. Most contracts' terms do not exceed twelve months. Payment terms vary by the type and location of the Company's customers and the products or services offered. The term between invoicing and when payment is due is not significant. For certain products or services and customer types, the Company requires payment before the products or services are delivered to the customer. Those customers that prepay are represented by the contract liabilities below until the performance obligations are satisfied.

The following table provides information about contract liabilities from contracts with customers. The contract liabilities are included in other accrued liabilities balance in the condensed consolidated balance sheet.

(In thousands)	June 27, 2020	December 31, 2019
Contract liabilities - current	$ 12,252	$ 13,022

Significant changes in the contract liabilities balances during the period are as follows:

(In thousands)	Six months ended June 27, 2020
Revenue recognized that was included in the contract liability balance at the beginning of the period	$ (9,100)
Increases due to cash received, excluding amounts recognized as revenue during the period	8,330

3. ACQUISITIONS

Sinmat

On January 10, 2020, the Company acquired Sinmat, a chemical mechanical polishing slurry manufacturer. Sinmat reports into the Specialty Chemicals and Engineered Materials segment of the Company. The acquisition was accounted for under the acquisition method of accounting and Sinmat's results of operations are included in the Company's condensed consolidated financial statements as of and since January 10, 2020. Costs associated with the acquisition of Sinmat were $0.7 million for the six months ended June 27, 2020 and were expensed as incurred. These costs are included in the selling, general and administrative expenses in the Company's condensed consolidated statement of operations. The acquisition does not constitute a material business combination.

The purchase price for Sinmat includes cash consideration of $76.2 million, or $75.6 million net of cash acquired, which was funded from the Company's existing cash on hand.

The purchase price of Sinmat exceeds the net of the acquisition-date amounts of the identifiable assets acquired and the liabilities assumed by $31.7 million. Cash flows used to determine the purchase price included strategic and synergistic benefits (investment value) specific to the Company, which resulted in a purchase price in excess of the fair value of identifiable net assets. This additional investment value resulted in goodwill, which is expected to be non-deductible for income tax purposes.

During the quarter ended June 27, 2020, the Company finalized its fair value determination of the assets acquired and the liabilities assumed. The following table summarizes the provisional and final allocations of the purchase price to the fair values assigned to the assets acquired and liabilities assumed at the date of the acquisition date and as adjusted as of June 27, 2020, respectively:

(In thousands):	As of January 10, 2020	As of June 27, 2020
Trade accounts and note receivable, net	$ 1,189	$ 1,189
Inventories, net	1,010	1,010
Other current assets	8	8
Property, plant and equipment	63	63
Identifiable intangible assets	41,680	41,680
Right-of-use assets	1,712	1,712
Deferred tax asset	—	102
Accounts payable and accrued liabilities	(58)	(58)
Short-term lease liability	(150)	(150)
Long-term lease liability	(1,562)	(1,562)
Net assets acquired	43,892	43,994
Goodwill	31,751	31,651
Total purchase price, net of cash acquired	$ 75,643	$ 75,645

The Company recognized the following finite-lived intangible assets as part of the acquisition of Sinmat:

(In thousands)	Amount	Weighted average life in years
Developed technology	$ 7,650	7.0
Trademarks and trade names	130	1.3
Customer relationships	33,900	15.0
	$ 41,680	13.5

<u>Hangzhou Anow Microfiltration Co., Ltd.</u>

On September 17, 2019, the Company acquired Hangzhou Anow Microfiltration Co., Ltd. ("Anow"), a filtration company for diverse industries including semiconductor, pharmaceutical, and medical. Anow reports into the Microcontamination Control segment of the Company. The acquisition was accounted for under the acquisition method of accounting and Anow's results of operations are included in the Company's condensed consolidated financial statements as of and since September 17, 2019. Costs associated with the acquisition of Anow were $0.3 million for the three and six months ended June 29, 2019 and were expensed as incurred. The acquisition does not constitute a material business combination.

The purchase price for Anow is $72.8 million, net of cash acquired. The purchase price includes (1) cash consideration of $73.0 million, or $69.3 million net of cash acquired, which was funded from the Company's existing cash on hand, and (2) $3.5 million deferred payment due to the seller no earlier than September 18, 2021, at which time either the seller or the Company can exercise its option to receive or pay the deferred payment, respectively.

The purchase price of Anow exceeds the net of the acquisition-date amounts of the identifiable assets acquired and the liabilities assumed by $49.6 million. Cash flows used to determine the purchase price included strategic and synergistic benefits (investment value) specific to the Company, which resulted in a purchase price in excess of the fair value of identifiable net assets. This additional investment value resulted in goodwill, which is expected to be non-deductible for income tax purposes.

The following table summarizes the provisional allocation of the purchase price to the fair values assigned to the assets acquired and liabilities assumed at the date of the acquisition date and as adjusted as of June 27, 2020:

(In thousands):	As of September 17, 2019	As of June 27, 2020
Trade accounts and note receivable, net	$ 3,455	$ 3,455
Inventories, net	4,242	4,459
Other current assets	202	794
Property, plant and equipment	8,863	8,257
Identifiable intangible assets	42,179	16,439
Right-of-use assets	—	2,328
Other noncurrent assets	1,565	74
Accounts payable and accrued liabilities	(1,814)	(5,022)
Short-term lease liability	—	(88)
Long-term lease liability	—	(107)
Noncurrent deferred tax liabilities	(10,890)	(4,129)
Other noncurrent liabilities	—	(3,270)
Net assets acquired	47,802	23,190
Goodwill	25,212	49,608
Total purchase price, net of cash acquired	$ 73,014	$ 72,798

The change in the allocation of the purchase price is due to the acquisition occurring near the quarter end date of September 29, 2019, which required an estimated allocation of values.

The Company recognized the following finite-lived intangible assets as part of the acquisition of Anow:

<u>(In thousands)</u>	Amount	Weighted average life in years
Developed technology	$ 6,764	6.8
Trademarks and trade names	2,019	7.3
Customer relationships	7,656	14.3
	$ 16,439	10.3

The final valuation of assets acquired and liabilities assumed is expected to be completed as soon as possible, but not later than one year from the acquisition date. The allocation of the purchase price to the assets acquired and the liabilities assumed is complete with the exception of the value allocated to income tax accounts. To the extent that the Company's estimates require adjustment, the Company will modify the values.

MPD Chemicals

On July 15, 2019, the Company acquired MPD Chemicals (“MPD”), a provider of advanced materials to the specialty chemical, technology, and life sciences industries. MPD reports into the Specialty Chemicals and Engineered Material segment of the Company. The acquisition was accounted for under the acquisition method of accounting and MPD’s results of operations are included in the Company’s condensed consolidated financial statements as of and since July 15, 2019. Costs associated with the acquisition of MPD were $1.1 million for the three and six months ended June 29, 2019 and were expensed as incurred. The acquisition does not constitute a material business combination.

The purchase price for MPD is $162.9 million, net of cash acquired. The purchase price includes (1) cash consideration of $158.4 million, which was funded from the Company’s existing cash on hand, and (2) a fixed deferred payment of $5.0 million that is due on January 15, 2022, recorded at $4.5 million, which represents the fair value of this fixed deferred payment as of the acquisition date.

The fair value of the fixed deferred payment was determined by taking the present value of this fixed deferred payment based on the term and a discount factor. The fixed deferred payment is reflected in pension benefit obligations and other liabilities in the Company’s condensed consolidated balance sheets.

The purchase price of MPD exceeds the net of the acquisition-date amounts of the identifiable assets acquired and the liabilities assumed by $63.2 million. Cash flows used to determine the purchase price included strategic and synergistic benefits (investment value) specific to the Company, which resulted in a purchase price in excess of the fair value of identifiable net assets. This additional investment value resulted in goodwill, which is expected to be deductible for income tax purposes.

During the quarter ended June 27, 2020, the Company finalized its fair value determination of the assets acquired and liabilities assumed. The following table summarizes the provisional and final allocations of the purchase price to the fair values assigned to the assets acquired and liabilities assumed at the date of the acquisition date and adjusted as of June 27, 2020, respectively:

(In thousands):	As of July 15, 2019	As of June 27, 2020
Trade accounts and note receivable, net	$ 3,575	$ 3,575
Inventories, net	21,899	8,689
Other current assets	318	313
Property, plant and equipment	14,571	11,465
Identifiable intangible assets	74,900	79,390
Right-of-use assets	3,677	3,621
Accounts payable and accrued liabilities	(2,440)	(1,874)
Short-term lease liabilities	(144)	(88)
Long-term lease liabilities	(4,016)	(4,016)
Other noncurrent liabilities	(1,416)	(1,416)
Net assets acquired	110,924	99,659
Goodwill	51,457	63,246
Total purchase price, net of cash acquired	$ 162,381	$ 162,905

The Company recognized the following finite-lived intangible assets as part of the acquisition of MPD:

(In thousands)	Amount	Weighted average life in years
Developed technology	$ 12,750	11.0
Trademarks and trade names	620	2.0
Customer relationships	66,020	17.0
	$ 79,390	16.0

Digital Specialty Chemicals

On March 8, 2019, the Company acquired Digital Specialty Chemicals Limited (“DSC”), a Toronto, Canada-based provider of advanced materials to the specialty chemical, technology, and pharmaceutical industries. DSC reports into the Specialty Chemicals and Engineered Materials segment of the Company. The acquisition was accounted for under the acquisition method of accounting and the results of operations of DSC are included in the Company’s condensed consolidated financial statements as of and since March 8, 2019. Costs associated with the acquisition of DSC were $2.1 million for the three and six months ended June 29, 2019 and were expensed as incurred. These costs were included in selling, general and administrative expense in the Company’s condensed consolidated statements of operations. The acquisition does not constitute a material business combination.

The purchase price for DSC is $64.1 million, net of cash acquired. The purchase price includes (1) cash consideration of $49.9 million, or $49.4 million net of cash acquired, which was funded from the Company’s existing cash on hand, (2) a fixed deferred payment of $16.1 million that is due on March 31, 2022, recorded at $14.0 million representing the fair value of this fixed deferred payment as of the acquisition date, and (3) an earnout-based contingent consideration of $0.7 million based on the operating performance of DSC for a twelve-month period ending March 31, 2021.

The fair value of the fixed deferred payment was determined by taking the present value of this fixed deferred payment based on the term and a discount factor. The fixed deferred payment is reflected in pension benefit obligations and other liabilities in the Company’s condensed consolidated balance sheets.

Upon closing the acquisition, the Company recorded a contingent consideration obligation of $0.7 million, which represents the fair value of the earnout-based contingent consideration. This amount was estimated based on a Black-Scholes model. Subsequent changes in the fair value of this obligation will be recognized as adjustments to the contingent consideration obligation and reflected within the Company’s condensed consolidated statements of operations.

On December 3, 2019 the Company entered into a settlement agreement to accelerate the fixed deferred payment of $16.1 million to no later than March 8, 2020. This payment was made in the first quarter of 2020. The Company adjusted the fair value of the fixed deferred payment from its fair value to the full value resulting in an additional $1.6 million charge to interest expense in the fourth quarter of 2019 and the liability was adjusted from other long-term liabilities to other accrued liabilities in the condensed consolidated balance sheet as of December 31, 2019. In addition to the acceleration of the fixed deferred payment, it was determined that the earnout-based contingent consideration of $0.7 million will never become owed to the sellers under the original purchase agreement. The Company removed the liability and credited selling, general and administrative expenses in the fourth quarter of 2019.

The purchase price of DSC exceeds the net of the acquisition-date amounts of the identifiable assets acquired and the liabilities assumed by $36.5 million. Cash flows used to determine the purchase price included strategic and synergistic benefits (investment value) specific to the Company, which resulted in a purchase price in excess of the fair value of identifiable net assets. This additional investment value resulted in goodwill, which is expected to be non-deductible for income tax purposes.

During the year ended December 31, 2019, the Company finalized its fair value determination of the assets acquired and liabilities assumed. The following table summarizes the final allocation of the purchase price to the fair values assigned to the assets acquired and liabilities assumed at the date of the acquisition:

(In thousands):		As of March 8, 2019
Trade accounts and note receivable, net	$	1,840
Inventories, net		4,307
Other current assets		1,437
Property, plant and equipment		16,654
Identifiable intangible assets		6,870
Right-of-use assets		79
Deferred tax asset		1,066
Other noncurrent assets		28
Accounts payable and accrued liabilities		(2,861)
Deferred tax liabilities		(1,802)
Long-term lease liability		(37)
Net assets acquired		27,581
Goodwill		36,540
Total purchase price, net of cash acquired	$	64,121

4. INVENTORIES

Inventories consist of the following:

(In thousands)	June 27, 2020	December 31, 2019
Raw materials	$ 111,099	$ 92,849
Work-in process	38,385	30,856
Finished goods	183,401	163,393
Total inventories, net	$ 332,885	$ 287,098

5. GOODWILL AND INTANGIBLE ASSETS

Goodwill activity for each period was as follows:

(In thousands)	Specialty Chemicals and Engineered Materials	Microcontamination Control	Advanced Materials Handling	Total
December 31, 2019	$ 397,952	$ 240,021	$ 57,071	$ 695,044
Addition due to acquisitions	31,751	—	—	31,751
Purchase accounting adjustments	1,276	1,897	—	3,173
Foreign currency translation	(3,283)	(1,007)	—	(4,290)
June 27, 2020	$ 427,696	$ 240,911	$ 57,071	$ 725,678

Identifiable intangible assets at June 27, 2020 and December 31, 2019 consist of the following:

	June 27, 2020		
(In thousands)	Gross carrying Amount	Accumulated amortization	Net carrying value
Developed technology	$ 279,130	$ 216,205	$ 62,925
Trademarks and trade names	28,918	17,245	11,673
Customer relationships	435,365	176,495	258,870
Other	36,295	27,505	8,790
	$ 779,708	$ 437,450	$ 342,258

	December 31, 2019		
(In thousands)	Gross carrying amount	Accumulated amortization	Net carrying value
Developed technology	$ 272,334	$ 204,689	$ 67,645
Trademarks and trade names	29,106	16,326	12,780
Customer relationships	405,537	161,551	243,986
Other	36,303	26,762	9,541
	$ 743,280	$ 409,328	$ 333,952

Future amortization expense during the remainder of 2020, the next four years and thereafter relating to intangible assets currently recorded in the Company’s condensed consolidated balance sheets is estimated at June 27, 2020 to be the following:

(In thousands)	Remaining 2020	2021	2022	2023	2024	Thereafter	Total
Future amortization expense	$ 23,817	47,407	46,639	44,763	31,295	148,337	$ 342,258

6. DEBT

Long-term debt as of June 27, 2020 and December 31, 2019 consists of the following:

(In thousands)	June 27, 2020	December 31, 2019
Senior unsecured notes due 2028	$ 400,000	$ —
Senior secured term loan facility due 2025	245,000	396,000
Senior unsecured notes due 2026	550,000	550,000
	1,195,000	946,000
Unamortized discount and debt issuance costs	11,008	9,516
Total long-term debt	1,183,992	936,484
Less current maturities of long-term debt	—	4,000
Long-term debt less current maturities	$ 1,183,992	$ 932,484

Annual maturities of long-term debt, excluding unamortized discount and issuance costs, due as of June 27, 2020 are as follows:

(In thousands)	2020	2021	2022	2023	2024	Thereafter	Total
Contractual debt obligation maturities*	$ —	—	—	—	—	1,195,000	$ 1,195,000

*Subject to Excess Cash Flow payments to the lenders.

2028 Senior Unsecured Notes

On April 30, 2020, the Company issued $400 million aggregate principal amount of 4.375% senior unsecured notes due April 15, 2028 (the "2028 Notes"). The 2028 Notes were issued under an indenture dated as of April 30, 2020 (the "2028 Notes Indenture") by and among the Company, certain subsidiaries of the Company and Wells Fargo Bank, National Association, as trustee (the "2028 Notes Trustee"). Interest on the 2028 Notes is payable semi-annually in arrears on April 15 and October 15 of each year, commencing on October 15, 2020. The Company incurred debt issuance costs of $4.0 million in connection with the 2028 Notes. These costs are reported in the condensed consolidated balance sheet as a direct deduction from the face amount of the 2028 Notes.

The 2028 Notes are guaranteed, jointly and severally, fully and unconditionally, on a senior unsecured basis, by the Company's existing and future domestic subsidiaries, other than certain excluded subsidiaries, to the extent that such entities guarantee indebtedness under the Company's senior secured term loan facility due 2025 and senior secured revolving credit facility due 2023 (together, the "Senior Secured Credit Facilities") or the Company's 4.625% senior unsecured notes due 2026 (the "2026 Notes") and any other subsidiary of the Company to the extent it incurs certain additional indebtedness (collectively, the "Guarantors").

The 2028 Notes and the guarantees thereof are the Company's and the Guarantors' senior unsecured obligations, respectively, and will (i) rank equally in right of payment with all of the Company's and the Guarantors' existing and future senior indebtedness (including the 2026 Notes); (ii) rank senior to any subordinated indebtedness that the Company or the Guarantors may incur; (iii) be effectively subordinated to all of the Company's or the Guarantors' existing and future secured indebtedness (including the Senior Secured Credit Facilities), in each case, to the extent of the value of the assets securing such indebtedness; and (iv) be structurally subordinated in right of payment to all existing and future obligations of the Company's subsidiaries that do not guarantee the 2028 Notes.

At any time prior to April 15, 2023, the Company may, at its option, on any one or more occasions, redeem up to 40% of the aggregate principal amount of the 2028 Notes, at a redemption price equal to 104.375% of the principal amount of the 2028 Notes redeemed, plus accrued and unpaid interest, if any, to, but not including, the date of redemption, with an amount of cash equal to the net cash proceeds of an equity offering, as defined in the 2028 Notes Indenture, by the Company; provided that (1) at least 60% of the aggregate principal amount of 2028 Notes issued under the 2028 Notes Indenture remains outstanding immediately after the occurrence of each such redemption; and (2) the redemption occurs within 120 days of the date of the closing of such equity offering.

Additionally, at any time prior to April 15, 2023, the 2028 Notes may be redeemed, in whole or in part, at the option of the Company, at a redemption price equal to 100% of the principal amount of the 2028 Notes redeemed, plus a "make whole" premium, plus accrued and unpaid interest to, but not including, the applicable redemption date.

On or after April 15, 2023, the Company may on any one or more occasions redeem all or a part of the 2028 Notes, at its option, at the redemption prices (expressed as percentages of principal amount) set forth below, plus accrued and unpaid interest, if any, on the 2028 Notes redeemed, to, but not including, the applicable date of redemption, if redeemed during the 12-month period beginning on April 15 of the years indicated below:

Year	**Percentage**
2023	102.188 %
2024	101.094 %
2025 and thereafter	100.000 %

Upon the occurrence of certain change of control events accompanied by certain ratings events, the Company will be required to offer to repurchase all of the outstanding 2028 Notes at a purchase price of 101% of the principal amount thereof, plus accrued and unpaid interest, if any, to, but not including, the date of repurchase.

The 2028 Notes Indenture that governs the 2028 Notes contains covenants that, among other things, limit the Company’s ability and/or the ability of the Company’s subsidiaries to incur liens, engage in sale and leaseback transactions and consolidate, merge with or convey, transfer or lease all or substantially all of the Company’s and its subsidiaries’ assets to another person. The 2028 Notes Indenture also, subject to certain exceptions, limits the ability of any non-Guarantor subsidiary of the Company to incur indebtedness. These covenants are subject to a number of other limitations and exceptions as set forth in the 2028 Notes Indenture.

The 2028 Notes Indenture provides for events of default which, if certain of them occur, would permit the 2028 Notes Trustee or the holders of at least 25% in aggregate principal amount of the then outstanding 2028 Notes to declare the principal of, and interest or premium, if any, and any other monetary obligations on, all the then-outstanding 2028 Notes to be due and payable immediately.

7. EARNINGS PER COMMON SHARE

The following table presents a reconciliation of the denominators used in the computation of basic and diluted earnings per common share (EPS):

	Three months ended		Six months ended	
(In thousands)	June 27, 2020	June 29, 2019	June 27, 2020	June 29, 2019
Basic—weighted common shares outstanding	134,700	135,378	134,722	135,338
Weighted common shares assumed upon exercise of stock options and vesting of restricted common stock	1,307	1,203	1,466	1,299
Diluted—weighted common shares and common shares equivalent outstanding	136,007	136,581	136,188	136,637

The Company excluded the following shares underlying stock-based awards from the calculations of diluted EPS because their inclusion would have been anti-dilutive for the three and six months ended June 27, 2020 and June 29, 2019:

	Three months ended		Six months ended	
(In thousands)	June 27, 2020	June 29, 2019	June 27, 2020	June 29, 2019
Shares excluded from calculations of diluted EPS	269	295	223	530

8. OTHER (INCOME) EXPENSE, NET

Other (income) expense, net for the three and six months ended June 27, 2020 and June 29, 2019 consists of the following:

	Three months ended		Six months ended	
(In thousands)	June 27, 2020	June 29, 2019	June 27, 2020	June 29, 2019
Versum termination fee, net	$ —	$ (122,000)	$ —	$ (122,000)
Gain on foreign currency remeasurement	(1,973)	(203)	(1,333)	(923)
Loss on extinguishment of debt	1,470	—	1,470	—
Other, net	26	188	264	660
Other (income) expense, net	$ (477)	$ (122,015)	$ 401	$ (122,263)

Versum termination fee, net

On January 28, 2019, the Company and Versum Materials, Inc. (“Versum”) announced that they had entered into an Agreement and Plan of Merger, dated as of January 27, 2019 (the “Merger Agreement”), pursuant to which they agreed to combine in a merger of equals. On April 8, 2019, Versum announced that its Board of Directors had received a proposal from Merck KGaA to acquire Versum and that its Board of Directors had deemed such proposal as a “Superior Proposal,” as defined in the Merger Agreement. On April 12, 2019, the Company received a termination notice from Versum terminating the Merger Agreement. In accordance with the terms of the Merger Agreement, Entegris received a $140.0 million termination fee from Versum in the second quarter of 2019. Also in the second quarter of 2019, the Company paid a fee of $18.0 million to the third-party financial adviser it had engaged to assist with the transaction.

9. LEASES

As of June 27, 2020, the Company was obligated under operating lease agreements for certain sales offices and manufacturing facilities, manufacturing equipment, vehicles, information technology equipment and warehouse space. As of June 27, 2020, the Company does not have material finance leases. Our leases have remaining lease terms of 1 year to 14 years, some of which may include options to extend the lease for up to 6 years, and some of which may include options to terminate the leases within 1 year.

As of June 27, 2020 and December 31, 2019, the Company’s operating lease components with initial or remaining terms in excess of one year were classified on the condensed consolidated balance sheet and other supplemental balance sheet information was as follows:

(*In thousands, except lease term and discount rate*)	Classification	June 27, 2020	December 31, 2019
Assets			
Right-of-use assets	Right-of-use assets	$ 47,911	$ 50,160
Liabilities			
Short-term lease liability	Other accrued liabilities	9,902	10,025
Long-term lease liability	Long-term lease liability	41,704	43,827
Total lease liabilities		$ 51,606	$ 53,852
Lease Term and Discount Rate			
Weighted average remaining lease term (years)		8.2	8.4
Weighted average discount rate		4.9 %	5.1 %

Expense for leases less than 12 months for the three and six months ended June 27, 2020 and June 29, 2019 were not material. The components of lease expense for the three and six months ended June 27, 2020 and June 29, 2019 are as follows:

	Three months ended		Six months ended	
(*In thousands*)	June 27, 2020	June 29, 2019	June 27, 2020	June 29, 2019
Operating lease cost	$ 3,111	$ 2,792	$ 6,652	$ 5,812

The Company combines the amortization of the Right-of-use assets and the change in the operating lease liability in the same line item in the condensed consolidated statement of cash flows. Other information related to the Company's operating leases was as follows:

(*In thousands*)	June 27, 2020	June 29, 2019
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows from leases	$ 5,336	$ 5,020
Right-of-use assets obtained in exchange for lease obligations:		
Operating leases	$ 2,047	$ 3,019

Future minimum lease payments for noncancellable operating leases as of June 27, 2020, were as follows:

(*In thousands*)	Operating Leases
Remaining 2020	$ 12,193
2021	9,094
2022	6,749
2023	5,716
2024	4,856
Thereafter	25,792
Total	64,400
Less: Interest	12,794
Present value of lease liabilities	$ 51,606

10. SEGMENT REPORTING

The Company's financial segment reporting reflects an organizational alignment intended to leverage the Company's unique portfolio of capabilities to create value for its customers by developing mission-critical solutions to maximize manufacturing yields and enable higher performance of devices. While these segments have separate products and technical know-how, they share common business systems and processes, technology centers, and strategic and technology roadmaps. The Company leverages its expertise from these three segments to create new and increasingly integrated solutions for its customers. The Company's business is reported in the following segments:

- **Specialty Chemicals and Engineered Materials (SCEM):** SCEM provides high-performance and high-purity process chemistries, gases, and materials, and safe and efficient delivery systems to support semiconductor and other advanced manufacturing processes.
- **Microcontamination Control (MC):** MC offers solutions to filter and purify critical liquid chemistries and gases used in semiconductor manufacturing processes and other high-technology industries.
- **Advanced Materials Handling (AMH):** AMH develops solutions to monitor, protect, transport, and deliver critical liquid chemistries, wafers, and other substrates for a broad set of applications in the semiconductor industry and other high-technology industries.

Summarized financial information for the Company's reportable segments is shown in the following tables.

	Three months ended		Six months ended	
(*In thousands*)	June 27, 2020	June 29, 2019	June 27, 2020	June 29, 2019
Net sales				
SCEM	$ 146,213	$ 127,552	$ 290,427	$ 252,022
MC	183,758	150,185	343,019	307,891
AMH	126,434	107,515	242,571	223,579
Inter-segment elimination	(8,000)	(6,378)	(15,285)	(13,571)
Total net sales	$ 448,405	$ 378,874	$ 860,732	$ 769,921

(In thousands)	Three months ended June 27, 2020	Three months ended June 29, 2019	Six months ended June 27, 2020	Six months ended June 29, 2019
Segment profit				
SCEM	$ 32,938	$ 24,000	$ 65,608	$ 48,431
MC	62,137	43,126	112,304	90,449
AMH	22,809	15,043	43,441	37,410
Total segment profit	$ 117,884	$ 82,169	$ 221,353	$ 176,290

The following table reconciles total segment profit to income before income taxes:

(In thousands)	Three months ended June 27, 2020	Three months ended June 29, 2019	Six months ended June 27, 2020	Six months ended June 29, 2019
Total segment profit	$ 117,884	$ 82,169	$ 221,353	$ 176,290
Less:				
Amortization of intangible assets	13,216	16,591	29,427	35,248
Unallocated general and administrative expenses	9,956	10,669	16,470	38,642
Operating income	94,712	54,909	175,456	102,400
Interest expense	13,005	11,315	23,564	22,199
Interest income	(213)	(1,623)	(534)	(2,848)
Other (income) expense, net	(477)	(122,015)	401	(122,263)
Income before income tax expense	$ 82,397	$ 167,232	$ 152,025	$ 205,312

In the following tables, revenue is disaggregated by customers' country or region for the three and six months ended June 27, 2020 and June 29, 2019, respectively.

	Three months ended June 27, 2020				
(In thousands)	SCEM	MC	AMH	Inter-segment	Total
North America	$ 45,123	$ 33,454	$ 39,996	$ (8,000)	110,573
Taiwan	26,246	42,358	22,334	—	$ 90,938
South Korea	21,118	22,959	21,036	—	65,113
Japan	18,209	30,015	11,955	—	60,179
China	18,315	28,362	13,038	—	59,715
Europe	8,746	17,801	11,765	—	38,312
Southeast Asia	8,456	8,809	6,310	—	23,575
	$ 146,213	$ 183,758	$ 126,434	$ (8,000)	$ 448,405

	Three months ended June 29, 2019				
(In thousands)	SCEM	MC	AMH	Inter-segment	Total
North America	$ 33,676	$ 25,092	$ 35,193	$ (6,378)	$ 87,583
Taiwan	21,584	31,205	12,740	—	65,529
South Korea	17,696	28,531	16,766	—	62,993
Japan	15,089	24,721	11,954	—	51,764
China	20,413	22,538	10,653	—	53,604
Europe	7,652	11,402	14,408	—	33,462
Southeast Asia	11,442	6,696	5,801	—	23,939
	$ 127,552	$ 150,185	$ 107,515	$ (6,378)	$ 378,874

(In thousands)	Six months ended June 27, 2020 SCEM	MC	AMH	Inter-segment	Total
North America	$ 91,673	$ 62,134	$ 73,399	$ (15,285)	$ 211,921
Taiwan	51,428	84,841	47,135	—	183,404
South Korea	41,247	43,081	36,197	—	120,525
Japan	35,332	58,126	22,375	—	115,833
China	33,825	46,559	24,677	—	105,061
Europe	17,354	31,289	24,313	—	72,956
Southeast Asia	19,568	16,989	14,475	—	51,032
	$ 290,427	$ 343,019	$ 242,571	$ (15,285)	$ 860,732

(In thousands)	Six months ended June 29, 2019 SCEM	MC	AMH	Inter-segment	Total
North America	$ 66,414	$ 52,674	$ 73,739	$ (13,571)	$ 179,256
Taiwan	46,757	69,695	30,863	—	147,315
South Korea	37,022	54,346	32,744	—	124,112
Japan	26,767	49,816	23,344	—	99,927
China	34,570	44,703	20,499	—	99,772
Europe	16,429	22,177	30,007	—	68,613
Southeast Asia	24,063	14,480	12,383	—	50,926
	$ 252,022	$ 307,891	$ 223,579	$ (13,571)	$ 769,921

11. SUBSEQUENT EVENT

On July 10, 2020, the Company acquired Global Measurement Technologies, Inc. (“GMTI”), an analytical instrument provider for critical processes in semiconductor production, and its manufacturing partner Clean Room Plastics, Inc., for an aggregate purchase price of approximately $36 million in cash, subject to customary purchase price adjustments. The Company funded the acquisition from its available cash on hand. GMTI will be a part of the AMH segment. The acquisition does not constitute a material business combination.

Item 2. Management’s Discussion and Analysis of Financial Condition and Results of Operations

The following discussion and analysis of the Company’s condensed consolidated financial condition and results of operations should be read along with the condensed consolidated financial statements and the accompanying notes thereto included elsewhere in this Quarterly Report on Form 10-Q. The information, except for historical information, contained in this discussion and analysis or set forth elsewhere in this Quarterly Report on Form 10-Q includes forward-looking statements that involve risks and uncertainties. You should review the section entitled “Risk Factors” in our Annual Report on Form 10-K for the year ended December 31, 2019 as well as in our Quarterly Reports on Form 10-Q and Current Reports on Form 8-K for a discussion of important factors that could cause actual results to differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis. The Company assumes no obligation to publicly release the results of any revision or updates to these forward-looking statements to reflect future events or unanticipated occurrences.

Overview

This overview is not a complete discussion of the Company’s financial condition, changes in financial condition or results of operations; it is intended merely to facilitate an understanding of the most salient aspects of the Company’s financial condition and operating performance and to provide a context for the detailed discussion and analysis that follows. The discussion and analysis must be read in its entirety in order to fully understand the Company’s financial condition and results of operations.

The Company is a leading global developer, manufacturer and supplier of microcontamination control products, specialty chemicals and advanced materials handling solutions for manufacturing processes in the semiconductor and other high-technology industries. We leverage our unique breadth of capabilities to create value for our customers by developing mission-critical solutions to maximize manufacturing yields, reduce manufacturing costs and enable higher device performance.

Our technology portfolio includes advanced materials and high-purity chemistries, with optimized packaging and delivery systems and in-process filtration and purification solutions that ensure high-value liquid chemistries and gases are free from contaminants before use. Our standard and customized products and solutions enable the highest levels of purity and performance that are essential to the manufacture of semiconductors, flat panel displays, light emitting diodes, high-purity chemicals, solar cells, gas lasers, optical and magnetic storage devices, and critical components for aerospace, glass manufacturing and biomedical applications. The majority of our products are consumed at various times throughout the manufacturing process, with demand driven in part by the level of semiconductor and other manufacturing activity.

Our business is organized and operated in three operating segments, which align with the key elements of the advanced semiconductor manufacturing ecosystem. The Specialty Chemicals and Engineered Materials, or SCEM, segment provides high-performance and high-purity process chemistries, gases, and materials, and safe and efficient delivery systems to support semiconductor and other advanced manufacturing processes. The Microcontamination Control, or MC, segment offers solutions to filter and purify critical liquid chemistries and gases used in semiconductor manufacturing processes and other high-technology industries. The Advanced Materials Handling, or AMH, segment develops solutions to monitor, protect, transport, and deliver critical liquid chemistries, wafers and other substrates for a broad set of applications in the semiconductor industry and other high-technology industries. While these segments have separate products and technical know-how, they share common business systems and processes, technology centers, and strategic and technology roadmaps. We leverage our expertise from these three segments and complementary product portfolios to create new and increasingly integrated solutions for our customers. See note 10 to the condensed consolidated financial statements for additional information on the Company’s three segments.

The Company’s fiscal year is the calendar period ending each December 31. The Company’s fiscal quarters consist of 13-week or 14-week periods that end on Saturday. The Company’s fiscal quarters in 2020 end March 28, 2020, June 27, 2020, September 26, 2020 and December 31, 2020. Unaudited information for the three and six months ended June 27, 2020 and June 29, 2019 and the financial position as of June 27, 2020 and December 31, 2019 are included in this Quarterly Report on Form 10-Q.

Key operating factors Key factors, which management believes have the largest impact on the overall results of operations of the Company, include:

- ***Level of sales*** Since a significant portion of the Company’s product costs (except for raw materials, purchased components and direct labor) are largely fixed in the short-to-medium term, an increase or decrease in sales affects gross profits and overall profitability significantly. Also, increases or decreases in sales and operating profitability affect certain costs such as incentive compensation and commissions, which are highly variable in nature. The Company’s sales are subject to the effects of industry cyclicality, technological change, substantial competition, pricing pressures and foreign currency fluctuations.

- ***Variable margin on sales*** The Company's variable margin on sales is determined by selling prices and the costs of manufacturing and raw materials. This is affected by a number of factors, which include the Company's sales mix, purchase prices of raw materials (especially polymers, membranes, stainless steel and purchased components), domestic and international competition, direct labor costs, and the efficiency of the Company's production operations, among others.
- ***Fixed cost structure*** The Company's operations include a number of large fixed or semi-fixed cost components, which include salaries, indirect labor and benefits, facility costs, lease expenses, and depreciation and amortization. It is not possible to vary these costs easily in the short-term as volumes fluctuate. Accordingly, increases or decreases in sales volume can have a large effect on the usage and productivity of these cost components, resulting in a large impact on the Company's profitability.

Impact of COVID-19 on our Business

A novel strain of coronavirus (COVID-19) was first identified in Wuhan, China in December 2019, and subsequently declared a pandemic by the World Health Organization. As a result of the COVID-19 pandemic, governmental authorities have implemented and are continuing to implement numerous and constantly evolving measures to try to contain the virus, such as travel bans and restrictions, limits on gatherings, quarantines, shelter-in-place orders, and business shutdowns. In some cases, governmental re-opening plans have been delayed or reversed due to spikes in the number of infections. We continue to monitor the situation regarding the COVID-19 pandemic, which remains fluid and uncertain, and to proactively manage and adapt our responses in collaboration with our employees, customers and suppliers. However, we are unable to accurately predict the full impact of COVID-19 on our business, results of operations, financial condition, liquidity and cash flows, which will depend on future developments that are highly uncertain and cannot be predicted with accuracy, including, but not limited to, the duration and continued spread of the outbreak, its severity, potential additional waves of infection, the actions to mitigate the virus or its impact, and how quickly and to what extent normal economic and operating conditions can resume.

Health and Safety

From the earliest signs of the outbreak, we have taken, and continue to take, proactive, aggressive action to protect the health and safety of our employees, customers, partners and suppliers. We enacted rigorous safety measures in all of our sites in accordance with applicable laws, including social distancing protocols, encouraging employees who do not need to be physically present on the manufacturing floor or in a lab to perform their work to work from home, suspending non-essential travel, implementing temperature checks at the entrances to our facilities, extensively and frequently disinfecting our workspaces and providing masks to employees who are physically present at our facilities. We expect to continue to implement these measures until the COVID-19 pandemic is adequately contained, and we may take further actions as government authorities require or recommend or as we determine to be in the best interests of our employees, customers, partners and suppliers. We expect that the pandemic may abate at different times in different regions, and accordingly our health and safety protocols may vary across regions.

Operations

We have important manufacturing operations in the U.S., Japan, Korea, China, Malaysia, and Taiwan, all of which have been affected by the outbreak and have taken measures to try to contain it. Measures providing for business shutdowns have generally excluded certain essential services, and those essential services have commonly included critical infrastructure and the businesses that support that critical infrastructure. While all of our facilities currently remain operational, these measures have impacted and may further impact our workforce and operations, as well as those of our customers, suppliers and other third parties with which we do business. For example, the government of Malaysia issued an order that significantly reduced the number of employees who could be physically present to operate our Malaysian plant, which had reduced the productivity of that plant for a period of time. As of the date of this filing, our Malaysian plant is back to full capacity. In addition to reduced productivity, constraints and limits imposed on our operations may slow or diminish our research and development and customer qualification activities. We also experienced brief interruptions in operations at our sites in Hangzhou, China, San Luis Obispo, California and Bedford, Massachusetts. While governmental measures may be modified, extended or reimposed, we expect that, absent a significant surge in infections in the relevant local area, our manufacturing and research and development facilities will remain operational, largely at or near full capacity. In connection with the COVID-19 pandemic, we have experienced limited absenteeism from employees who are required to be on-site to perform their jobs, and we have incurred incremental employee compensation related to the COVID-19 pandemic. We do not currently expect that our operations will be adversely affected by significant absenteeism.

Supply

We have not yet experienced any significant impacts or interruptions to our supply chain as a result of the COVID-19 pandemic. However, certain of our suppliers have faced and, as the pandemic continues, may continue to face, difficulties maintaining operations in light of government-ordered restrictions and shelter-in-place mandates and may face challenges in maintaining their level of supply. For example, earlier in the year, one of our critical valve suppliers was shut down and was unable to supply us with valves for certain of our gas purification products. In this instance we were able to procure this critical part from a second, pre-qualified source. Although we regularly monitor the financial health of companies in our supply chain, financial hardship on our suppliers or sub-suppliers caused by the COVID-19 pandemic could cause a disruption in our ability to obtain raw materials or components required to manufacture our products, adversely affecting our operations. To mitigate the risk of potential supply interruptions from the COVID-19 pandemic, we chose to increase certain inventory levels during the second quarter, and we continue to hold more inventory than we might otherwise seek to maintain. These actions may result in increased charges for excess or obsolete inventory, which would have the effect of reducing our profitability. We may decide to take similar actions going forward. Additionally, restrictions or disruptions of transportation, such as reduced availability of air transport, port closures and increased border controls or closures, have resulted, in certain instances, in higher costs and delays, both on obtaining raw materials and shipping finished goods to customers. If these restrictions and disruptions continue, they could harm our profitability, make our products less competitive, or cause our customers to seek alternative suppliers.

Demand

The COVID-19 pandemic has significantly increased economic and demand uncertainty. During the first and second quarters of 2020, we have seen strong demand from leading-edge customers associated with end-uses in servers and other data center applications. We believe that a portion of recent orders we have received may be a result of customers increasing their inventory to reduce their exposure to risks of future supply disruptions, which could offset demand for our products in the future. We continue to see weakness in some mainstream fabs associated with the slowdown in sales of automotive, aerospace, mobile phone, and other applications. Across our three divisions, certain customers impacted by governmental reactions to COVID-19 pushed out product deliveries and acceptance inspections from the first quarter of 2020 to the second quarter of 2020. We anticipate that the pandemic will continue to contribute to the current global economic slowdown, and it is possible that it could cause a global recession. In the event of a recession, demand for our products would decline and our business would be adversely affected.

Liquidity

Although there is uncertainty related to the anticipated impact of the COVID-19 pandemic on our future results, we believe our business model, our current cash reserves and our balance sheet leave us well-positioned to manage our business through this crisis as we expect it to unfold. We have taken recent steps to strengthen our balance sheet. On April 30, 2020, we issued $400 million aggregate principal amount of 4.375% senior unsecured notes due April 15, 2028. We used a portion of the net proceeds of the offering to repay approximately $142 million of borrowings under our senior secured revolving facility due 2023, or the Revolving Facility, representing the entire aggregate principal amount outstanding thereunder. We also used a portion of the net proceeds of the offering to repay approximately $151 million of outstanding borrowings under our senior secured term loan facility, or the Term Loan Facility.

We have reviewed numerous potential scenarios in connection with the impact of COVID-19 on the global economy and the semiconductor industry. Based on our analysis, we believe our existing balances of domestic cash and cash equivalents and our currently anticipated operating cash flows will be sufficient to meet our cash needs arising in the ordinary course of business for the next twelve months.

We continue to monitor the rapidly evolving situation and guidance from international and domestic authorities, including federal, state and local public health authorities, and may take additional actions based on their recommendations. In these circumstances, there may be developments outside our control requiring us to adjust our operating plan. As such, given the dynamic nature of this situation, we cannot reasonably estimate the impacts that COVID-19 may have on our financial condition, results of operations or cash flows in the future. In addition, see Part II—Item 1A, “Risk Factors,” included herein for updates to our risk factors regarding risks associated with the COVID-19 pandemic.

Overall Summary of Financial Results

For the three months ended June 27, 2020, net sales increased 18% to $448.4 million, compared to $378.9 million for the three months ended June 29, 2019. Net sales for the three months ended June 27, 2020 included sales of $12.4 million from acquired businesses and favorable foreign currency translation effects of $0.4 million. In addition to these factors, the increase in revenue primarily resulted from increased customer demand from the semiconductor market compared to the year-ago quarter.

Sales were up $36.1 million, or 9%, on a sequential basis over sales of $412.3 million in the first quarter of 2020, including favorable foreign currency translation effects of $0.1 million and sales attributable to acquired businesses of $2.0 million. The increase in revenue resulted primarily from increased customer demand from the semiconductor market compared to the previous quarter.

The Company’s gross profit for the three months ended June 27, 2020 increased to $207.4 million, up from $166.3 million for the three months ended June 29, 2019. The Company experienced a 46.2% gross margin for the three months ended June 27, 2020, compared to 43.9% in the comparable year-ago period. The gross profit and gross margin increases reflect higher factory utilization associated with higher sales levels and a favorable sales mix.

The Company’s selling, general and administrative (SG&A) expenses increased by $2.7 million for the three months ended June 27, 2020 compared to the year-ago quarter, mainly due to higher employee costs.

The Company’s other income, net decreased by $121.5 million for the three months ended June 27, 2020 compared to the year-ago quarter, mainly due to the net proceeds of $122.0 million received from the termination of the merger agreement with Versum in the three months ended June 29, 2019. See note 8 to the Company’s condensed consolidated financial statements for additional information.

As a result of the aforementioned factors, the Company reported net income of $68.0 million, or $0.50 per diluted share, for the quarter ended June 27, 2020, compared to net income of $124.0 million, or $0.91 per diluted share, a year ago.

On April 30, 2020, the Company issued $400 million aggregate principal amount of 4.375% senior unsecured notes due April 15, 2028. The transaction is described in further detail in note 6 to the Company’s condensed consolidated financial statements.

On July 10, 2020, the Company acquired Global Measurement Technologies, Inc., or GMTI, an analytical instrument provider for critical processes in semiconductor production, and its manufacturing partner Clean Room Plastics, Inc., for an aggregate purchase price of approximately $36 million in cash, subject to customary purchase price adjustments. The Company funded the acquisition from its available cash on hand. GMTI will be a part of the AMH segment. The acquisition does not constitute a material business combination.

Cash and cash equivalents were $532.7 million at June 27, 2020, compared with cash and cash equivalents of $351.9 million at December 31, 2019. The Company had outstanding debt of $1,184.0 million at June 27, 2020, compared to $936.5 million at December 31, 2019.

Critical Accounting Policies

Management’s discussion and analysis of financial condition and results of operations are based upon the Company’s condensed consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these condensed consolidated financial statements requires the Company to make estimates, assumptions and judgments that affect the reported amounts of assets, liabilities, revenues and expenses and related disclosure of contingent assets and liabilities. Actual results may differ from these estimates under different assumptions or conditions.

The critical accounting policies affected most significantly by estimates, assumptions and judgments used in the preparation of the Company’s condensed consolidated financial statements are described in Item 7 of its Annual Report on Form 10-K for the year ended December 31, 2019 filed with the Securities and Exchange Commission. On an ongoing basis, the Company evaluates the critical accounting policies used to prepare its condensed consolidated financial statements, including, but not limited to, those related to impairment of long-lived assets, goodwill, income taxes and business acquisitions. There have been no material changes in these aforementioned critical accounting policies.

Three and Six Months Ended June 27, 2020 Compared to Three and Six Months Ended June 29, 2019 and Three Months Ended March 28, 2020

The following table compares operating results for the three and six months ended June 27, 2020 with results for the three and six months ended June 29, 2019 and three months ended March 28, 2020 both in dollars and as a percentage of net sales, for each caption.

	Three months ended						Six months ended			
(Dollars in thousands)	June 27, 2020		June 29, 2019		March 28, 2020		June 27, 2020		June 29, 2019	
Net sales	$ 448,405	100.0 %	$ 378,874	100.0 %	$ 412,327	100.0 %	$ 860,732	100.0 %	$ 769,921	100.0 %
Cost of sales	241,033	53.8	212,600	56.1	226,849	55.0	467,882	54.4	426,254	55.4
Gross profit	207,372	46.2	166,274	43.9	185,478	45.0	392,850	45.6	343,667	44.6
Selling, general and administrative expenses	66,872	14.9	64,150	16.9	58,891	14.3	125,763	14.6	146,404	19.0
Engineering, research and development expenses	32,572	7.3	30,624	8.1	29,632	7.2	62,204	7.2	59,615	7.7
Amortization of intangible assets	13,216	2.9	16,591	4.4	16,211	3.9	29,427	3.4	35,248	4.6
Operating income	94,712	21.1	54,909	14.5	80,744	19.6	175,456	20.4	102,400	13.3
Interest expense	13,005	2.9	11,315	3.0	10,559	2.6	23,564	2.7	22,199	2.9
Interest income	(213)	—	(1,623)	(0.4)	(321)	(0.1)	(534)	(0.1)	(2,848)	(0.4)
Other (income) expense, net	(477)	(0.1)	(122,015)	(32.2)	878	0.2	401	—	(122,263)	(15.9)
Income before income taxes	82,397	18.4	167,232	44.1	69,628	16.9	152,025	17.7	205,312	26.7
Income tax expense	14,361	3.2	43,235	11.4	8,622	2.1	22,983	2.7	48,657	6.3
Net income	$ 68,036	15.2 %	$ 123,997	32.7 %	$ 61,006	14.8 %	$ 129,042	15.0 %	$ 156,655	20.3 %

Net sales For the three months ended June 27, 2020, net sales increased by 18% to $448.4 million, compared to $378.9 million for the three months ended June 29, 2019. An analysis of the factors underlying the increase in net sales is presented in the following table:

(In thousands)	
Net sales in the quarter ended June 29, 2019	$ 378,874
Increase associated with acquired businesses	12,448
Increase associated with volume, pricing and mix	56,649
Increase associated with effect of foreign currency translation	434
Net sales in the quarter ended June 27, 2020	$ 448,405

The Company’s sales increase was primarily due to increased customer demand from the semiconductor market compared to the year-ago quarter, sales of $12.4 million from the Company’s recent acquisitions and favorable foreign currency translation effects of $0.4 million.

On a geographic basis, sales percentage by customers’ country or region for the three months ended June 27, 2020 and June 29, 2019 and the percentage increase (decrease) in sales for the three months ended June 27, 2020 compared to the sales for the three months ended June 29, 2019 were as follows:

	Three months ended		
	June 27, 2020	June 29, 2019	Percentage increase (decrease) in sales
North America	25 %	23 %	26 %
Taiwan	20 %	17 %	39 %
South Korea	15 %	17 %	3 %
Japan	13 %	14 %	16 %
China	13 %	14 %	11 %
Europe	9 %	9 %	14 %
Southeast Asia	5 %	6 %	(2 %)

The increase in sales to customers in North America was primarily driven by sales from our recent acquisitions of MPD Chemicals, or MPD, and Sinmat and demand for our Microcontamination Control products. The increase in sales to customers in Taiwan was primarily driven by demand for our Advanced Materials Handling and Microcontamination Control products. The increase in sales to customers in Japan was primarily driven by demand for our Microcontamination Control and Specialty Chemicals and Engineered Materials products. The increase in sales to customers in China was due to sales from our acquisition of Hangzhou Anow Microfiltration Co., Ltd, or Anow. The increase in sales to customers in Europe was driven by demand for our Microcontamination Control products.

Sales were up $36.1 million, or 9%, on a sequential basis over sales of $412.3 million for the first quarter of 2020, including favorable foreign currency translation effects of $0.1 million and sales associated attributable to acquired businesses of $2.0 million. The increase in revenue resulted from increased customer demand from the semiconductor market compared to the previous quarter.

Net sales for the six months ended June 27, 2020 were $860.7 million, up 12% from $769.9 million in the comparable year-ago period. An analysis of the factors underlying the increase in net sales is presented in the following table:

(In thousands)		
Net sales in the six months ended June 29, 2019	$	769,921
Increase associated with volume, pricing and mix		62,858
Increase associated with effect of foreign currency translation		125
Increase associated with acquired businesses		27,828
Net sales in the six months ended June 27, 2020	$	860,732

The Company’s sales increase was primarily due to increased customer demand from the semiconductor market compared to the year-ago period, sales of $27.8 million from the Company’s recent acquisitions and favorable foreign currency translation effects of $0.1 million.

On a geographic basis, sales percentage by customers’ country or region for the six months ended June 27, 2020 and June 29, 2019 and the percentage increase (decrease) in sales for the six months ended June 27, 2020 compared to the sales for the six months ended June 29, 2019 were as follows:

	Six months ended		
	June 27, 2020	June 29, 2019	Percentage increase (decrease) in sales
North America	25 %	23 %	18 %
Taiwan	21 %	19 %	24 %
South Korea	14 %	16 %	(3 %)
Japan	13 %	13 %	16 %
China	12 %	13 %	5 %
Europe	8 %	9 %	6 %
Southeast Asia	6 %	7 %	— %

The increase in sales to customers in North America was primarily driven by sales from our recent acquisitions of MPD and Sinmat and demand for our Microcontamination Control products. The increase in sales to customers in Taiwan was primarily driven by demand for our Advanced Materials Handling and Microcontamination Control products. The increase in sales to customers in Japan was primarily driven by demand for our Microcontamination Control and Specialty Chemicals and Engineered Materials products.

Gross profit The Company's gross profit increased 25% for the three months ended June 27, 2020 to $207.4 million, compared to $166.3 million for the three months ended June 29, 2019. The Company experienced a 46.2% gross margin rate for the three months ended June 27, 2020, compared to 43.9% in the comparable year-ago period. The gross profit and gross margin increases reflect higher factory utilization associated with higher sales levels and a favorable sales mix. The gross profit and gross margin figures include a cost of sales charge of $0.7 million associated with the sale of inventory acquired in recent business acquisitions for the three months ended June 29, 2019.

For the six months ended June 27, 2020, the Company's gross profit increased 14% to $392.9 million, compared to $343.7 million for the six months ended June 29, 2019. The Company experienced a 45.6% gross margin rate for the six months ended June 27, 2020, compared to 44.6% in the comparable year-ago period. The gross profit and gross margin increases reflect higher factory utilization associated with higher sales levels and a favorable sales mix. The gross profit and gross margin figures include incremental cost of sales charges of $0.4 million and $2.9 million associated with the sale of inventory acquired in recent business acquisitions for the six months ended June 27, 2020 and June 29, 2019, respectively.

Selling, general and administrative expenses SG&A expenses were $66.9 million for the three months ended June 27, 2020, up $2.7 million, or 4%, from the comparable three-month period a year earlier. An analysis of the factors underlying the increase in SG&A is presented in the following table:

(In thousands)		
Selling, general and administrative expenses in the quarter ended June 29, 2019	$	64,150
Deal and transaction costs		(661)
Integration costs		648
Employee costs		4,457
Travel costs		(2,219)
Provision for bad debt		1,105
Professional fees		(1,005)
Other increases, net		397
Selling, general and administrative expenses in the quarter ended June 27, 2020	$	66,872

SG&A expenses were $125.8 million for the first six months of 2020, down 14% compared to SG&A expenses of $146.4 million in the year-ago period. An analysis of the factors underlying changes in SG&A is presented in the following table:

(In thousands)		
Selling, general and administrative expenses in the six months ended June 29, 2019	$	146,404
Deal and transaction costs		(18,366)
Integration costs		(2,224)
Employee costs		1,085
Travel costs		(2,954)
Provision for bad debt		1,438
Other increases, net		380
Selling, general and administrative expenses in the six months ended June 27, 2020	$	125,763

Deal and transaction costs were $18.4 million lower in the six months ended June 27, 2020 compared to the six months ended June 29, 2019, mainly due to the deal costs associated with the terminated Versum transaction.

Engineering, research and development expenses The Company's engineering, research and development, or ER&D, efforts focus on the support or extension of current product lines and the development of new products and manufacturing technologies. ER&D expenses were $32.6 million in the three months ended June 27, 2020 compared to $30.6 million in the year-ago period. An analysis of the factors underlying the increase in ER&D is presented in the following table:

(In thousands)		
Engineering, research and development expenses in the quarter ended June 29, 2019	$	30,624
Employee costs		2,839
Travel costs		(349)
Other decreases, net		(542)
Engineering, research and development expenses in the quarter June 27, 2020	$	32,572

ER&D expenses increased 4% to $62.2 million in the first six months of 2020, compared to $59.6 million in the year ago period. An analysis of the factors underlying the increase in ER&D is presented in the following table:

(In thousands)		
Engineering, research and development expenses in the six months ended June 29, 2019	$	59,615
Employee costs		2,629
Depreciation		1,068
Travel costs		(548)
Other decreases, net		(560)
Engineering, research and development expenses in the six months ended June 27, 2020	$	62,204

Amortization expenses Amortization of intangible assets was $13.2 million in the three months ended June 27, 2020, compared to $16.6 million for the three months ended June 29, 2019. The decrease primarily reflects the elimination of amortization expense of $6.0 million for identifiable intangible assets acquired in recent acquisitions that became fully amortized in previous periods, partially offset by additional amortization expense of $2.7 million associated with recent acquisitions.

Amortization of intangible assets was $29.4 million in the six months ended June 27, 2020, compared to $35.2 million for the six months ended June 29, 2019. The decrease primarily reflects the elimination of amortization expense of $10.9 million for identifiable intangible assets acquired in recent acquisitions that became fully amortized in previous periods, partially offset by additional amortization expense of $5.3 million associated with recent acquisitions.

Interest expense Interest expense includes interest associated with debt outstanding and the amortization of debt issuance costs associated with such borrowings. Interest expense was $13.0 million in the three months ended June 27, 2020 compared to $11.3 million in the three months ended June 29, 2019. The increase primarily reflects higher average debt levels.

Interest expense was $23.6 million in the six months ended June 27, 2020, compared to $22.2 million in the six months ended June 29, 2019. The increase reflects higher average debt levels.

Interest income Interest income was $0.2 million in the three months ended June 27, 2020, compared to $1.6 million in the three months ended June 29, 2019. The decrease reflects lower average interest rates.

Interest income was $0.5 million in the six months ended June 27, 2020, compared to $2.8 million in the six months ended June 29, 2019. The decrease reflects lower average interest rates.

Other (income) expense, net Other income, net was $0.5 million in the three months ended June 27, 2020 and consisted mainly of foreign currency transaction gains of $2.0 million, partially offset by loss on debt extinguishment costs of $1.5 million associated with payments on the Term Loan Facility. Other income, net was $122.0 million in the three months ended June 29, 2019 and consisted of net proceeds of $122.0 million received from the termination of the merger agreement with Versum.

Other expense, net was $0.4 million in the six months ended June 27, 2020 and consisted of loss on debt extinguishment costs of $1.5 million associated with payments on the Term Loan Facility, partially offset by foreign currency transaction gains of $1.3 million. Other income, net was $122.3 million in the six months ended June 29, 2019 and consisted mainly of net proceeds of $122.0 million received from the termination of the merger agreement with Versum.

Income tax expense Income tax expense was $14.4 million and $23.0 million in the three and six months ended June 27, 2020, respectively, compared to income tax expense of $43.2 million and $48.7 million in the three and six months ended June 29, 2019, respectively. The Company’s year-to-date effective tax rate at June 27, 2020 was 15.1% , compared to 23.7% at June 29, 2019.

The year-to-date effective tax rate at June 29, 2019 included a discrete tax charge of $9.4 million related to the reversal of a dividend received deduction that was recorded in 2018. This discrete charge was recorded based on the issuance of final regulations during the quarter ended June 29, 2019. Additionally, in 2019 the Company received a termination fee from Versum based on the termination of the Versum merger agreement and recorded a discrete charge of $23.5 million related to the termination fee, net of associated expenses. As a result of the termination fee, the Company released a valuation allowance on federal capital loss carryforwards and recorded a discrete benefit of $2.4 million. Furthermore, the year-to-date effective tax rate decreased from June 29, 2019 to June 27, 2020 due to lower accrued withholding taxes as a result of a portion of the Company’s foreign earnings being permanently reinvested in 2020 and an increase in the federal research and development credits. The year-to-date income tax expense at June 27, 2020 and June 29, 2019 includes discrete benefits of $6.4 million and $3.1 million, respectively, recorded in connection with share-based compensation.

Net income Due to the factors noted above, the Company recorded net income of $68.0 million, or $0.50 per diluted share, in the three-month period ended June 27, 2020, compared to net income of $124.0 million, or $0.91 per diluted share, in the three months ended June 29, 2019. In the three months ended June 27, 2020, net income, as a percentage of net sales, decreased to 15.2% from 32.7% in the year-ago period.

In the six months ended June 27, 2020, the Company recorded net income of $129.0 million, or $0.95 per diluted share, compared to net income of $156.7 million, or $1.15 per diluted share, in the six months ended June 29, 2019. In the six months ended June 27, 2020, net income, as a percentage of net sales, decreased to 15.0% from 20.3% in the year-ago period.

Non-GAAP Measures The Company's condensed consolidated financial statements are prepared in conformity with accounting principles generally accepted in the United States, or GAAP. The Company also utilizes certain non-GAAP financial measures as a complement to financial measures provided in accordance with GAAP in order to better assess and reflect trends affecting the Company's business and results of operations. See the section "Non-GAAP Information" included below in this section for additional detail, including the definition of certain non-GAAP financial measures and the reconciliation of these non-GAAP measures to the Company's GAAP measures.

The Company's principal non-GAAP financial measures are Adjusted EBITDA and Adjusted Operating Income, together with related measures thereof, and non-GAAP Earnings Per Share.

Adjusted EBITDA increased 38% to $131.5 million in the three months ended June 27, 2020, compared to $95.4 million in the three months ended June 29, 2019. In the three months ended June 27, 2020, Adjusted EBITDA, as a percentage of net sales, increased to 29% from 25% in the year-ago period.

Adjusted EBITDA increased 23% to $251.8 million in the six months ended June 27, 2020, compared to $204.3 million in the six months ended June 29, 2019. In the six months ended June 27, 2020, Adjusted EBITDA, as a percentage of net sales, increased to 29% from 27% in the year-ago period.

Adjusted Operating Income increased 44% to $110.8 million in the three months ended June 27, 2020, compared to $76.8 million in the three months ended June 29, 2019. Adjusted Operating Income, as a percentage of net sales, increased to 25% from 20% in the year-ago period.

Adjusted Operating Income increased 25% to $210.5 million in the six months ended June 27, 2020, compared to $169.0 million in the six months ended June 29, 2019. In the six months ended June 27, 2020, Adjusted Operating Income, as a percentage of net sales, increased to 24% from 22% in the year-ago period.

Non-GAAP Earnings Per Share increased 54% to $0.60 in the three months ended June 27, 2020, compared to $0.39 in the three months ended June 29, 2019. Non-GAAP Earnings Per Share increased 29% to $1.15 in the six months ended June 29, 2019, compared to $0.89 in the six months ended June 29, 2019.

Segment Analysis

The Company reports its financial performance based on three reporting segments. The following is a discussion of the results of operations of these three business segments. See note 10 to the condensed consolidated financial statements for additional information on the Company's three segments.

The following table presents selected net sales and segment profit data for the Company's three reportable segments and unallocated general and administrative expenses for the three months ended June 27, 2020, June 29, 2019 and March 28, 2020, and the six months ended June 27, 2020 and June 29, 2019.

	Three months ended			Six months ended	
(In thousands)	June 27, 2020	June 29, 2019	March 28, 2020	June 27, 2020	June 29, 2019
Specialty Chemicals and Engineered Materials					
Net sales	$ 146,213	$ 127,552	$ 144,214	$ 290,427	$ 252,022
Segment profit	32,938	24,000	32,670	65,608	48,431
Microcontamination Control					
Net sales	$ 183,758	$ 150,185	$ 159,261	$ 343,019	$ 307,891
Segment profit	62,137	43,126	50,167	112,304	90,449
Advanced Materials Handling					
Net sales	$ 126,434	$ 107,515	$ 116,137	$ 242,571	$ 223,579
Segment profit	22,809	15,043	20,632	43,441	37,410
Unallocated general and administrative expenses	$ 9,956	$ 10,669	$ 6,514	$ 16,470	$ 38,642

Specialty Chemicals and Engineered Materials (SCEM)

For the second quarter of 2020, SCEM net sales increased to $146.2 million, compared to $127.6 million in the comparable period last year. The sales increase was due to increased sales of advanced deposition materials and cleaning chemistries, as well as additional sales of $8.2 million attributable to the acquisitions of MPD in the third quarter of 2019 and Sinmat in the first quarter of 2020. This growth was offset by declines in non-semi related sales, particularly in end markets that were most impacted by the pandemic, such as aerospace and handsets. SCEM reported a segment profit of $32.9 million in the second quarter of 2020, up 37% from $24.0 million in the year-ago period. The segment profit increase was primarily due to higher gross profit related to increased sales volume, partially offset by a 9% increase in operating expenses, primarily due to recent acquisitions and higher compensation costs.

For the six months ended June 27, 2020, SCEM net sales increased to $290.4 million, compared to $252.0 million in the comparable period last year. The sales increase was mainly due to increased sales of advanced deposition materials and cleaning chemistries, as well as additional sales of $20.6 million attributable to the acquisitions of Digital Specialty Chemicals Limited, or DSC, in the first quarter of 2019, MPD in the third quarter of 2019 and Sinmat in the first quarter of 2020. This growth was offset by declines in non-semi related sales, particularly in end markets that were most impacted by the pandemic, such as aerospace and handsets. SCEM reported a segment profit of $65.6 million in the six months ended June 27, 2020, up 35% from $48.4 million in the year-ago period also due to higher sales levels, partially offset by a 7% increase in operating expenses, primarily due to recent acquisitions and higher compensation costs.

Microcontamination Control (MC)

For the second quarter of 2020, MC net sales increased to $183.8 million, compared to $150.2 million in the comparable period last year. The sales increase was mainly due to improved sales from liquid filtration and gas filtration products, as well as additional sales of $4.0 million attributable to the acquisition of Anow in the third quarter of 2019, partially offset by a decrease in sales from gas purification products. MC reported a segment profit of $62.1 million in the second quarter of 2020, up 44% from $43.1 million in the year-ago period. The segment profit improvement was primarily due to higher gross profit related to the increased sales volume.

For the six months ended June 27, 2020, MC net sales increased to $343.0 million, compared to $307.9 million in the comparable period last year. The sales increase was due to improved sales from liquid filtration and gas purification products, as well as additional sales of $7.2 million attributable to the acquisition of Anow in the third quarter of 2019. MC reported a segment profit of $112.3 million in the six months ended June 27, 2020, up 24% from $90.4 million in the year-ago period. The segment profit improvement was primarily due to higher gross profit related to the increased sales volume.

Advanced Materials Handling (AMH)

For the second quarter of 2020, AMH net sales increased to $126.4 million, compared to $107.5 million in the comparable period last year. The sales increase was mainly due to improved sales from high purity liquid containers and wafer handling products. AMH reported a segment profit of $22.8 million in the second quarter of 2020, up 52% from $15.0 million in the year-ago period. The segment profit increase was primarily due to higher sales volume and a 5% decrease in operating expenses, primarily due to lower spending and restructuring initiatives from the previous year.

For the six months ended June 27, 2020, AMH net sales increased to $242.6 million, compared to $223.6 million in the comparable period last year. The sales increase was mainly due to improved sales from high purity liquid containers and wafer handling products. AMH reported a segment profit of $43.4 million in the six months ended June 27, 2020, up 16% from $37.4 million in the year-ago period. The segment profit increase was primarily due to higher sales volume and a 7% decrease in operating expenses, primarily due to lower spending and restructuring initiatives from the previous year.

Unallocated general and administrative expenses

Unallocated general and administrative expenses totaled $10.0 million in the second quarter of 2020, compared to $10.7 million in the comparable period last year.

Unallocated general and administrative expenses for the six months ended June 27, 2020 totaled $16.5 million, down from $38.6 million in the six months ended June 27, 2020. The $22.2 million decrease mainly reflects a $20.6 million decrease in deal and integration costs referenced in the discussion of SG&A above.

Liquidity and Capital Resources

We consider the following when assessing our liquidity and capital resources:

In thousands	June 27, 2020	December 31, 2019
Cash and cash equivalents	$ 532,667	$ 351,911
Working capital	950,892	667,964
Total debt	1,183,992	936,484

The Company has historically financed its operations and capital requirements through cash flow from its operating activities, long-term loans, lease financing and borrowings under domestic and international short-term lines of credit. Although there is uncertainty related to the anticipated impact of the COVID-19 pandemic on the Company's future results, we believe our business model, our current cash reserves and the recent steps we have taken to strengthen our balance sheet, such as our issuance of $400 million aggregate principal amount of 4.375% senior unsecured notes due April 15, 2028 and related repayments under the Revolving Facility and Term Loan Facility, will help us to manage our business through this crisis as we expect it to unfold.

We have reviewed numerous potential scenarios in connection with the impact of COVID-19 on the global economy and the semiconductor industry. Based on our analysis, we believe our existing balances of domestic cash and cash equivalents and our currently anticipated operating cash flows will be sufficient to meet our cash needs arising in the ordinary course of business for the next twelve months. As the opportunity arises, we may seek to take advantage of opportunities to raise additional capital through additional debt financing or through public or private sales of securities. If in the future our available liquidity is not sufficient to meet the Company's operating and debt service obligations as they come due, management would need to pursue alternative arrangements through additional equity or debt financing in order to meet the Company's cash requirements. There can be no assurance that any such financing would be available on commercially acceptable terms, or at all. To date, in fiscal 2020, we have not experienced difficulty accessing the capital and credit markets; however, future volatility in the capital and credit markets may increase costs associated with issuing debt instruments or affect our ability to access those markets. In addition, it is possible that our ability to access the capital and credit markets could be limited at a time when we would like, or need, to do so, which could have an adverse impact on our ability to refinance maturing debt and/or react to changing economic and business conditions.

In summary, our cash flows for each period were as follows:

	Six months ended	
(in thousands)	June 27, 2020	June 29, 2019
Net cash provided by operating activities	$ 141,424	$ 228,363
Net cash used in investing activities	(122,307)	(109,171)
Net cash provided by (used in) financing activities	163,833	(79,166)
Increase in cash and cash equivalents	180,756	39,320

Operating activities

Cash provided by operating activities is net income adjusted for certain non-cash items and changes in assets and liabilities. Cash flows provided by operating activities totaled $141.4 million in the six months ended June 27, 2020 compared to cash flows provided by operating activities of $228.4 million in the six months ended June 29, 2019. The decrease in cash provided by operating activities was primarily due to lower net income and changes in working capital and other assets and liabilities. The net change in working capital and other assets and liabilities resulted in a decrease to cash provided by operations of $81.9 million for the six months ended June 27, 2020 compared to a decrease of $14.6 million for the six months ended June 29, 2019.

Changes in working capital and other assets and liabilities for the six months ended June 27, 2020 were driven by increases in accounts receivable, inventories and accounts payable. The change for accounts receivable was primarily due to the Company's quarter closing date occurring several days prior to the end of the calendar month, the period during which receivable collections are typically heavy, particularly for the Company's Asia operations as compared to the six months ended June 29, 2019. The change for inventory was driven by an increase in raw material purchases to provide a buffer related to any potential supply chain issues related to COVID-19. The change for accounts payable and accrued liabilities was primarily driven by the timing of payments of accounts payable. In addition, the Company paid out a lower incentive compensation payment for the six months ended June 27, 2020 compared to the Company’s analogous payment for the six months ended June 29, 2019. Furthermore, the Company’s incentive compensation accrual is higher at June 27, 2020 than its incentive compensation accrual at June 29, 2019.

Investing activities Cash flows used in investing activities totaled $122.3 million in the six months ended June 27, 2020 compared to cash flows used in investing activities of $109.2 million in the six months ended June 29, 2019. The change was due to higher cash paid for acquisitions, offset in-part by lower cash paid for acquisition of property, plant and equipment.

Acquisition of property, plant and equipment totaled $46.9 million in the six months ended June 27, 2020, which primarily reflected investments in equipment and tooling, compared to $60.1 million in the six months ended June 29, 2019, which primarily reflected investments in equipment and tooling.

On January 10, 2020, the Company acquired Sinmat, a CMP slurry manufacturer. The cash used to acquire Sinmat for the six months ended June 27, 2020 was $75.6 million, net of cash acquired. The transaction is described in further detail in note 3 to the Company’s condensed consolidated financial statements.

In the six months ended June 29, 2019, the Company acquired DSC, which provides advanced materials to the specialty chemical, technology and pharmaceutical industries. The cash used to acquire DSC for the six months ended June 29, 2019 was $49.3 million, net of cash acquired. The transaction is described in further detail in note 3 to the Company’s condensed consolidated financial statements.

As of June 27, 2020, the Company expects its full-year capital expenditures in 2020 to be approximately $120.0 million. As of June 27, 2020, the Company had outstanding capital purchase obligations of $42.1 million for the construction or purchase of plant and equipment not yet recorded in the Company’s condensed consolidated financial statements as the Company had not received the related goods or property as of such date.

Financing activities Cash flows provided by financing activities totaled $163.8 million during the six months ended June 27, 2020 compared to cash flows used in financing activities of $79.2 million during the six months ended June 29, 2019. The change was primarily due to net long-term debt activity, which was a source of cash of $249.0 million in the six months ended June 27, 2020, compared to a use of cash of $2.0 million in the comparable period in 2019, and a $20.8 million decrease of repurchases of the Company’s common stock, partially offset by a $16.1 million deferred acquisition payment related to our DSC acquisition, a $4.4 million increase in cash used to pay taxes for net share settlements of equity awards and $4.0 million increase in payments for debt issuance costs. In March 2020, the Company suspended its share repurchase program.

Our total dividend payments were $21.7 million in the six months ended June 27, 2020 compared to $19.0 million in the six months ended June 29, 2019. We have paid a cash dividend in each of the past 11 quarters. On July 15, 2020, the Board declared a quarterly cash dividend of $0.08 per share of common stock, payable on August 19, 2020 to stockholders of record on July 29, 2020.

Other Liquidity and Capital Resources Considerations

The Company’s Term Loan Facility matures on November 6, 2025 and bears interest rate at a rate per annum of 2.2% at June 27, 2020. During the six months ended June 27, 2020, the Company made payments of $151.0 million on the Term Loan Facility and had losses on debt extinguishment of $1.5 million. As of June 27, 2020, the aggregate principal amount outstanding under the Term Loan Facility was $245 million.

The Company’s Revolving Facility provides for lending commitments in an aggregate principal amount of up to $300 million maturing on November 6, 2023. The Revolving Facility bears interest at a rate per annum equal to, at the Company’s option, either a base rate (such as prime rate) or LIBOR plus, in each case, an applicable margin. At June 27, 2020, there was no balance outstanding under the Revolving Facility and we had undrawn outstanding letters of credit of $0.2 million.

Through June 27, 2020, the Company was in compliance with all applicable financial covenants under its credit facilities.

As of June 27, 2020, we had $550 million aggregate principal amount of 4.625% senior unsecured notes due February 10, 2026 outstanding.

On April 30, 2020, the Company issued $400 million aggregate principal amount of 4.375% senior unsecured notes due April 15, 2028. The Company paid debt issuance costs of $4.0 million in connection with the issuance of the notes during the six months ended June 27, 2020. The transaction is described in further detail in note 6 to the Company's condensed consolidated financial statements.

The Company also has lines of credit with two banks that provide for borrowings of Japanese yen for the Company's Japanese subsidiary, equivalent to an aggregate of approximately $11.2 million. There were no outstanding borrowings under these lines of credit at June 27, 2020.

As of June 27, 2020, the Company's sources of available funds were its cash and cash equivalents of $532.7 million, funds available under the Revolving Facility and international credit facilities and cash flow generated from operations. As of June 27, 2020, the amount of cash and cash equivalents held in certain of our foreign operations totaled approximately $219.5 million. If we repatriate such funds, we will be required to pay income taxes in certain U.S. states and applicable foreign withholding taxes on those amounts during the period when such repatriation occurs. We have accrued taxes for the tax effect of repatriating the funds to the U.S.

Off-Balance Sheet Arrangements

As of June 27, 2020, we did not have any off-balance sheet arrangements that have, or are reasonably likely to have, a material current or future effect on our financial condition, results of operations, liquidity, capital expenditures or capital resources.

Contractual Obligations

There have been no significant changes to the contractual obligations reported in our Annual Report on Form 10-K for the fiscal year ended December 31, 2019, except for long-term debt. On April 30, 2020, the Company issued $400 million aggregate principal amount of 4.375% senior unsecured notes due April 15, 2028. The Company paid down $151 million on the Term Loan Facility during the second quarter of 2020.

Recently adopted accounting pronouncements Refer to note 1 to the Company's condensed consolidated financial statements for a discussion of accounting pronouncements recently adopted.

Recently issued accounting pronouncements Refer to note 1 to the Company's condensed consolidated financial statements for a discussion of accounting pronouncements recently issued but not yet adopted.

Non-GAAP Information The Company's condensed consolidated financial statements are prepared in conformity with GAAP.

The Company also utilizes certain non-GAAP financial measures as a complement to financial measures provided in accordance with GAAP in order to better assess and reflect trends affecting the Company's business and results of operations. These non-GAAP financial measures include Adjusted EBITDA and Adjusted Operating Income, together with related measures thereof, and non-GAAP Earnings Per Share, or EPS, as well as certain other supplemental non-GAAP financial measures included in the discussion of the Company's financial results.

Adjusted EBITDA, a non-GAAP financial measure, is defined by the Company as net income before (1) income tax expense, (2) interest expense, (3) interest income, (4) other (income) expense, net, (5) charge for fair value write-up of acquired inventory sold, (6) deal and transaction costs, (7) integration costs, (8) severance and restructuring costs, (9) amortization of intangible assets and (10) depreciation. Adjusted Operating Income, another non-GAAP financial measure, is defined by the Company as Adjusted EBITDA exclusive of the depreciation addback noted above. The Company also utilizes non-GAAP financial measures whereby Adjusted EBITDA and Adjusted Operating Income are each divided by the Company's net sales to derive Adjusted EBITDA Margin and Adjusted Operating Margin, respectively.

Non-GAAP EPS, a non-GAAP financial measure, is defined by the Company as net income before (1) charge for fair value write-up of acquired inventory sold, (2) deal and transaction costs, (3) integration costs, (4) severance and restructuring costs, (5) loss on debt extinguishment and modification, (6) Versum termination fee, net, (7) amortization of intangible assets, (8) tax effect of legal entity restructuring and (9) the tax effect of the foregoing adjustments to net income, stated on a per share basis.

The Company provides supplemental non-GAAP financial measures to help management and investors to better understand its business and believes these measures provide investors and analysts additional and meaningful information for the assessment of the Company's ongoing results. Management also uses these non-GAAP measures to assist in the evaluation of the performance of the Company's business segments and to make operating decisions.

Management believes the Company's non-GAAP measures help indicate the Company's baseline performance before certain gains, losses or other charges that may not be indicative of the Company's business or future outlook and offer a useful view of business performance in that the measures provide a more consistent means of comparing performance. The Company believes the non-GAAP measures aid investors' overall understanding of the Company's results by providing a higher degree of transparency for such items and providing a level of disclosure that will help investors understand how management plans, measures and evaluates the Company's business performance. Management believes that the inclusion of non-GAAP measures provides greater consistency in its financial reporting and facilitates investors' understanding of the Company's historical operating trends by providing an additional basis for comparisons to prior periods.

Management uses Adjusted EBITDA and Adjusted Operating Income to assist it in evaluations of the Company's operating performance by excluding items that management does not consider as relevant in the results of its ongoing operations. Internally, these non-GAAP measures are used by management for planning and forecasting purposes, including the preparation of internal budgets; for allocating resources to enhance financial performance; for evaluating the effectiveness of operational strategies; and for evaluating the Company's capacity to fund capital expenditures, secure financing and expand its business.

In addition, and as a consequence of the importance of these non-GAAP financial measures in managing its business, the Company's Board of Directors uses non-GAAP financial measures in the evaluation process to determine management compensation.

The Company believes that certain analysts and investors use Adjusted EBITDA, Adjusted Operating Income and non-GAAP EPS as supplemental measures to evaluate the overall operating performance of firms in the Company's industry. Additionally, lenders or potential lenders use Adjusted EBITDA measures to evaluate the Company's creditworthiness.

The presentation of non-GAAP financial measures is not meant to be considered in isolation, as a substitute for, or superior to, financial measures or information provided in accordance with GAAP. Management strongly encourages investors to review the Company's condensed consolidated financial statements in their entirety and to not rely on any single financial measure.

Management notes that the use of non-GAAP measures has limitations, including but not limited to:

First, non-GAAP financial measures are not standardized. Accordingly, the methodology used to produce the Company's non-GAAP financial measures is not computed under GAAP and may differ notably from the methodology used by other companies. For example, the Company's non-GAAP measure of Adjusted EBITDA may not be directly comparable to EBITDA or an adjusted EBITDA measure reported by other companies.

Second, the Company's non-GAAP financial measures exclude items such as amortization and depreciation that are recurring. Amortization of intangibles and depreciation have been, and will continue to be for the foreseeable future, a significant recurring expense with an impact upon the Company's results of operations, notwithstanding the lack of immediate impact upon cash flows.

Third, there is no assurance that the Company will not have future charges for fair value write-up of acquired inventory, restructuring activities, deal costs, integration costs, or similar items and, therefore, may need to record additional charges (or credits) associated with such items, including the tax effects thereon. The exclusion of these items in the Company's non-GAAP measures should not be construed as an implication that these costs are unusual, infrequent or non-recurring.

Management considers these limitations by providing specific information regarding the GAAP amounts excluded from these non-GAAP financial measures and evaluating these non-GAAP financial measures together with their most directly comparable financial measures calculated in accordance with GAAP. The calculations of Adjusted EBITDA, Adjusted Operating Income, and non-GAAP EPS, and reconciliations between these financial measures and their most directly comparable GAAP equivalents, are presented below in the accompanying tables.

Reconciliation of GAAP Net Income to Adjusted Operating Income and Adjusted EBITDA

(In thousands)	Three months ended June 27, 2020	Three months ended June 29, 2019	Six months ended June 27, 2020	Six months ended June 29, 2019
Net sales	$ 448,405	$ 378,874	$ 860,732	$ 769,921
Net income	$ 68,036	$ 123,997	$ 129,042	$ 156,655
Net income - as a % of net sales	15.2 %	32.7 %	15.0 %	20.3 %
Adjustments to net income				
Income tax expense	14,361	43,235	22,983	48,657
Interest expense	13,005	11,315	23,564	22,199
Interest income	(213)	(1,623)	(534)	(2,848)
Other (income) expense, net	(477)	(122,015)	401	(122,263)
GAAP – Operating income	94,712	54,909	175,456	102,400
Operating margin -as a % of net sales	21.1 %	14.5 %	20.4 %	13.3 %
Charge for fair value write-up of acquired inventory sold	—	695	361	2,850
Deal and transaction costs	503	1,164	1,934	20,300
Integration costs	355	1,264	403	4,184
Severance and restructuring costs	2,049	2,170	2,892	3,991
Amortization of intangible assets	13,216	16,591	29,427	35,248
Adjusted operating income	110,835	76,793	210,473	168,973
Adjusted operating margin - as a % of net sales	24.7 %	20.3 %	24.5 %	21.9 %
Depreciation	20,639	18,596	41,287	35,317
Adjusted EBITDA	$ 131,474	$ 95,389	$ 251,760	$ 204,290
Adjusted EBITDA – as a % of net sales	29.3 %	25.2 %	29.2 %	26.5 %

Reconciliation of GAAP Net Income and Earnings per Share to Non-GAAP Net Income and Earnings per Share

(In thousands, except per share data)	Three months ended June 27, 2020	Three months ended June 29, 2019	Six months ended June 27, 2020	Six months ended June 29, 2019
Net income	$ 68,036	$ 123,997	$ 129,042	$ 156,655
Adjustments to net income				
Charge for fair value write-up of acquired inventory sold	—	695	361	2,850
Deal and transaction costs	503	1,164	1,934	20,711
Integration costs	355	1,264	403	4,184
Severance and restructuring costs	2,049	2,170	2,892	3,991
Loss on debt extinguishment and modification	1,470	—	1,470	—
Versum termination fee, net	—	(122,000)	—	(122,000)
Amortization of intangible assets	13,216	16,591	29,427	35,248
Tax effect of legal entity restructuring	—	9,398	—	9,398
Tax effect of adjustments to net income and certain discrete tax items[1]	(4,048)	20,153	(8,377)	10,289
Non-GAAP net income	$ 81,581	$ 53,432	$ 157,152	$ 121,326
Diluted earnings per common share	$ 0.50	$ 0.91	$ 0.95	$ 1.15
Effect of adjustments to net income	0.10	(0.52)	0.21	(0.26)
Diluted non-GAAP earnings per common share	$ 0.60	$ 0.39	$ 1.15	$ 0.89

[1]The tax effect of pre-tax adjustments to net income was calculated using the applicable marginal tax rate for each respective year.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

The Company's principal financial market risks are sensitivities to interest rates and foreign currency exchange rates. The Company's interest-bearing cash equivalents and senior secured financing obligations are subject to interest rate fluctuations. The Company's cash equivalents are instruments with maturities of three months or less. A 100 basis point change in interest rates would potentially increase or decrease annual net income by approximately $2.2 million annually.

The cash flows and results of operations of the Company's foreign-based operations are subject to fluctuations in foreign exchange rates. We have sales denominated in the South Korean Won, New Taiwan Dollar, Chinese Renminbi, Canadian Dollar, Malaysian Ringgit, Singapore Dollar, Euro, Israeli Shekel and the Japanese Yen. Approximately 23.7% of the Company's sales are denominated in these currencies. Financial results therefore will be affected by changes in currency exchange rates. If all foreign currencies had experienced a 10% reduction versus the U.S. dollar during the three months ended June 27, 2020, revenue for the quarter would have been negatively impacted by approximately $10.5 million.

The Company occasionally uses derivative financial instruments to manage the foreign currency exchange rate risks associated with its foreign-based operations. At June 27, 2020, the Company had no net exposure to any foreign currency forward contracts.

Item 4. Controls and Procedures

(a) Evaluation of disclosure controls and procedures.
The Company's management, including the Chief Executive Officer, or CEO, and Chief Financial Officer, or CFO, has conducted an evaluation of the effectiveness of the Company's disclosure controls and procedures (as defined under Rules 13a-15(e) and 15d-15(e) promulgated under the Securities Exchange Act of 1934, or the 1934 Act) as of June 27, 2020. The term "disclosure controls and procedures" means controls and other procedures of a company that are designed to ensure that information required to be disclosed by the Company in the reports that it files or submits under the 1934 Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by the Company in the reports that it files or submits under the 1934 Act is accumulated and communicated to the Company's management, including its principal executive and principal financial officers, 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 management's evaluation (with the participation of the Company's CEO and CFO), as of June 27, 2020, the Company's CEO and CFO have concluded that the disclosure controls and procedures used by the Company were effective to provide reasonable assurance that information required to be disclosed by the Company in reports that it files or submits under the 1934 Act is recorded, processed, summarized, and reported within the time periods specified in SEC rules and forms, and is accumulated and communicated to management, including its principal executive officer and principal financial officer, as appropriate, to allow timely decisions regarding required disclosure.

(b) Changes in internal control over financial reporting.
There has been no change in the Company's internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the 1934 Act) identified in connection with the foregoing evaluation of disclosure controls and procedures that occurred during the most recently completed fiscal quarter that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting.

The Company acquired MPD, Anow and Sinmat on July 15, 2019, September 17, 2019 and January 10, 2020, respectively. None of MPD, Anow and Sinmat is significant to the Company's financial statements. The Company is continuing to integrate MPD, Anow and Sinmat into the Company's internal control over financial reporting, and the foregoing evaluation of the effectiveness of the Company's disclosure controls and procedures does not include an assessment of those disclosure controls and procedures of MPD, Anow and Sinmat that are subsumed by internal control over financial reporting.

PART II

OTHER INFORMATION

Item 1. Legal Proceedings

As of June 27, 2020, the Company is subject to various claims, legal actions, and complaints arising in the ordinary course of business. The Company believes the final outcome of these matters will not have a material adverse effect on its condensed consolidated financial statements. The Company expenses legal costs as incurred.

Item 1A. Risk Factors

This section augments and updates certain risk factors disclosed in Item 1A of Part I of our Annual Report on Form 10-K for the year ended December 31, 2019, or the Annual Report, and in Item 1A of Part II of our Quarterly Report on Form 10-Q for the fiscal period ended March 28, 2020, or the Q1 Quarterly Report. The following risk factors supersede the corresponding risks described in the Annual Report and the Q1 Quarterly Report and should be read together with the other risk factors disclosed in the Annual Report. In addition to the other information in this Quarterly Report on Form 10-Q, all of these risk factors should be carefully considered in evaluating us and our common stock. Any of these risks, many of which are beyond our control, could materially and adversely affect our financial condition, results of operations or cash flows, or cause our actual results to differ materially from those projected in any forward-looking statements. We may also face other risks and uncertainties that are not presently known, are not currently believed to be material, or are not identified below because they are common to all businesses. Past financial performance may not be a reliable indicator of future performance, and historical trends should not be used to anticipate results or trends in future periods. For more information, see “Cautionary Statements” at the beginning of this Quarterly Report on Form 10-Q.

Risks Related to Our Business and Industry

The COVID-19 pandemic and ensuing governmental responses could materially adversely affect our financial condition and results of operations.

As a result of the COVID-19 pandemic, governmental authorities have implemented and are continuing to implement numerous and constantly evolving measures to try to contain the virus, such as travel bans and restrictions, limits on gatherings, quarantines, shelter-in-place orders, and business shutdowns. We have important manufacturing operations in the U.S., Japan, Korea, China, Malaysia, and Taiwan, all of which have been affected by the outbreak and have taken measures to try to contain it. Measures providing for business shutdowns have generally excluded certain essential services, and those essential services have commonly included critical infrastructure and the businesses that support that critical infrastructure. While all of our facilities currently remain operational, these measures have impacted and may further impact our workforce and operations, as well as those of our customers, suppliers and other third parties with which we do business. For example, the government of Malaysia issued an order that significantly reduced the number of employees who could be physically present to operate our Malaysian plant, which had reduced the productivity of that plant. As of the date of this filing, our Malaysian plant is back to full capacity. In addition to reduced productivity, the constraints and limits imposed on our operations may slow or diminish our research and development and customer qualification activities. Although many governmental measures have had specific expiration dates, some of those measures have already been extended more than once, and some governmental re-opening plans have been delayed or reversed due to spikes in the number of infections. In addition, such measures have not effectively reduced the high rate of spread of the virus in certain U.S. states, and there may be potential additional waves of infection in the future. As a result, there is considerable uncertainty regarding the duration and extent of current and future measures. Restrictions on our manufacturing, support operations or workforce, or similar limitations for our suppliers, could limit our ability to meet customer demand and could have a material adverse effect on our financial condition and results of operations. Furthermore, restrictions or disruptions of transportation, such as reduced availability of air transport, port closures and increased border controls or closures, have resulted, in certain instances, in higher costs and delays, both on obtaining raw materials and shipping finished goods to customers. If these restrictions and disruptions continue, they could harm our profitability, make our products less competitive, or cause our customers to seek alternative suppliers.

The COVID-19 pandemic has significantly increased economic and demand uncertainty. We anticipate that the pandemic will continue to contribute to the current global economic slowdown, and it is possible that it could cause a global recession.
In response to these developments, we have modified our business practices, including restricting employee travel, modifying employee work locations, implementing social distancing and enhanced sanitary measures in our facilities, and cancelling attendance at events and conferences. Many of our suppliers and service providers have made similar modifications. The resources available to employees working remotely may not enable them to maintain the same level of productivity and efficiency, and these and other employees may face additional demands on their time, such as increased responsibilities resulting from school closures or the illness of family members. While we have experienced only limited absenteeism from employees who are required to be on-site to perform their jobs, absenteeism may increase in the future and may harm our

productivity. In addition, we have incurred and may continue to incur incremental employee compensation related to the COVID-19 pandemic. Further, our increased reliance on remote access to our information systems increases our exposure to potential cybersecurity breaches. We may take further actions as government authorities require or recommend or as we determine to be in the best interests of our employees, customers, partners and suppliers. There is no certainty that such measures will be sufficient to mitigate the risks posed by the virus, in which case our employees may become sick, our ability to perform critical functions could be harmed, and we may be unable to respond to the needs of our global business. The resumption of normal business operations after such interruptions may be delayed or constrained by lingering effects of COVID-19 on our suppliers, third-party service providers, and/or customers.

The degree to which COVID-19 impacts our results will depend on future developments, which are highly uncertain and cannot be predicted, including, but not limited to, the duration and spread of the outbreak, its severity, potential additional waves of infection, the actions to mitigate the virus and its impact, and how quickly and to what extent normal economic and operating conditions can resume. Furthermore, the COVID-19 pandemic makes it more difficult for us to forecast demand and provide guidance for the remainder of 2020. Accordingly, any guidance we provide is likely to be less reliable than usual, and actual results are more likely to differ from any such guidance. In light of the foregoing, investors are urged to put the guidance in context and not to place undue reliance on it.

Anticipated declines in worldwide economic conditions, at least in the short term, are likely to cause demand for our products to decrease and to adversely affect our business.

We anticipate declines in industry and worldwide economic conditions at least in the short term, and these declines are likely to adversely affect our business for a period of time. We expect that the COVID-19 pandemic and any additional waves of infection will cause an economic slowdown, and it is possible that it could cause a global recession or other adverse economic conditions across the world. In the event of a recession or other downturn in the worldwide economy, demand for our products would decline and our business would be adversely effected. Our revenue is primarily dependent upon demand from semiconductor manufacturers, which is largely driven by the current and anticipated demand for electronic products that utilize semiconductors. Despite recent increases in demand for semiconductors in applications such as smartphones, cloud computing, the Internet of Things, and artificial intelligence, the semiconductor industry has historically been, and is likely to continue to be, highly cyclical with periodic significant downturns, resulting in significantly decreased demand for products such as ours. We have previously experienced significant revenue deterioration and operating losses due to severe downturns in the semiconductor industry, which often occur suddenly. The semiconductor industry is also affected by seasonal shifts in demand. Although we currently anticipate an economic downturn in the near term as a result of the COVID-19 pandemic, we are unable to predict its duration or severity, nor are we able to predict the timing, duration or severity of any future downturns in the semiconductor industry. As a result, we could underperform the market or our peers.

During downturns and periods of soft demand, our revenue is reduced, and we typically experience greater pricing pressure and shifts in product and customer mix, which often adversely affect our gross margin and net income. Even moderate seasonality can cause our operating results to fluctuate significantly from one period to the next. Uncertain and volatile economic, political, public health or business conditions in any of our key sales regions can cause or exacerbate negative trends in business and consumer spending and have historically impacted customer demand for our products. These conditions can cause material adverse changes in our results of operations and financial condition, including:

- a decline in demand for our products, which, given our limited backlog, will have an immediate impact on our revenues;
- an increase in reserves for accounts receivable due to our customers' inability to pay us;
- lower utilization of our manufacturing facilities, which could lead to lower margins;
- an increase in write-offs for excess or obsolete inventory that we cannot sell;
- potential impairment charges relating to goodwill, intangible assets, manufacturing equipment or other long-lived assets, to the extent that any downturn indicates that the carrying amount of the asset may not be recoverable;
- greater challenges in forecasting operating results, making business decisions, and identifying and prioritizing business risks; and
- additional cost reduction efforts, including additional restructuring activities, which may adversely affect our ability to capitalize on opportunities.

We anticipate that the COVID-19 pandemic, including potential additional waves of infection, will likely cause us to experience at least some of these adverse changes, but we cannot predict the degree to which they will occur. They may be more severe than we currently expect; for example, recent bookings of orders may be attributable to customers increasing their inventory to reduce their exposure to risks of future supply disruptions, which could be an offset to future demand for our products. Furthermore, to remain competitive, we must maintain a satisfactory level of engineering, research and development, invest in our infrastructure and maintain the ability to respond to any increases in demand and, as a result, a lower volume of sales can have a large and disproportionate impact on our profitability.

Our revenues and operating results are variable.

Our revenues and operating results may fluctuate significantly from quarter-to-quarter or year-to-year due to a number of factors, many of which are outside our control. We manage our expenses based in part on our expectations of future revenues. Because some of our expenses are relatively fixed in the short term, a change in the timing of revenue or the amount of profit we generate from a small number of transactions can unfavorably affect operating results in a particular period. Factors that may cause our financial results to fluctuate unpredictably include:

- economic conditions in the semiconductor industry or in the other industries we serve;
- the impact of the COVID-19 pandemic on the global economy, the semiconductor industry, our manufacturing capabilities or our supply chain;
- the size and timing of customer orders;
- consolidation of our customers could impact their purchasing decisions and negatively affect our revenues;
- procurement shortages;
- the failure of our suppliers or outsource providers to perform their obligations;
- manufacturing difficulties;
- additional expenses we would expect to incur in our efforts to respond promptly to any supply shortages, manufacturing difficulties or other supplier problems;
- decisions to increase or accelerate our purchasing of raw materials, components or other supplies in an effort to mitigate supply risk;
- customer cancellations of or delays in shipments, installations or customer acceptances or, alternatively, acceleration of orders from customers to increase their inventory;
- our customers' rate of replacement of our consumable products;
- changes in average selling prices, customer mix, and product mix;
- our ability to develop, introduce, and market new, enhanced, and competitive products in a timely manner;
- our competitors' introduction of new products;
- legal or technical challenges to our products or technologies;
- disruptions in transportation, communication, demand, information technology, or supply, including strikes, acts of God, wars, terrorist activities, and natural or man-made disasters;
- legal, tax, accounting, or regulatory changes (including changes in import/export regulations and tariffs) or changes in the interpretation or enforcement of existing requirements;
- changes in our estimated tax rate; and
- foreign currency exchange rate fluctuations.

The COVID-19 pandemic is likely to exacerbate the adverse impact of many of these factors on our revenues and results of operations, at least in the short term.

We depend on single and limited source suppliers and an interruption in our ordinary sources of supply could affect our ability to manufacture our products and have an adverse effect on our results of operations.

We rely on single or limited source suppliers for raw materials, such as plastic polymers, filtration membranes, petroleum coke and other materials, which are critical to the manufacturing of our products. If we were to lose any one of these sources, it could be difficult for us to find an alternative supplier and we would need to qualify this new source through our customers' rigorous qualification processes. Although we seek to reduce our dependence on sole and limited source suppliers, the partial or complete loss of any of these sources could interrupt our manufacturing operations and result in a material adverse effect on our results of operations. At times, we have experienced a limited supply of certain raw materials, which has resulted in delays, lost revenue, increased costs and risks associated with qualifying products made from such new raw materials with our customers. Events such as an industry-wide increase in demand for, or the discontinuation of, raw materials used in our products could harm our ability to acquire sufficient quantities and our manufacturing operations may be interrupted. For example, in 2019, we experienced a disruption in the supply of certain ceramic material for use in our coatings business in our SCEM division when the supplier was unable to produce these materials at the required specifications. In response, we worked collaboratively with the supplier to determine the root cause and to solve the manufacturing issue, reestablishing the supply of these materials. Although we were able to reestablish our supply of this raw material, we may be unable to do so in the future or with other raw materials, in which case raw materials shortages may adversely affect our operations. Additionally, our suppliers may not have the capacity to meet increases in our demand for raw materials, in turn, making it difficult for us to meet demand from our customers. Furthermore, prices for our raw materials can vary widely. While we have long-term arrangements with certain key suppliers that fix our price for the purchase of certain raw materials, if the cost of our raw materials increases and we are unable to correspondingly increase the sales price of our products or find other cost savings, our profit margins will decline.

Although we have not yet experienced any significant impacts or interruptions to our supply chain as a result of the COVID-19 pandemic, there is no assurance that they will not occur in the future. Certain of our suppliers have faced difficulties maintaining operations in light of government-ordered restrictions and shelter-in-place mandates. If our suppliers or sub-suppliers are unable to maintain their operations or restrictions become more severe, we may encounter difficulties obtaining raw materials, which may cause us to fail to meet customer demand or require us to pay higher prices for these materials, either of which could harm our business and profitability. For example, one of our critical valve suppliers was shut down and was unable to supply us with valves for our gas purification products. Although in this instance we were able to procure this critical part from a second, pre-qualified source, we may be unable to find alternative sources of supply in the future and may therefore be adversely affected by supply interruptions resulting from the COVID-19 pandemic. Additionally, an economic slowdown caused by the COVID-19 pandemic could harm the financial health of our suppliers and sub-suppliers. Although we regularly monitor the financial health of companies in our supply chain, financial hardship on our suppliers or sub-suppliers could cause a disruption in our ability to obtain raw materials or components required to manufacture our products, adversely affecting our operations or require us to alter our payment terms with certain suppliers, including prepaying for raw materials, which could put downward pressure on our cash flow.

We are exposed to the risks of operating a global business as a significant amount of our sales and manufacturing activity occur outside the United States.

Sales to customers outside the United States accounted for approximately 75%, 76%, 78% and 79% of our net sales in the six months ended June 27, 2020 and in 2019, 2018 and 2017, respectively. We anticipate that international sales will continue to account for a majority of our net sales. In addition, a number of our key domestic customers derive a significant portion of their revenues from sales in international markets. We also manufacture a significant portion of our products outside the United States and are dependent on international suppliers for many of our parts and raw materials. We intend to continue to pursue opportunities in both sales and manufacturing internationally. Our international operations are subject to a number of risks and potential costs that could adversely affect our revenue and profitability, including:

- border closures, travel bans, entry limitations or inspections, and other restrictions on the international movement of goods, including actions to limit the export of goods in order to secure a domestic supply in light of actual or anticipated global shortages, as well as the potential exercise of governmental power to requisition or prioritize the production of specified goods or to commandeer facilities in the public interest, such as in the effort to combat the COVID-19 pandemic, any of which could adversely affect our ability to obtain supplies and delivery our products to customers;
- government actions, laws, rules, regulations and policies, such as “trade wars,” tariffs, sanctions or other changes in international trade requirements that affect our business and that of our customers and suppliers, any of which could impose additional costs on our operations and limit our ability to operate our business;
- challenges in hiring and integrating workers in different countries;
- challenges in managing a diverse workforce with different experience levels, languages, cultures, customs, business practices and worker expectations, along with differing employment practices and labor issues;
- challenges of maintaining appropriate business processes, procedures and internal controls and complying with legal, environmental, health and safety, anti-bribery, anti-corruption and other regulatory requirements that vary by jurisdiction, including new and evolving requirements for social distancing and other measures to minimize the spread of COVID-19;
- challenges in developing relationships with local customers, suppliers and governments;
- fluctuating pricing and availability of raw materials and supply chain interruptions or slowdowns, including as a result of difficulties, financial or otherwise, faced by segments of the transportation industry;
- public health crises, such as the COVID-19 pandemic;

- expense and complexity of complying with U.S. and foreign import and export regulations, including the ability to obtain required import and export licenses;
- fluctuations in interest rates and currency exchange rates, including the relative strength or weakness of the U.S. dollar against foreign currencies that are important to our business, including Japanese yen, euro, Taiwanese dollar, Korean won, Chinese yuan, Singapore dollar or Malaysian ringgit, which could cause our sales and profitability to decline;
- liability for foreign taxes assessed at rates higher than those applicable to our domestic operations;
- customer or government efforts to encourage operations and sourcing in a particular country, such as Korea and China, including efforts to develop and grow local competitors, requiring local manufacturing, and providing special incentives to government-backed local customers to buy from local competitors, even if their products are inferior to ours; and
- political and economic instability and uncertainty, which may result in severely diminished liquidity and credit availability, rating downgrades of sovereign debt, declining valuation of certain investments, declines in consumer confidence, declines in economic growth, and increased volatility in unemployment rates.

In the past, these factors have disrupted our operations and increased our costs, and we expect that these factors will continue to do so in the future.

Tariffs, export controls and other trade laws and restrictions resulting from international trade disputes, strained international relations, and changes to foreign and national security policy could have an adverse impact on our operations.

Tariffs, additional taxes, trade barriers and other measures, particularly those arising out of U.S.-China relations, may increase costs of raw materials and our manufacturing costs, decrease margins, reduce the competitiveness of our products, or inhibit our ability to sell products or purchase necessary equipment and supplies, any of which could have a material adverse effect on our business, results of operations, or financial condition. For example, both the U.S. and China have implemented several rounds of tariffs and retaliations, some of which have impacted certain raw materials we use. We have made operational changes in to mitigate the impact of these tariffs on our products, but our efforts may not be successful in the future.
In addition, we are subject to export control and economic sanctions laws and regulations that restrict the delivery of some of our products and services to certain end users, countries, and nationals of certain countries. In certain circumstances, these restrictions may prohibit the transfer of certain of our products, services and technologies, and in other circumstances they may require us to obtain a license from the U.S. government before delivering the controlled item or service. We must also comply with export control and economic sanctions laws and regulations imposed by other countries. Although we maintain an export and trade control compliance program, our compliance program may be ineffective or circumvented, exposing us to legal liabilities. Compliance with these laws could significantly limit our sales in the future. Changes in, and responses to, U.S. trade controls could reduce the competitiveness of our products and cause our sales to drop, which could have a material adverse effect on our business, financial condition and results of operations.

Over the last several years and accelerating this year, the U.S. government has significantly expanded export controls on certain technologies and commodities to certain markets, particularly with respect to semiconductor and other high technology exports to China. For example, effective June 29, 2020, the U.S. Department of Commerce imposed new export controls on the transfer of many U.S. products and technologies, including many commercial-grade electronics, to “military end users” in China, a term which may include many Chinese commercial companies that sell products to or do business with the military. Likewise, beginning in May 2019, the U.S. Department of Commerce has imposed significant restrictions on the transfer of any products from the United States, as well as many products produced overseas that incorporate U.S. content or rely on U.S. software or technology, to Huawei Technologies Co., Ltd., and a large number of its overseas affiliates, including HiSilicon. The U.S. government is also engaged in an ongoing process of assessing which “emerging and foundational technologies” warrant new or additional controls, which could subject additional U.S.-origin products and services to more stringent export restrictions. I is possible that these modified regulations, and any future regulations could reduce demand for our products. In particular, these restrictive measures may reduce overall global demand for our customers’ products or for other products produced or manufactured in the United States or based on United States technology, in turn reducing demand for our products, which could have a material adverse effect on our business, financial condition and results of operations.

Risks Related to Owning our Common Stock

The price of our common stock has been volatile in the past and may be volatile in the future.

The price of our common stock has been volatile in the past and may be volatile in the future. In 2019, the closing price of our stock on The Nasdaq Global Select Market, or Nasdaq, ranged from a low of $27.43 to a high of $51.21, and from January 1, 2020 to July 16, 2020, it ranged from a low of $39.03 to a high of $64.51. The price of our common stock may show greater volatility in the future, particularly in light of the significant increase in volatility in the stock market in general as a result of the impact of the COVID-19 pandemic and ensuing governmental actions. The trading price of our common stock is subject to significant volatility in response to numerous factors, many of which are beyond our control or may be unrelated to our operating results, and which may adversely affect the market price of our common stock, including the following:

- any decision we make to modify, qualify, withdraw or cease providing any guidance regarding our anticipated financial results for future periods, as well as potential decreased confidence in any guidance we do provide;
- the failure to meet the published expectations of securities analysts, which in the future may vary more significantly from our actual results;
- changes in financial estimates by securities analysts;
- press releases or announcements by, or changes in market values of, comparable companies;
- volatility in the markets for high-technology stocks, general stock market price and volume fluctuations, which are particularly common among securities of high-technology companies;
- stock market price and volume fluctuations attributable to inconsistent trading volume levels;
- the public perception of equity values of publicly traded companies;
- fluctuations in our results of operations; and
- the other risks and uncertainties described in this Quarterly Report on Form 10-Q, our Annual Report on Form 10-K or our other filings with the SEC.

Fluctuations in our results could cause our stock price to decline significantly. We believe that period-to-period comparisons of our results of operations may not be meaningful, and you should not rely upon them as indicators of our future performance. Future decreases in our stock price may adversely impact our ability to raise sufficient additional capital in the future, if needed.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds.

Issuer Purchases of Equity Securities

The Company did not purchase any of its equity securities during the quarter ended June 27, 2020.

On February 5, 2020, the Company’s Board of Directors authorized a repurchase program, effective February 16, 2020, covering up to an aggregate of $125 million of the Company’s common stock, during a period of twelve months, in open market transactions and in accordance with one or more pre-arranged stock trading plans to be established in accordance with Rule 10b5-1 under the Securities Exchange Act of 1934, as amended. This repurchase program replaced the previous repurchase program, which was originally approved in February 2018 and amended in November 2018 and which expired pursuant to its terms on February 15, 2020. In March 2020, the Company suspended its share repurchase program.

The Company issues common stock awards under its equity incentive plans. In the condensed consolidated financial statements, the Company treats shares of common stock withheld for tax purposes on behalf of its employees in connection with the vesting or exercise of the awards as common stock repurchases because they reduce the number of shares that would have been issued upon vesting or exercise. These withheld shares of common stock are not considered common stock repurchases under the Company’s authorized common stock repurchase plan.

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Item 6. Exhibits

EXHIBIT INDEX

A. The Company hereby incorporates by reference as exhibits to this Quarterly Report on Form 10-Q the following documents:

Reg. S-K Item 601(b) Reference	Document Incorporated	Referenced Document on file with the Commission
(4)	Indenture, dated as of April 30, 2020, by and among the Company, certain subsidiaries of the Company and Wells Fargo Bank, National Association, as trustee, including the form of note representing the 2028 Notes	Exhibit 4.1 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on April 30, 2020
(10)	Entegris, Inc. 2020 Stock Plan*	Annex 1 to the Entegris, Inc. Schedule 14A proxy statement for its 2020 Annual Meeting of Stockholders (No. 001-32598), as filed with the Securities and Exchange Commission on March 18, 2020

* A management contract or compensatory plan

B. The Company hereby files as exhibits to this Quarterly Report on Form 10-Q the following documents:

Reg. S-K Item 601(b) Reference	Exhibit No.	Document Filed Herewith
(10)	10.1	Amendment No. 3, dated as of May 20, 2020, among Entegris, Inc., as the borrower, the lenders party thereto and Morgan Stanley Senior Funding, Inc., as administrative agent.
(31)	31.1	Certification of Chief Executive Officer Pursuant to Exchange Act Rule 13a-14(a).
(31)	31.2	Certification of Chief Financial Officer Pursuant to Exchange Act Rule 13a-14(a).
(32)	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)	101.INS	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)	101.SCH	XBRL Taxonomy Extension Schema Document
(101)	101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
(101)	101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
(101)	101.LAB	XBRL Taxonomy Extension Label Linkbase Document
(101)	101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document

* A management contract or compensatory plan

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.

ENTEGRIS, INC.

Date: July 23, 2020

/s/ Gregory B. Graves

Gregory B. Graves
Executive Vice President and Chief Financial Officer (on behalf of the registrant and as principal financial officer)

AMENDMENT NO. 3 dated as of May 20, 2020 (this "**Amendment**"), among ENTEGRIS, INC., a Delaware corporation (the "**Borrower**"), the LENDERS party hereto and MORGAN STANLEY SENIOR FUNDING, INC., as Administrative Agent.

Reference is made to the Credit and Guaranty Agreement dated as of November 6, 2018, as heretofore amended (the "**Credit Agreement**"), among the Borrower, certain subsidiaries of the Borrower party thereto, the lenders party thereto and Morgan Stanley Senior Funding, Inc., as Administrative Agent and Collateral Agent. Capitalized terms used but not otherwise defined in this Amendment have the meanings specified in the Credit Agreement.

The Borrower has requested certain amendments to the Credit Agreement, and the Lenders party hereto, which collectively constitute the Majority in Interest of the Revolving Lenders, have agreed to such amendments on the terms and subject to the conditions set forth herein.

NOW, THEREFORE, in consideration of the premises and for other good and valuable consideration (the receipt and sufficiency of which is hereby acknowledged), the parties hereto hereby agree as follows:

SECTION 1. Amendments. Effective as of the Amendment No. 3 Effective Date the Credit Agreement (excluding the Schedules and Exhibits thereto, each of which shall remain as in effect immediately prior to the Amendment No. 3 Effective Date) is hereby amended by inserting the language indicated in single underlined text (indicated textually in the same manner as the following example: **single-underlined text**) in Annex I hereto and by deleting the language indicated by strikethrough text (indicated textually in the same manner as the following example: ~~stricken text~~) in Annex I hereto.

SECTION 2. Conditions to Effectiveness of this Amendment No. 3. This Amendment shall become effective on the first date (the "**Amendment No. 3 Effective Date**") on which the following conditions shall have been satisfied or waived:

(a) The Administrative Agent shall have executed a counterpart of this Amendment and shall have received from the Borrower and the Majority in Interest of the Revolving Lenders either (i) a counterpart of this Amendment signed on behalf of such party or (ii) evidence satisfactory to the Administrative Agent (which may include a facsimile or electronic image scan transmission) that such party has signed a counterpart of this Amendment.

(b) The Administrative Agent shall have received a closing certificate, dated the Amendment No. 3 Effective Date and signed by the chief financial officer of the Borrower, certifying as to the accuracy of the representations and warranties set forth in Section 3 hereof.

(c) The Borrower shall have paid to the Administrative Agent all expenses due and payable on or prior to the Amendment No. 3 Effective Date pursuant to the Credit Agreement to the extent invoiced at least one Business Days prior to the Amendment No. 3 Effective Date (or such later date as is reasonably agreed by the Borrower).

SECTION 3. Representations and Warranties. The Borrower represents and warrants that, on and as of the Amendment No. 3 Effective Date:

(a) (i) this Amendment and the transactions contemplated hereby have been duly authorized by all necessary corporate action on the part of the Borrower and (ii) this Amendment has been duly executed and delivered by the Borrower and is the legally valid and binding obligation of the Borrower, enforceable against the Borrower in accordance with its terms, except as enforceability may be limited by bankruptcy, insolvency, reorganization, moratorium or similar laws relating to or limiting creditors' rights generally or by equitable principles relating to enforceability;

(b) no Default or Event of Default has occurred and is continuing; and

(c) the representations and warranties of each Credit Party set forth in Section 4 of the Credit Agreement and the other Credit Documents are true and correct in all material respects (provided that any representation or warranty that is already qualified by "materiality", "Material Adverse Effect" or similar language shall be true and correct in all respects) on and as of the Amendment No. 3 Effective Date (immediately after giving effect to this Amendment), except to the extent that such representations and warranties specifically refer to an earlier date, in which case they shall be true and correct in all material respects (provided that any representation or warranty that is already qualified by "materiality", "Material Adverse Effect" or similar language shall be true and correct in all respects) as of such earlier date; provided that, for purposes of this clause, (a) the term "Historical Financial Statements", as used in Section 4.7 of the Credit Agreement, shall mean the consolidated financial statements of the Borrower most recently delivered pursuant to Section 5.1 of the Credit Agreement and (b) the term "Closing Date", as used in the Sections 4.7, 4.18 and 4.20 of the Credit Agreement, shall mean the Amendment No. 3 Effective Date.

SECTION 4. Effect of Amendment. (a) Except as expressly set forth herein, this Amendment shall not by implication or otherwise limit, impair, constitute a waiver of or otherwise affect the rights and remedies of any Agent, any Arranger, any Lender, any Issuing Bank or the Swing Line Lender under the Credit Agreement or any other Credit Document, and shall not alter, modify, amend or in any way affect any of the terms, conditions, obligations, covenants or agreements contained in the Credit Agreement or any other Credit Document, all of which, as amended, supplemented or otherwise modified hereby, are ratified and affirmed in all respects and shall continue in full force and effect. Nothing herein shall be deemed to entitle any Credit Party to a consent to, or a waiver, amendment, modification or other change of, any of the terms, conditions, obligations, covenants or agreements contained in the Credit Agreement or any other Credit Document in similar or different circumstances. This Amendment shall constitute a Credit Document for all purposes of the Credit Agreement and the other Credit Documents. On and after the Amendment No. 3 Effective Date, each reference in the Credit Agreement to “this Agreement”, “hereunder”, “hereof”, “herein”, or words of like import, and each reference in any other Credit Document to the “Credit Agreement”, shall be deemed to be a reference to the Credit Agreement as amended hereby.

(b) The Credit Agreement, as specifically amended by this Amendment, is and shall continue to be in full force and effect and is hereby in all respects ratified and confirmed. Without limiting the generality of the foregoing, the Collateral Documents executed prior to the Amendment No. 3 Effective Date and all of the Collateral described therein do and shall continue in full force and effect to secure where they purport to do so the payment of all Obligations of the Credit Parties under the Credit Documents, in each case as amended by this Amendment.

(c) The execution, delivery and effectiveness of this Amendment shall not, except as expressly provided herein, operate as a waiver of any right, power or remedy of any Lender, the Administrative Agent or the Collateral Agent under any of the Credit Documents, nor constitute a waiver of any provision of any of the Credit Documents.

SECTION 5. No Novation. The Borrower has requested, and the Lenders party hereto have agreed, that the Credit Agreement be, effective from the Amendment No. 3 Effective Date, amended as set forth herein. This Amendment shall not constitute a novation of any Indebtedness or other obligations owing to the Lenders or the Agents under the Credit Agreement.

SECTION 6. Headings. Section headings herein are included for convenience of reference only and shall not constitute a part hereof for any other purpose or be given any substantive effect.

SECTION 7. Applicable Law. THIS AMENDMENT AND THE RIGHTS AND OBLIGATIONS OF THE PARTIES HEREUNDER (INCLUDING ANY CLAIMS SOUNDING IN CONTRACT LAW OR TORT LAW ARISING OUT OF THE SUBJECT MATTER HEREOF AND ANY DETERMINATIONS WITH RESPECT TO POST-JUDGMENT INTEREST) SHALL BE GOVERNED BY, AND SHALL BE CONSTRUED AND ENFORCED IN ACCORDANCE WITH, THE LAWS OF THE STATE OF NEW YORK, WITHOUT REGARD TO CONFLICT OF LAWS PRINCIPLES THEREOF THAT WOULD RESULT IN THE APPLICATION OF ANY LAW OTHER THAN THE LAW OF THE STATE OF NEW YORK.

SECTION 8. Consent to Jurisdiction; Waiver of Jury Trial. The provisions of Sections 10.15 and 10.16 of the Credit Agreement are hereby incorporated by reference, mutatis mutandis, as if set forth in full herein.

SECTION 9. Counterparts. This Amendment may be executed in any number of counterparts, each of which when so executed and delivered shall be deemed an original, but all such counterparts together shall constitute but one and the same instrument. Delivery of an executed counterpart of a signature page of this Amendment by facsimile or in electronic format (i.e., “pdf” or “tif”) shall be effective as delivery of a manually executed counterpart of this Amendment. The words “execution,” “signed,” “signature” and words of like import in this Amendment shall be deemed to include electronic signatures or the keeping of records in electronic form, each of which shall be of the same legal effect, validity or enforceability as a manually executed signature or the use of a paper-based recordkeeping system, as the case may be, to the extent and as provided for in any applicable law, including the Federal Electronic Signatures in Global and National Commerce Act, the New York State Electronic Signatures and Records Act, or any other similar state laws based on the Uniform Electronic Transactions Act.

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IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be executed by their respective officers thereunto duly authorized, as of the date first above written.

ENTEGRIS, INC.

by

/s/ Gregory B. Graves

Name: Gregory B. Graves

Title: Executive Vice President, Chief Financial Officer and Treasurer

[Signature Page to Amendment No. 3]

MORGAN STANLEY SENIOR FUNDING, INC., individually, as Administrative Agent

by

/s/ Lisa Hanson

Name: Lisa Hanson

Title: Vice President

LENDERS’ SIGNATURES ON FILE WITH THE ADMINISTRATIVE AGENT

ANNEX I

CREDIT AND GUARANTY AGREEMENT

dated as of November 6, 2018, among

ENTEGRIS, INC.,

CERTAIN SUBSIDIARIES OF ENTEGRIS, INC.,
as Guarantors,

THE LENDERS PARTY HERETO
and
MORGAN STANLEY SENIOR FUNDING, INC.
as Administrative Agent and Collateral Agent

GOLDMAN SACHS BANK USA, BARCLAYS BANK PLC, CITIGROUP GLOBAL MARKETS INC., MORGAN STANLEY SENIOR FUNDING, INC., PNC CAPITAL MARKETS LLC and SUNTRUST ROBINSON HUMPHREY, INC.,
as Joint Lead Arrangers and Joint Bookrunners

~~$700,000,000 Senior Secured Credit Facilities~~

[CS&M Ref. No. ~~4020-862~~**8669-384**]

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CREDIT AND GUARANTY AGREEMENT dated as of November 6, 2018, among **ENTEGRIS, INC.**, a Delaware corporation (the "**Borrower**"), **CERTAIN SUBSIDIARIES OF THE BORROWER** party hereto, as Guarantors, the **LENDERS** party hereto and **MORGAN STANLEY SENIOR FUNDING, INC.** ("**Morgan Stanley**"), as Administrative Agent and Collateral Agent.

The Lenders have agreed, on the terms and conditions set forth herein, to extend credit facilities to the Borrower in an aggregate principal amount of $700,000,000 **as of the Closing Date**, consisting of Tranche B Term Loans in an aggregate principal amount of $400,000,000 **as of the Closing Date** and Revolving Commitments in an aggregate ~~initial~~ amount of $300,000,000 **as of the Closing Date**.

NOW, THEREFORE, in consideration of the premises and the agreements, provisions and covenants herein contained, the parties hereto agree as follows:

SECTION 1. DEFINITIONS AND INTERPRETATION

1.1. Definitions. As used in this Agreement (including the recitals hereto), the following terms have the meanings specified below:

"**Acquisition**" means the purchase or other acquisition (in one transaction or a series of transactions, including pursuant to any merger or consolidation) of all or substantially all the issued and outstanding Equity Interests in, or all or substantially all the assets of (or all or substantially all the assets constituting a business unit, division, product line or line of business of), any Person.

"**Acquisition Consideration**" means, with respect to any Acquisition, (a) the purchase consideration for such Acquisition, whether paid in Cash or other property (valued at the fair value thereof, as determined reasonably and in good faith by a Financial Officer of the Borrower), but excluding any component thereof consisting of Equity Interests in the Borrower (other than any Disqualified Equity Interests), and whether payable at or prior to the consummation of such Acquisition or deferred for payment at any future time, whether or not any such future payment is subject to the occurrence of any contingency, and including any earnouts and other agreements to make any payment the amount of which is, or the terms of payment of which are, in any respect subject to or contingent upon the revenues, income, cash flow or profits (or the like) of the Person or assets acquired, provided that any such future payment that is subject to a contingency shall be considered Acquisition Consideration only to the extent of the reserve, if any, required under GAAP to be established by the Borrower or any Restricted Subsidiary in respect thereof at the time of the consummation of such Acquisition, and (b) the aggregate amount of Indebtedness assumed by the Borrower or any Restricted Subsidiary in connection with such Acquisition.

"**Adjusted Eurodollar Rate**" means, for any Interest Period for a Eurodollar Rate Loan, the rate per annum obtained by dividing (a) (i) the rate per annum determined by the Administrative Agent to be the rate that appears on the page of the Reuters Screen that displays the London interbank offered rate as administered by ICE Benchmark Administration (or any other Person that takes over the administration of such rate) (such page currently being LIBOR01 page) for deposits (for delivery on the first day of such Interest Period) with a term equivalent to such Interest Period in Dollars, determined as of approximately 11:00 a.m. (London, England time) on the Interest Rate Determination Date for such Interest Period, or (ii) in the event the rate referred to in the preceding clause (i) does not appear on such page or if the Reuters Screen shall cease to be available, the rate per annum determined by the Administrative Agent in consultation with the Borrower to be the offered rate on such other page or other service that displays the London interbank offered rate as administered by ICE Benchmark Administration (or any other Person that takes over the administration of such rate) for deposits (for delivery on the first day of such Interest Period) with a term equivalent to such Interest Period in Dollars, determined as of approximately 11:00 a.m. (London, England time) on such Interest Rate Determination Date, by (b) an amount equal to one minus the Applicable Reserve Requirement; provided that, notwithstanding the foregoing, the Adjusted Eurodollar Rate shall at no time be less than zero.

"**Administrative Agent**" means Morgan Stanley, in its capacity as administrative agent for the Lenders hereunder and under the other Credit Documents, and its successors in such capacity as provided in Section 9.

"**Adverse Proceeding**" means any action, suit, proceeding, hearing or investigation, in each case whether administrative, judicial or otherwise, by or before any Governmental Authority or any arbitrator, that is pending or, to the knowledge of the Borrower or any Restricted Subsidiary, threatened against or affecting the Borrower or any Restricted Subsidiary or any property of the Borrower or any Restricted Subsidiary.

"Affected Financial Institution" means (a) any EEA Financial Institution or (b) any UK Financial Institution.

"**Affected Lender**" as defined in Section 2.17(b).

"**Affected Loans**" as defined in Section 2.17(b).

"**Affiliate**" means, with respect to any Person, any other Person directly or indirectly Controlling, Controlled by or under common Control with the Person specified.

"**Agent**" means each of (a) the Administrative Agent, (b) the Collateral Agent, (c) the Arrangers and (d) any other Person appointed under the Credit Documents to serve in an agent or similar capacity, including any Auction Manager.

"**Aggregate Amounts Due**" as defined in Section 2.16.

"**Aggregate Payments**" as defined in Section 7.2(b).

"**Agreement**" means this Credit and Guaranty Agreement dated as of November 6, 2018.

"**Amendment No. 2**" means that certain Amendment No. 2 dated as of October 31, 2019, to this Agreement.

lesser of (i) the amount of all Investments made using the Available Basket Amount in such Unrestricted Subsidiary (including any such Investment deemed made pursuant to the definition of the term "Unrestricted Subsidiary"), net of the aggregate amount, if any, by which the Available Basket Amount shall have been increased prior to such time in respect of such Investments pursuant to clause (c) above, and (B) the fair value of such Unrestricted Subsidiary (as determined reasonably and in good faith by an Authorized Officer of the Borrower) at the time it is designated as a Restricted Subsidiary or the time of such merger, consolidation, transfer, conveyance or liquidation, as applicable, plus

(e) the Declined Mandatory Prepayment Retained Amount as of such date, minus

(f) the aggregate amount of Permitted Stock Repurchases made after the Closing Date and on or prior to such date, minus

(g) the portion of the Available Basket Amount previously utilized pursuant to Section 6.4(m) or 6.6(r), with the utilization pursuant to Section 6.6(r) for any Acquisition being the Acquisition Consideration in respect thereof and the utilization pursuant to Section 6.6(r) for any other Investment (or any deemed Investment in respect of any designation of an Unrestricted Subsidiary) being the amount thereof as of the date the applicable Investment is made, determined in accordance with the definition of "Investment" (or the definition of "Unrestricted Subsidiary").

"**Available Excess Cash Flow Amount**" means, as of any date, an amount equal to the sum, for the Fiscal Years of the Borrower in respect of which financial statements and the related Compliance Certificate have been delivered in accordance with Sections 5.1(a) and 5.1(d), and for which prepayments required by Section 2.13(d) (if any) have been made, in each case on or prior to such date (commencing with the Fiscal Year ending December 31, 2019), of the products of (a) the amount of Consolidated Excess Cash Flow (to the extent such amount exceeds zero) for each such Fiscal Year multiplied by (b) the Retained ECF Percentage for such Fiscal Year (it being understood that the Retained ECF Percentage of Consolidated Excess Cash Flow for any such Fiscal Year shall be included in the Available Excess Cash Flow Amount regardless of whether a prepayment is required for such Fiscal Year under Section 2.13(d)).

"**Backstopped Letter of Credit**" as defined in Section 2.3(a).

"**Bail-In Action**" means the exercise of any Write-Down and Conversion Powers by the applicable ~~EEA~~ Resolution Authority in respect of any liability of an ~~EEA~~**Affected** Financial Institution.

"**Bail-In Legislation**" means~~,~~ **(a)** with respect to any EEA Member Country implementing Article 55 of Directive 2014/59/EU of the European Parliament and of the Council of the European Union, the implementing law**, regulation rule or requirement** for such EEA Member Country from time to time which is described in the EU Bail-In Legislation Schedule **and (b) with respect to the United Kingdom, Part I of the United Kingdom Banking Act 2009 (as amended from time to time) and any other law, regulation or rule applicable in the United Kingdom relating to the resolution of unsound or failing banks, investment firms or other financial institutions or their Affiliates (other than through liquidation, administration or other insolvency proceedings)**.

"**Bankruptcy Code**" means Title 11 of the United States Code entitled "Bankruptcy"

"**Base Rate**" means, for any day, the rate per annum equal to the greatest of (a) the Prime Rate in effect on such day, (b) the Federal Funds Effective Rate in effect on such day plus ½ of 1% per annum and (c) the Adjusted Eurodollar Rate that would be applicable to a Eurodollar Rate Loan with an Interest Period of one month commencing on such day plus ~~1~~**1.00**%; provided that, notwithstanding the foregoing, the Base Rate shall at no time be less than 1.00% per annum. Any change in the Base Rate due to a change in the Prime Rate, the Federal Funds Effective Rate or the Adjusted Eurodollar Rate shall be effective on the effective day of such change in the Prime Rate, the Federal Funds Effective Rate or the Adjusted Eurodollar Rate, as the case may be.

"**Base Rate Borrowing**" means a Borrowing comprised of Base Rate Loans.

"**Base Rate Loan**" means a Loan bearing interest at a rate determined by reference to the Base Rate.

"**Beneficial Ownership Certification**" means a certification regarding beneficial ownership as required by the Beneficial Ownership Regulation.

"**Beneficial Ownership Regulation**" means 31 C.F.R. § 1010.230.

"**Benefit Plan**" means (a) an "employee benefit plan" (as defined in ERISA) that is subject to Title I of ERISA, (b) a "plan" as defined in and subject to Section 4975 of the Internal Revenue Code or (c) any Person whose assets include (for purposes of ERISA Section 3(42) or otherwise for purposes of Title I of ERISA or Section 4975 of the Internal Revenue Code) the assets of any such "employee benefit plan" or "plan".

"**BHC Act Affiliate**" means, with respect to any Person, an "affiliate" (as such term is defined under, and interpreted in accordance with, 12 U.S.C. § 1841(k)) of such Person.

"**Board of Governors**" means the Board of Governors of the United States Federal Reserve System.

"**Borrower**" as defined in the preamble hereto.

"**Borrowing**" means Loans of the same Class and Type made, converted or continued on the same date and, in the case of Eurodollar Rate Loans, as to which a single Interest Period is in effect.

"**Business Day**" means any day other than a Saturday or Sunday, a day that is a legal holiday under the laws of the State of New York or a day on which banking institutions located in such State are authorized or required by law to remain closed; provided that, with respect to all notices, determinations, fundings and payments in connection with the Adjusted companies in the jurisdiction of such Foreign Subsidiary for cash management purposes; and (h) marketable corporate bonds for which an active trading market exists and price quotations are available, in each case maturing within two years after such date and issued by Persons that are not Affiliates of the Borrower and where such Persons (i) in the case of any such bonds maturing more than 12 months from the date of the acquisition thereof, have a long-term credit rating of at least AA- from S&P or Aa3 from Moody's or (ii) in the case of any such bonds maturing less than or equal to 12 months from the date of the acquisition thereof, have a long-term credit rating of at least A+ from S&P or A1 from Moody's, provided that the portfolio of any such bonds included as Cash Equivalents at any time shall have a weighted average maturity of not more than 360 days.

"**Cash Management Services**" means cash management and related services provided to the Borrower or any Restricted Subsidiary, including treasury, depository, return items, overdraft, controlled disbursement, cash sweeps, zero balance arrangements, merchant stored value cards, e-payables, electronic funds transfer, interstate depository network and automatic clearing house transfer (including the Automated Clearing House processing of electronic funds transfers through the direct Federal Reserve Fedline system) services and credit cards, credit card processing services, debit cards, stored value cards and commercial cards (including so-called "'purchase cards", "procurement cards" or "p-cards") arrangements.

"**Cash Management Services Provider**" means any Person that (a) is, or was on the Closing Date, an Agent, an Arranger or any Affiliate of any of the foregoing, whether or not such Person shall have been an Agent, an Arranger or any Affiliate of any of the foregoing at the time the applicable agreement in respect of Cash Management Services was entered into, (b) is a counterparty to an agreement in respect of Cash Management Services in effect on the Closing Date and is a Lender or an Affiliate of a Lender as of the Closing Date or (c) becomes a counterparty after the Closing Date to an agreement in respect of Cash Management Services at a time when such Person is a Lender or an Affiliate of a Lender.

"**Covered Entity**" means (a) a "covered entity" as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 252.82(b), (b) a "covered bank" as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 47.3(b) or (c) a "covered FSI" as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 382.2(b).

"**Covered Party**" has the meaning set forth in Section 10.26.

"**CFC**" means (a) each Person that is a "controlled foreign corporation" for purposes of the Internal Revenue Code and (b) each Subsidiary of any such controlled foreign person.

"**CFC Holding Company**" means each Domestic Subsidiary that is treated as a partnership or a disregarded entity for United States federal income tax purposes and that has no material assets other than assets that consist (directly or indirectly through disregarded entities or partnerships) of Equity Interests or indebtedness (as determined for United States tax purposes) in one or more CFCs or CFC Holding Companies.

"**Change in Law**" means the occurrence, after the date of this Agreement, of any of the following: (a) the adoption or taking effect of any rule, regulation, treaty or other law, (b) any change in any rule, regulation, treaty or other law or in the administration, interpretation, implementation or application thereof by any Governmental Authority or (c) the making or issuance of any request, rule, guideline or directive (whether or not having the force of law) by any Governmental Authority; provided that, notwithstanding anything herein to the contrary, (i) the Dodd-Frank Wall Street Reform and Consumer Protection Act and all requests, rules, guidelines or directives thereunder or issued in connection therewith and (ii) all requests, rules, guidelines or directives promulgated by the Bank for International Settlements, the Basel Committee on Banking Supervision (or any successor or similar authority) or the United States or foreign regulatory authorities, in each case pursuant to Basel III, shall in each case be deemed to be a "Change in Law", regardless of the date enacted, adopted, promulgated or issued.

"**Change of Control**" means (a) the acquisition of ownership, directly or indirectly, beneficially or of record, by any Person or group (within the meaning of the Exchange Act and the rules of the SEC thereunder) of Equity Interests in the Borrower representing more than 35% of the aggregate ordinary voting power represented by the issued and outstanding Equity Interests in the Borrower or (b) the occurrence of any "change of control" (or similar event, however denominated) under and as defined in any Permitted Senior Notes Indebtedness Document, any Permitted Credit Agreement Refinancing Indebtedness Document, any Permitted Incremental Equivalent Indebtedness Document or any credit agreement, indenture or other agreement or instrument evidencing or governing the rights of the holders of any other Material Indebtedness of the Borrower or any Restricted Subsidiary.

"**Claiming Guarantor**" as defined in Section 7.2(b).

"**Class**", when used in reference to (a) any Loan or Borrowing, refers to whether such Loan, or the Loans comprising such Borrowing, are Revolving Loans or Tranche B Term Loans or Loans of another "Class" established pursuant to Section 2.23, 2.24 or 2.25 as contemplated below, (b) any Commitment, refers to whether such Commitment is a Revolving Commitment or a Tranche B Term Loan Commitment or a Commitment of another "Class" established pursuant to Section 2.23, 2.24 or 2.25 as contemplated below and (c) any Lender, refers to whether such Lender has a Loan or Commitment of a particular Class. Additional Classes of Loans, Borrowings, Commitments and Lenders may be created pursuant to Section 2.23, 2.24 or 2.25 and, as provided in Section 2.23, 2.24 or 2.25, any Incremental Term Loans, any Extended/Modified Term Loans or any Refinancing Term Loans may be treated as a single Class with any other Class of Term Loans having the same terms as such Incremental Term Loans, Extended/Modified Term Loans or Refinancing Term Loans, as applicable.

"**Closing Date**" means the date on which the conditions specified in Section 3.1 ~~have been~~**were** satisfied (or waived in accordance with Section 10.5)**, which date is acknowledged to be November 6, 2018**.

"**Closing Date Certificate**" means a Closing Date Certificate substantially in the form of Exhibit B.

prior to such date in reliance on this clause (a), (B) the aggregate amount of Incremental Revolving Commitments that shall have been established prior to such date in reliance on this clause (a) and (C) the aggregate outstanding principal amount of any Permitted Incremental Equivalent Indebtedness that shall have been incurred prior to such date in reliance on this clause (a) (the amounts available on such date under this clause (a) being referred to as the "**Unrestricted Incremental Amount**"), plus

(b) an additional amount so long as, in the case of this clause (b), after giving Pro Forma Effect to the incurrence of Indebtedness with respect to which the Incremental Amount is being determined and the use of proceeds thereof (but without netting the Cash proceeds of such Indebtedness and any other Indebtedness incurred substantially concurrently therewith), and assuming, solely for purposes of this determination, that the entire amount of the Incremental Commitments with respect to which the Incremental Amount is being determined are fully funded as Loans, (i) in the case of the establishment of any Incremental Commitments or the incurrence of any Permitted Incremental Equivalent Indebtedness that is secured, the Secured Net Leverage Ratio, determined as of the last day of the Test Period most recently ended on or prior to such date, shall not exceed ~~2:75:1.00~~**2.75:1.00** or (ii) in the case of incurrence of any Permitted Incremental Equivalent Indebtedness that is Permitted Unsecured Indebtedness, either (A) the Total Net Leverage Ratio, determined as of the last day of the Test Period most recently ended on or prior to such date, shall not exceed 4.50:1.00 or (B) solely in the case of the incurrence of any such Permitted Incremental Equivalent Indebtedness the proceeds of which are used to finance an Acquisition, the Total Net Leverage Ratio, determined as of the last day of the Test Period most recently ended on or prior to such date, shall not exceed the Total Net Leverage Ratio, determined as of such date but without giving Pro Forma Effect to the incurrence of such Indebtedness and the use of proceeds thereof;

provided that (I) if, for purposes of determining capacity under clause (b) above, Pro Forma Effect is given to the entire committed amount of any Indebtedness with respect to which the Incremental Amount is being determined, such committed amount may thereafter be borrowed and reborrowed, in whole or in part, from time to time, without any further testing under this definition (provided that such committed amount shall, solely for purposes of calculating availability under clause (b) above, at all times thereafter be deemed to be fully funded as Indebtedness for borrowed money), (II) in the case of any Incremental Commitments or Permitted Incremental Equivalent Indebtedness established or incurred concurrently in reliance on the Unrestricted Incremental Amount and in reliance on clause (b) above, the amount of such Incremental Commitments or Permitted Incremental Equivalent Indebtedness established or incurred in reliance on the Unrestricted Incremental Amount shall be disregarded for purposes of calculating the Secured Net Leverage Ratio or the Total Net Leverage Ratio, as applicable, under clause (b) above, (III) in the case of any Incremental Commitments or Permitted Incremental Equivalent Indebtedness established or incurred in reliance on clause (b) above, any Revolving Loans incurred concurrently therewith or any other Indebtedness incurred concurrently therewith pursuant to and in accordance with any clause of Section 6.1 that does not require observance of the Secured Net Leverage Ratio or the Total Net Leverage Ratio shall be disregarded for purposes of calculating the Secured Net Leverage Ratio or the Total Net Leverage Ratio, as applicable, under clause (b) above, (IV) in the case of any Incremental Term Loan Commitment or Permitted Incremental Equivalent Indebtedness established or incurred in reliance on clause (b) above, to the extent the proceeds thereof are intended to be applied to unused Revolving Commitments, Tranche B Term Loan Exposure and Term Loan Exposure of each such other Class of all the Lenders at such time. For purposes of this definition, the amount of Revolving Exposure, unused Revolving Commitments, Tranche B Term Loan Exposure and Term Loan Exposure of any other Class shall be determined by excluding the Revolving Exposure, unused Revolving Commitments, Tranche B Term Loan Exposure and Term Loan Exposure of each such other Class of any Defaulting Lender.

“Resolution Authority” means an EEA Resolution Authority or, with respect to any UK Financial Institution, a UK Resolution Authority.

“**Restricted Junior Payment**” means (a) any dividend or other distribution, direct or indirect (whether in Cash, Securities or other property), with respect to any Equity Interests in the Borrower or any Restricted Subsidiary, (b) any payment or distribution, direct or indirect (whether in Cash, Securities or other property), including any sinking fund or similar deposit, on account of any redemption, retirement, purchase, acquisition, exchange, conversion, cancelation or termination of, or any other return of capital with respect to, any Equity Interests in the Borrower or any Restricted Subsidiary and (c) any payment or other distribution, direct or indirect (whether in Cash, Securities or other property) of or in respect of principal of or interest or premium on any Junior Indebtedness, or any payment or other distribution (whether in Cash, Securities or other property), including any sinking fund or similar deposit, on account of the redemption, retirement, purchase, acquisition, defeasance (including in-substance or legal defeasance), exchange, conversion, cancelation or termination of any Junior Indebtedness; provided that any Special Mandatory Redemption/Repayment shall be deemed not to be a Restricted Junior Payment.

“**Restricted Subsidiary**” means any Subsidiary that is not an Unrestricted Subsidiary.

“**Resulting Revolving Borrowings**” as defined in Section 2.23(e)(iv).

“**Retained ECF Percentage**” means, with respect to any Fiscal Year, (a) 100% minus (b) the Applicable ECF Percentage with respect to such Fiscal Year.

“**Returns**” means (a) with respect to any Investment in the form of a loan or advance, the repayment to the investor in Cash or Cash Equivalents of principal thereof and (b) with respect to any Acquisition or other Investment, any return of capital (including dividends, distributions and similar payments and profits on sale to a Person other than the Borrower or a Subsidiary) received by the investor in Cash or Cash Equivalents in respect of such Acquisition or other Investment.

“**Revolving Borrowing**” means a Borrowing comprised of Revolving Loans.

“**Revolving Commitment**” means, with respect to any Lender, the commitment, if any, of such Lender to make Revolving Loans and to acquire participations in Letters of Credit hereunder, expressed as an amount representing the maximum aggregate permitted amount of such Lender’s Revolving Exposure hereunder. As of the Amendment No. 2 Effective Date, the amount of each Lender’s Revolving Commitment, if any, is set forth on Schedule 2.1 (for the

“**Tranche B Term Borrowing**” means a Borrowing comprised of Tranche B Term Loans.

“**Tranche B Term Loan**” means a term loan made by a Lender to the Borrower pursuant to Section 2.1(a)(i).

“**Tranche B Term Loan Commitment**” means, with respect to any Lender, the commitment, if any, of such Lender to make a Tranche B Term Loan hereunder, expressed as an amount representing the maximum principal amount of the Tranche B Term Loan to be made by such Lender, subject to any increase or reduction pursuant to the terms and conditions hereof. The initial amount of each Lender’s Tranche B Term Loan Commitment, if any, is set forth on Schedule 2.1 or in the Assignment Agreement pursuant to which such Lender shall have assumed its Tranche B Term Loan Commitment. The aggregate amount of the Tranche B Term Loan Commitments as of the Closing Date is $400,000,000.

“**Tranche B Term Loan Exposure**” means, with respect to any Lender at any time, (a) prior to the making of Tranche B Term Loans hereunder, the Tranche B Term Loan Commitment of such Lender at such time and (b) after the making of Tranche B Term Loans hereunder, the aggregate principal amount of the Tranche B Term Loans of such Lender outstanding at such time.

“**Tranche B Term Loan Maturity Date**” means the date that is seven years after the Closing Date (or, if such date is not a Business Day, the immediately preceding Business Day).

“**Transactions**” means (a) the execution, delivery and performance by each Credit Party of the Credit Documents to which it is to be a party, the creation of the Liens provided for in the Collateral Documents and, in the case of the Borrower, the borrowing of Loans and the use of the proceeds thereof and (b) the payment of fees and expenses in connection with the foregoing.

“**Type**” when used in reference to any Loan or Borrowing, refers to whether the rate of interest on such Loan, or on the Loans comprising such Borrowing, is determined by reference to the Adjusted Eurodollar Rate or the Base Rate.

“**UCC**” means the Uniform Commercial Code (or any similar or equivalent legislation) as in effect from time to time in any applicable jurisdiction.

“**UCP**” means, with respect to any Letter of Credit, the Uniform Customs and Practice for Documentary Credits 2007 Revision, International Chamber of Commerce Publication No. 600 and any subsequent revision thereof adopted by the International Chamber of Commerce on the date such Letter of Credit is issued.

“UK Financial Institution” means any BRRD Undertaking (as such term is defined under the PRA Rulebook (as amended form time to time) promulgated by the United Kingdom Prudential Regulation Authority) or any Person falling within IFPRU 11.6 of the FCA Handbook (as amended from time to time) promulgated by the United

Kingdom Financial Conduct Authority, which includes certain credit institutions and investment firms, and certain Affiliates of such credit institutions or investment firms.

"UK Resolution Authority" means the Bank of England or any other public administrative authority having responsibility for the resolution of any UK Financial Institution.

"**Unrestricted Cash**" means, on any date, Cash and Cash Equivalents owned on such date by the Borrower or any Restricted Subsidiary, as reflected on a balance sheet prepared as of such date in conformity with GAAP, provided that (a) such Cash and Cash Equivalents do not appear (and would not be required to appear) as "restricted" on a consolidated balance sheet of such Person prepared in conformity with GAAP and (b) the use of such Cash and Cash Equivalents for application to the payment of Indebtedness is not prohibited in any material respect by applicable law or any material Contractual Obligation and such Cash and Cash Equivalents are not contractually restricted in any material respect from being distributed to the Borrower.

"**Unrestricted Subsidiary**" means (a) any Escrow Subsidiary, (b) any Subsidiary of the Borrower that is designated as an Unrestricted Subsidiary in the manner provided below and not subsequently redesignated as a "Restricted Subsidiary" in the manner provided below and (c) each Subsidiary of an Unrestricted Subsidiary.

The Borrower may designate any Subsidiary to be an "Unrestricted Subsidiary" by delivering to the Administrative Agent a certificate of a Financial Officer of the Borrower specifying such designation and certifying that such designated Subsidiary satisfies the requirements set forth in this definition (and including reasonably detailed calculations demonstrating satisfaction of the requirement in clause (b) below); provided that no Subsidiary may be designated as an Unrestricted Subsidiary unless (a) no Default or Event of Default has occurred and is continuing or would result therefrom, (b) immediately after giving Pro Forma Effect to such designation, the Total Net Leverage Ratio, determined as of the last day of the then most recently ended Test Period, shall not exceed 2.95:1.00, (c) such Subsidiary does not own any Equity Interests in any of the Restricted Subsidiaries, (d) such Subsidiary does not own (or hold or control by lease, exclusive license or otherwise) any asset (including any Intellectual Property) that is material to the operation in the ordinary course of business of (i) the Borrower and the Restricted Subsidiaries, taken as a whole, or (ii) the Borrower and the Restricted Subsidiaries that are Domestic Subsidiaries, taken as a whole, (e) each Subsidiary of such Subsidiary has been designated as (and, for so long as it is a Subsidiary of the Borrower, continues as) an "Unrestricted Subsidiary" in accordance with this definition, (f) the Investments in such Unrestricted Subsidiary by the Borrower and the Restricted Subsidiaries (including, after giving effect to the next sentence, those resulting from such designation) are permitted under Section 6.6, (g) such Subsidiary shall have been or will promptly be designated an "unrestricted subsidiary" (or otherwise not be subject to the covenants) under any Permitted Credit Agreement Refinancing Indebtedness and any Permitted Incremental Equivalent Indebtedness and (h) no Subsidiary may be designated as an Unrestricted Subsidiary if it was previously an Unrestricted Subsidiary that has been redesignated as a Restricted Subsidiary. Upon the designation of any Subsidiary as an Unrestricted Subsidiary, the Borrower and the Restricted Subsidiaries shall be deemed to have made an Investment in such Unrestricted Subsidiary in an amount equal at the time of such designation to the fair value of such Subsidiary (as determined reasonably and in good faith by a Financial Officer of the Borrower). The Borrower shall cause each Unrestricted Subsidiary to satisfy at all times the requirements set forth in clauses (c), (d) and (g) above.

The Borrower may designate any Unrestricted Subsidiary (other than any Escrow Subsidiary) as a "Restricted Subsidiary" by delivering to the Administrative Agent a certificate of a Financial Officer of the Borrower specifying such redesignation and certifying that such redesignation satisfies the requirements set forth in this paragraph; provided that (a) no Default or Event of Default has occurred and is continuing or would result therefrom, (b) the redesignation of an Unrestricted Subsidiary as a Restricted Subsidiary shall constitute the incurrence, at the time of such redesignation, of any Indebtedness, Liens and Investments of such Subsidiary existing at such time and (c) such Subsidiary shall have been or will promptly be designated a "restricted subsidiary" (or otherwise be subject to the covenants) under any Permitted Credit Agreement Refinancing Indebtedness and any Permitted Incremental Equivalent Indebtedness.

Notwithstanding anything in this Agreement or any other Credit Document to the contrary, nothing shall restrict or prohibit (a) the formation of an Escrow Subsidiary and (b) the holding by any Escrow Subsidiary of any Escrow Funds in any Escrow Account and the granting by any Escrow Subsidiary of, or the existence of, any Liens on any Escrow Account, the Escrow Funds or any documentation relating thereto, in each case, in favor of any Escrow Agent (or its designee).

"**Unrestricted Subsidiary Reconciliation Statement**" means, with respect to any balance sheet or statement of operations, comprehensive income, equity or cash flows of the Borrower, such financial statement (in substantially the same form) prepared on the basis of consolidating the accounts of the Borrower and the Restricted Subsidiaries and treating Unrestricted Subsidiaries as if they were not consolidated with the Borrower and otherwise eliminating all accounts of Unrestricted Subsidiaries, together with an explanation of reconciliation adjustments in reasonable detail.

"**US Person**" means any Person that is a "United States Person" as defined in Section 7701(a)(30) of the Internal Revenue Code.

"**US Special Resolution Regime**" has the meaning set forth in Section 10.26.

"**US Tax Compliance Certificate**" as defined in Section 2.19(g)(ii)(B)(3).

"**wholly owned**", when used in reference to a Subsidiary of any Person, means that all the Equity Interests in such Subsidiary (other than directors' qualifying shares and other nominal amounts of Equity Interests that are required to be held by other Persons under applicable law) are owned, beneficially and of record, by such Person, another wholly owned Subsidiary of such Person or any combination thereof.

"**Write-Down and Conversion Powers**" means, ~~,~~ (a) with respect to any EEA Resolution Authority, the write-down and conversion powers of such EEA Resolution Authority from time to time under the Bail-In Legislation for the applicable EEA Member Country, which write-down and conversion powers are described in the EU Bail-In Legislation Schedule**, and (b) with respect to the United Kingdom, any powers of the applicable Resolution Authority under the Bail-In Legislation to cancel, reduce, modify or change the form of a liability of any UK Financial Institution or any contract or instrument under which that liability arises, to convert all or part of that liability into shares, securities or obligations of such Person or any other Person, to provide that any such contract or instrument is to have effect as if a right had been exercised under it or to suspend any obligation in respect of that liability or any of the powers under that Bail-In Legislation that are related to or ancillary to any of those powers**.

1.2. Accounting Terms; Certain Calculations. (a) Except as otherwise expressly provided herein, all terms of an accounting or financial nature used herein shall be construed in conformity with GAAP as in effect from time to time; provided that (i) if the Borrower, by notice to the Administrative Agent, shall request an amendment to any provision hereof to eliminate the effect of any change occurring after the date hereof in GAAP or in the application thereof on the operation of such provision (or if the Administrative Agent or the Requisite Lenders, by notice to the Borrower, shall request an amendment to any provision hereof for such purpose) (in each case, other than as a result of the adoption of the *Accounting Standards Update, Leases (Topic 842)*), regardless of whether any such notice is given before or after such change in GAAP or in the application thereof, then such provision shall be interpreted on the basis of GAAP as in effect and applied immediately before such change shall have become effective until such notice shall have been withdrawn or such provision amended in accordance herewith, it being agreed that the Lenders and the Borrower shall negotiate in good faith such amendment, and (ii) notwithstanding any other provision contained herein, all terms of an accounting or financial nature used herein shall be construed, and all computations of amounts and ratios referred to herein shall be made, without giving effect to (A) any election under Financial Accounting Standards Board Accounting Standards Codification 825-10-25 (previously referred to as Statement of Financial Accounting Standards 159) (or any other Accounting Standards Codification or Financial Accounting Standard having a similar result or effect) (and related interpretations) to value any Indebtedness or other liabilities of the Borrower or any Restricted Subsidiary at “fair value”, as defined therein and (B) any treatment of Indebtedness in respect of convertible debt instruments under Accounting Standards Codification 470-20 (or any other Accounting Standards Codification or Financial Accounting Standard having a similar result or effect) to value any such Indebtedness in a reduced or bifurcated manner as described therein, and such Indebtedness shall at all times be valued at the full stated principal amount thereof. It is understood and agreed that when any term of an accounting or financial nature refers to a determination being made on a “consolidated basis”, when such reference is made with respect to the Borrower and the Restricted Subsidiaries (or any Restricted Subsidiary and its Restricted Subsidiaries), such determination shall exclude from such consolidation the accounts of the Unrestricted Subsidiaries.

(b) Notwithstanding anything to the contrary contained herein, for purposes of determining compliance with any test or covenant contained in this Agreement, the Secured Net Leverage Ratio, the Total Net Leverage Ratio and any other financial ratio shall be calculated giving Pro Forma Effect to each Pro Forma Event occurring during the applicable period of four consecutive Fiscal Quarters to which such calculation relates or after the end of such period of four consecutive Fiscal Quarters but not later than the date of such calculation (notwithstanding

Equity Interests, and declare and make other Restricted Junior Payments in respect of its Equity Interests, in each case ratably to the holders of such Equity Interests (or, if not ratably, on a basis more favorable to the Borrower and the Restricted Subsidiaries);

(c) the Borrower may pay dividends with respect to its common stock within 60 days after the declaration of such dividend; provided that at the date of such declaration, such payment would have complied with this Section 6.4 (it being understood that any dividends paid pursuant to this clause (c) shall be deemed for purposes of determining availability under the applicable clause under this Section 6.4, to have been paid under such clause);

(d) the Borrower may make payments in respect of, or repurchases of its Equity Interests deemed to occur upon the "cashless exercise" of, stock options, stock purchase rights, stock exchange rights or other equity-based awards if such payment or repurchase represents a portion of the exercise price of such options, rights or awards or withholding taxes, payroll taxes or other similar taxes due upon such exercise, purchase or exchange;

(e) the Borrower may make cash payments in lieu of the issuance of fractional shares representing Equity Interests in the Borrower in connection with the exercise of warrants, options or other Securities convertible into or exchangeable for common stock in the Borrower;

(f) the Borrower may make Restricted Junior Payments in respect of its Equity Interests pursuant to and in accordance with stock option plans or other benefit plans or agreements for directors, officers or employees of the Borrower and its Subsidiaries; provided that the amount of any such Restricted Junior Payments, together with the aggregate amount of all other Restricted Junior Payments made in reliance on this clause (~~e~~**f**) during the same Fiscal Year, shall not exceed the sum of (i) the greater of (x) $20,000,000 and (y) 1.0% of Consolidated Total Assets as of the last day of the then most recently ended Test Period, plus (ii) any unutilized portion of such amount in any preceding Fiscal Year ended after the Closing Date;

(g) so long as no Default or Event of Default shall have occurred and be continuing, the Borrower may repurchase common stock in the Borrower, provided that the aggregate amount of Restricted Junior Payments made in reliance on this clause (~~f~~**g**) shall not exceed the quotient obtained by dividing (i) the aggregate principal amount, without duplication, of all prepayments of the Tranche B Term Loans (other than any prepayments pursuant to Section 2.13 or in connection with any refinancing of any Tranche B Term Loans (including on account of incurrence of any Permitted Credit Agreement Refinancing Indebtedness)) by (ii) three (such repurchases, "**Permitted Stock Repurchases**");

(h) to the extent constituting Restricted Junior Payments of the type referred to in clause (a) or (b) of the definition of such term, the Borrower and the Restricted Subsidiaries may consummate the transactions permitted by Section 6.6 (other than in reliance on Section 6.6(q)) and Section 6.8 (other than in reliance on Section 6.8(b)(i)(D)) (it being understood that this clause (g) may be relied on to consummate any transaction that is technically subject to this Section 6.4 but is intended to be restricted primarily by any such other Section, but may not be relied on to consummate any transaction that is intended to be restricted primarily by this Section 6.4);

satisfied, the Borrower shall not permit the Secured Net Leverage Ratio to exceed ~~3.25:1.00~~**3.75:1.00**.

6.8. Fundamental Changes; Disposition of Assets; Equity Interests of Subsidiaries. (a) Neither the Borrower nor any Restricted Subsidiary will merge or consolidate with or into any other Person, or liquidate, wind up or dissolve (or suffer any liquidation or dissolution), and neither the Borrower nor any Restricted Subsidiary shall Dispose (whether in one transaction or in a series of transactions) of assets that represent all or substantially all of the assets of the Borrower and the Restricted Subsidiaries, on a consolidated basis, except that:

(i) any Person may merge into the Borrower in a transaction in which the Borrower is the surviving corporation;

(ii) any Person (other than the Borrower) may merge or consolidate with or into any Restricted Subsidiary in a transaction in which the surviving entity is a Restricted Subsidiary;

(iii) any Restricted Subsidiary may merge or consolidate with or into any Person (other than the Borrower) in a transaction permitted under Section 6.8(b) in which, after giving effect to such transaction, the surviving entity is not a Subsidiary, provided that such transaction shall not result in the Borrower and the Restricted Subsidiaries Disposing (whether in one transaction or in a series of transactions) of assets that represent all or substantially all of the assets of the Borrower and the Restricted Subsidiaries, on a consolidated basis; and

(iv) any Restricted Subsidiary may liquidate or dissolve or may (if the validity, perfection and priority of the Liens created by the Collateral Documents are not adversely affected thereby) change its legal form, in each case if the Borrower determines in good faith that such liquidation or dissolution is in the best interests of the Borrower and is not disadvantageous to the Lenders in any material respect (it being understood that in the case of any liquidation or dissolution of a Restricted Subsidiary that is a Guarantor Subsidiary, such Restricted Subsidiary shall at or before the time of such liquidation or dissolution transfer its assets to the Borrower or another Restricted Subsidiary that is a Guarantor Subsidiary and in the case of any change in legal form, a Restricted Subsidiary that is a Guarantor Subsidiary will remain a Guarantor Subsidiary unless such Restricted Subsidiary is otherwise permitted to cease being a Guarantor Subsidiary hereunder);

provided that, in the case of clauses (i), (ii) and (iii) above, any such merger or consolidation shall not be permitted unless it, and each Investment resulting therefrom, is also permitted under Section 6.6 (other than in reliance on Section 6.6(q)).

(b) Neither the Borrower nor any Restricted Subsidiary will Dispose of, or exclusively license, any asset, including any Equity Interest, owned by it, except:

(i) Dispositions of (A) inventory and goods held for sale in the ordinary course of business, (B) used, obsolete, worn out or surplus equipment in the ordinary course of business, (C) items of property no longer used or useful in the conduct of the business of varying, percentage of all rights and obligations of the assigning Lender hereunder; provided that a Lender may assign or transfer all or a portion of its Commitment or of the Loans owing to it of any Class without assigning or transferring any portion of its Commitment or of the Loans owing to it, as the case may be, of any other Class; and

(C) in connection with any assignment of rights and obligations of any Defaulting Lender hereunder, no such assignment shall be effective unless and until, in addition to the other conditions thereto set forth herein, the parties to the assignment shall make such additional payments to the Administrative Agent in an aggregate amount sufficient, upon distribution thereof as appropriate (which may be outright payment, purchases by the assignee of participations or subparticipations or other compensating actions, including funding, with the consent of the Borrower and the Administrative Agent, such Defaulting Lender's applicable Pro Rata Share of Revolving Loans previously requested but not funded by such Defaulting Lender, to each of which the applicable assignee and assignor hereby irrevocably consent), to (1) pay and satisfy in full all payment liabilities then owed by such Defaulting Lender to the Administrative Agent, each Issuing Bank and each Revolving Lender hereunder (and interest accrued thereon), and (2) acquire (and fund as appropriate) its applicable Pro Rata Share of all Revolving Loans and participations in Letters of Credit; provided that, notwithstanding the foregoing, in the event that any assignment of rights and obligations of any Defaulting Lender hereunder shall become effective under applicable law without compliance with the provisions of this clause (C), then the assignee of such interest shall be deemed to be a Defaulting Lender for all purposes of this Agreement until such compliance occurs.

(d) Mechanics. Assignments and transfers of Loans and Commitments by Lenders shall be effected by the execution and delivery to the Administrative Agent of an Assignment Agreement. In connection with all assignments, there shall be delivered to the Administrative Agent such forms, certificates or other evidence, if any, with respect to United States federal income tax withholding matters as the assignee thereunder may be required to deliver pursuant to Section 2.19(d), together with payment to the Administrative Agent by the assignor or the assignee of a registration and processing fee of $3,500 (except that no such registration and processing fee shall be payable (i) in the case of an assignee that is already a Lender or is an Affiliate or Related Fund of a Lender or a Person under common management with a Lender or (ii) **if** otherwise waived by the Administrative Agent in its sole discretion).

(e) Representations and Warranties of Assignee. Each Lender, upon execution and delivery hereof (or of any Incremental Facility Agreement or Refinancing Facility Agreement) or upon succeeding to an interest in the Commitments and Loans, as the case may be, represents and warrants as of the Closing Date (or, in the case of any Incremental Facility Agreement or Refinancing Facility Agreement, as of the date of the effectiveness thereof) or as of the applicable Assignment Effective Date, as applicable, that (i) it is an Eligible Assignee, (ii) it has experience and expertise in the making of or investing in commitments or loans such as the applicable Commitments or Loans, as the case may be, (iii) it will make or invest in, as the case may be, its Commitments or Loans for its own account in the ordinary course and without a view

DEALINGS. EACH PARTY HERETO FURTHER WARRANTS AND REPRESENTS THAT IT HAS REVIEWED THIS WAIVER WITH ITS LEGAL COUNSEL AND THAT IT KNOWINGLY AND VOLUNTARILY WAIVES ITS JURY TRIAL RIGHTS FOLLOWING CONSULTATION WITH LEGAL COUNSEL. THIS WAIVER IS IRREVOCABLE, MEANING THAT IT MAY NOT BE MODIFIED EITHER ORALLY OR IN WRITING (OTHER THAN BY A MUTUAL WRITTEN WAIVER SPECIFICALLY REFERRING TO THIS SECTION 10.16 **AND EXECUTED BY EACH OF THE PARTIES HERETO), AND THIS WAIVER SHALL APPLY TO ANY SUBSEQUENT AMENDMENTS, RENEWALS, SUPPLEMENTS OR MODIFICATIONS HERETO OR ANY OF THE OTHER CREDIT DOCUMENTS OR TO ANY OTHER DOCUMENTS OR AGREEMENTS RELATING TO THE LOANS MADE HEREUNDER. IN THE EVENT OF LITIGATION, THIS AGREEMENT MAY BE FILED AS A WRITTEN CONSENT TO A TRIAL BY THE COURT.**

10.17. Confidentiality. Each Agent and each Lender (which term shall for the purposes of this Section 10.17 include each Issuing Bank) shall hold all Confidential Information (as defined below) obtained by such Agent or such Lender in accordance with such Agent's and such Lender's customary procedures for handling confidential information of such nature, it being understood and agreed by the Borrower that, in any event, the Administrative Agent and the Collateral Agent may disclose Confidential Information to the Lenders and the other Agents and that each Agent and each Lender may disclose Confidential Information (a) to Affiliates of such Agent or Lender and to its and their respective Related Parties, independent auditors and other advisors, experts or agents who need to know such Confidential Information (and to other Persons authorized by a Lender or Agent to organize, present or disseminate such information in connection with disclosures otherwise made in accordance with this Section 10.17) (it being understood that the Persons to whom such disclosure is made will be advised of the confidential nature of such Confidential Information or shall otherwise be subject to an obligation of confidentiality), (b) to any potential or prospective assignee, transferee or participant in connection with the contemplated assignment, transfer or participation of any Loans or other Obligations or any participations therein or to any direct or indirect contractual counterparties (or the advisors thereto) to any swap or derivative transaction relating to the Borrower, its Affiliates or its or their obligations (provided that such assignees, transferees, participants, counterparties and advisors are advised of and agree to be bound by either the provisions of this Section 10.17 or other provisions at least as restrictive as this Section 10.17 or otherwise reasonably acceptable to the Administrative Agent, the Collateral Agent or the applicable Lender, as the case may be, and the Borrower, including pursuant to the confidentiality terms set forth in the Confidential Information Memorandum or other marketing materials relating to the credit facilities governed by this Agreement), (c) to any rating agency, provided that, prior to any disclosure, such rating agency shall undertake in writing to preserve the confidentiality of any Confidential Information relating to the Credit Parties received by it from such Agent or such Lender, as the case may be, (d) customary information regarding the credit facilities governed by this Agreement to the CUSIP Service Bureau or any similar agency in connection with the issuance and monitoring of CUSIP numbers with respect to the Loans and to market data collectors, including league table providers, similar service providers to the lending industry and service providers to the Administrative Agent and the Lenders in connection with the syndication or administration of this Agreement, the other ~~Loan~~**Credit** Documents, the Loans and the Commitments, (e) for other action by such Secured Party, any amendments, supplements or other modifications of any Permitted Intercreditor Agreement that the Borrower may from time to time request and that are reasonably acceptable to the Administrative Agent (i) to give effect to any establishment, incurrence, amendment, extension, renewal, refinancing or replacement of any Obligations, any Permitted Credit Agreement Refinancing Indebtedness or any Permitted Incremental Equivalent Indebtedness, (ii) to confirm for any party that such Permitted Intercreditor Agreement is effective and binding upon the Administrative Agent and the Collateral Agent on behalf of the Secured Parties or (iii) to effect any other amendment, supplement or modification so long as the resulting agreement would constitute a Permitted Intercreditor Agreement if executed at such time as a new agreement.

(d) Each of the Lenders and the other Secured Parties hereby irrevocably further authorizes and directs the Administrative Agent and the Collateral Agent to execute and deliver, in each case on behalf of such Secured Party and without any further consent, authorization or other action by such Secured Party, any amendments, supplements or other modifications of any Collateral Document to add or remove any legend that may be required pursuant to any Permitted Intercreditor Agreement.

(e) Each of the Administrative Agent and the Collateral Agent shall have the benefit of the provisions of Sections 9, 10.2 and 10.3 with respect to all actions taken by it pursuant to this Section 10.24 or in accordance with the terms of any Permitted Intercreditor Agreement to the full extent thereof.

(f) The provisions of this Section 10.24 are intended as an inducement to the secured parties under any Permitted Credit Agreement Refinancing Indebtedness or Permitted Incremental Equivalent Indebtedness to extend credit to the Borrower thereunder and such secured parties are intended third party beneficiaries of such provisions.

10.25. Acknowledgement and Consent to Bail-In of ~~EEA~~Affected Financial Institutions. Notwithstanding anything to the contrary in any Credit Document or in any other agreement, arrangement or understanding among ~~the~~**any such** parties~~ hereto~~, each party hereto acknowledges that any liability of any ~~EEA~~**Affected** Financial Institution arising under any Credit Document, to the extent such liability is unsecured, may be subject to the Write-Down and Conversion Powers of ~~an EEA~~**the applicable** Resolution Authority and agrees and consents to, and acknowledges and agrees to be bound by:

(a) the application of any Write-Down and Conversion Powers by ~~an EEA~~**the applicable** Resolution Authority to any such liabilities arising hereunder which may be payable to it by any party hereto that is an ~~EEA~~**Affected** Financial Institution; and

(b) the effects of any Bail-In Action on any such liability, including, if applicable:

(i) a reduction in full or in part or cancellation of any such liability;

(ii) a conversion of all, or a portion of, such liability into shares or other instruments of ownership in such ~~EEA~~ **Affected** Financial Institution, its parent undertaking**,** or a bridge institution that may be issued to it or otherwise conferred on it, and that such shares or other instruments of ownership will be accepted by it in lieu of any rights with respect to any such liability under this Agreement or any other Credit Document; or

(iii) the variation of the terms of such liability in connection with the exercise of the Write-Down and Conversion Powers of ~~any EEA~~**the applicable** Resolution Authority.

10.26. Acknowledgment Regarding any Supported QFCs. (a) To the extent that the Credit Documents provide support, through a guarantee or otherwise, for Hedge Agreements or any other agreement or instrument that is a QFC (such support, "**QFC Credit Support**" and each such QFC, a "**Supported QFC**"), the parties hereto acknowledge and agree as follows with respect to the resolution power of the Federal Deposit Insurance Corporation under the Federal Deposit Insurance Act and Title II of the Dodd-Frank Wall Street Reform and Consumer Protection Act (together with the regulations promulgated thereunder, the "**US Special Resolution Regimes**") in respect of such Supported QFC and QFC Credit Support (with the provisions below applicable notwithstanding that the Credit Documents and any Supported QFC may in fact be stated to be governed by the laws of the State of New York and/or of the United States or any other state of the United States).

(b) In the event a Covered Entity that is party to a Supported QFC (each, a "**Covered Party**") becomes subject to a proceeding under a US Special Resolution Regime, the transfer of such Supported QFC and the benefit of such QFC Credit Support (and any interest and obligation in or under such Supported QFC and such QFC Credit Support, and any rights in property securing such Supported QFC or such QFC Credit Support) from such Covered Party will be effective to the same extent as the transfer would be effective under the US Special Resolution Regime if the Supported QFC and such QFC Credit Support (and any such interest, obligation and rights in property) were governed by the laws of the United States or a state of the United States. In the event a Covered Party or a BHC Act Affiliate of a Covered Party becomes subject to a proceeding under a US Special Resolution Regime, Default Rights under the Credit Documents that might otherwise apply to such Supported QFC or any QFC Credit Support that may be exercised against such Covered Party are permitted to be exercised to no greater extent than such Default Rights could be exercised under the US Special Resolution Regime if the Supported QFC and the Credit Documents were governed by the laws of the United States or a state of the United States. Without limitation of the foregoing, it is understood and agreed that rights and remedies of the parties with respect to a Defaulting Lender shall in no event affect the rights of any Covered Party with respect to a Supported QFC or any QFC Credit Support.

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Exhibit 31.1

CERTIFICATIONS

I, Bertrand Loy, certify that:

1. I have reviewed this Report on Form 10-Q of Entegris, 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: July 23, 2020

/s/ Bertrand Loy

Bertrand Loy
Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATIONS

I, Gregory B. Graves, certify that:

1. I have reviewed this Report on Form 10-Q of Entegris, 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: July 23, 2020

/s/ Gregory B. Graves

Gregory B. Graves
Chief Financial Officer
(Principal Financial Officer)

EXHIBIT 32.1

CERTIFICATION 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 (the “Report”) of Entegris, Inc, a Delaware corporation (the “Company”), for the period ended June 27, 2020 as filed with the Securities and Exchange Commission on the date hereof, Bertrand Loy, President and Chief Executive Officer of the Company, and Gregory B. Graves, Chief Financial Officer of the Company, each hereby certify pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 that:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; 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: July 23, 2020

/s/ Bertrand Loy

Bertrand Loy
Chief Executive Officer

/s/ Gregory B. Graves

Gregory B. Graves
Chief Financial Officer