



2023 Annual Report

April 24, 2024



**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549**

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31, 2023

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
(State or Other Jurisdiction of
Incorporation or Organization)

41-1941551
(I.R.S. Employer
Identification No.)

129 Concord Road, Billerica, Massachusetts 01821
(Address of principal executive offices and zip code)

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

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

Title of Each Class	Trading Symbol(s)	Name of Exchange on which Registered
Common Stock, \$0.01 Par Value	ENTG	The Nasdaq Global Select Market

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. ☒ Yes ☐ No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. ☐ Yes ☒ No

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

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

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

If an emerging growth company, indicate by check mark if 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 has filed a report on and attestation to its management’s assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant’s executive officers during the relevant recovery period pursuant to § 240.10D-1(b). ☐

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

The aggregate market value of voting and non-voting stock held by non-affiliates of the registrant, based on the last sale price of the Common Stock on July 3, 2023, the last business day of registrant’s most recently completed second fiscal quarter, was \$14.7 billion. Shares held by each officer and director of the registrant and by each person who owned 10 percent or more of the outstanding Common Stock have been excluded from this computation in that such persons may be deemed to be affiliates of the registrant. The determination of affiliate status for this purpose is not necessarily a conclusive determination for other purposes.

As of February 12, 2024, 150,396,207 shares of the registrant’s Common Stock were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant’s Definitive Proxy Statement for its 2024 Annual Meeting of Stockholders scheduled to be held on April 24, 2024 (the “2024 Proxy Statement”) which is scheduled to be filed with the Securities and Exchange Commission (the “SEC”) not later than 120 days after December 31, 2023, are incorporated by reference into Part III of this Annual Report on Form 10-K. With the exception of the portions of the 2024 Proxy Statement expressly incorporated into this Annual Report on Form 10-K by reference, such document shall not be deemed to constitute part of this Annual Report on Form 10-K.

Auditor Name	Auditor Location	Auditor Firm ID
KPMG LLP	Minneapolis, Minnesota	185

ENTEGRIS, INC.

INDEX TO ANNUAL REPORT ON FORM 10-K

FOR THE FISCAL YEAR ENDED DECEMBER 31, 2023

	Caption	Page
PART I		
Item 1.	Business	1
Item 1A.	Risk Factors	16
Item 1B.	Unresolved Staff Comments	29
Item 1C.	Cybersecurity	29
Item 2.	Properties	31
Item 3.	Legal Proceedings	31
Item 4.	Mine Safety Disclosures	31
PART II		
Item 5.	Market for Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities	32
Item 6.	Reserved	33
Item 7.	Management’s Discussion and Analysis of Financial Condition and Results of Operations	34
Item 7A.	Quantitative and Qualitative Disclosures About Market Risk	50
Item 8.	Financial Statements and Supplementary Data	50
Item 9.	Changes in and Disagreements with Accountants on Accounting and Financial Disclosure	50
Item 9A.	Controls and Procedures	50
Item 9B.	Other Information	52
Item 9C.	Disclosure Regarding Foreign Jurisdictions that Prevent Inspections	53
PART III		
Item 10.	Directors, Executive Officers and Corporate Governance	53
Item 11.	Executive Compensation	55
Item 12.	Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters	55
Item 13.	Certain Relationships and Related Transactions, and Director Independence	55
Item 14.	Principal Accountant Fees and Services	55
PART IV		
Item 15.	Exhibit and Financial Statement Schedules	56
Item 16.	Form 10-K Summary	60
	Signatures	61
	Index to Financial Statements	F-1

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PART I

Item 1. Business.

OUR COMPANY

Entegris, Inc. (“Entegris”, “the Company”, “us”, “we”, or “our”) is a leading supplier of mission-critical advanced materials and process solutions for the semiconductor and other high-technology industries. We leverage our unique breadth of capabilities to help our customers improve their productivity, performance and technology in the most advanced manufacturing environments.

Semiconductors, or integrated circuits, are key components in electronic devices that have changed, and that we believe will continue to change, the way we live, communicate and work. Products and emerging applications such as smartphones, wearable technology, self-driving vehicles, artificial intelligence, the Internet of Things, gaming and virtual reality, high-performance and cloud computing, and smart healthcare will require faster, more powerful, more compact and more energy efficient semiconductors. We believe these trends, combined with existing applications, will drive long-term secular growth for semiconductors. We believe that semiconductor sales will double and reach \$1 trillion by 2030, which we expect will create significant opportunities for our products.

Advanced products and applications require improved chip performance, higher chip density, and greater energy efficiency. To meet these requirements, semiconductor manufacturing processes have rapidly become increasingly complex, for example, by moving to smaller geometries and adopting new device architectures. These complex processes are enabled by new and innovative materials and the increasing need to ensure materials purity throughout these process steps. We believe Entegris offers the industry’s most comprehensive electronic materials portfolio, especially in the areas of materials science, materials purity, and complementary solutions that enable faster time to yield. We believe these capabilities are quickly becoming critical enablers of our customers’ technology roadmaps. We expect these trends to translate into a higher served addressable market for our products and expanding Entegris’ content per semiconductor wafer, which we believe will allow us to achieve growth that outperforms our markets.

In the third quarter of 2023, the Company realigned its segments into three reportable segments discussed below, which align with the key elements of the advanced semiconductor manufacturing ecosystem. The current annual and succeeding annual periods will disclose the reportable segments with prior periods recast to reflect the change.

- The Materials Solutions segment, or MS, provides materials-based solutions, such as chemical mechanical planarization (“CMP”) slurries and pads, deposition materials, process chemistries and gases, formulated cleans, etchants and other specialty materials that enable our customers to achieve better device performance and faster time to yield, while providing for lower total cost of ownership.
- The Microcontamination Control segment, or MC, offers advanced solutions that improve customers’ yield, device reliability and cost by filtering and purifying critical liquid chemistries and gases used in semiconductor manufacturing processes and other high-technology industries.
- The Advanced Materials Handling segment, or AMH, develops solutions that improve customers’ yields by protecting critical materials during manufacturing, transportation, and storage, including products that monitor, protect, transport and deliver critical liquid chemistries, wafers, and other substrates for a broad set of applications in the semiconductor, life sciences and other high-technology industries.

These segments share common business systems and processes, technology centers and technology roadmaps. With the complementary capabilities across these segments, we believe we are uniquely positioned to create new, co-optimized and increasingly integrated solutions for our customers, which should translate into improved device performance, lower cost of ownership and faster time to market. This capability has been further enhanced with the acquisition of CMC Materials. For example, we can now develop and provide complementary offerings solving customers’ complex manufacturing challenges across the deposition, CMP process and post-CMP modules with co-optimized products from each of our divisions, such as advanced deposition materials, CMP slurries, pads and post-CMP cleaning chemistries from our MS segment, CMP slurry filters from our MC segment, and CMP slurry high-purity packaging and fluid monitoring systems from our AMH segment.

ACQUISITIONS AND DIVESTITURES

On July 6, 2022 (the “Closing Date”), we completed the acquisition of CMC Materials, Inc. (now known as CMC Materials LLC) (“CMC Materials”). We acquired all of the issued and outstanding common shares of CMC Materials for \$133.00 in cash and 0.4506 shares of our common stock per share, representing a total purchase price (inclusive of debt retired and cash assumed) of \$6.0 billion (based on our closing price on June 30, 2022), including \$3.8 billion in cash paid to CMC Materials’ shareholders, the issuance of 12.9 million shares of our common stock (excluding unvested CMC stock options and unvested CMC Materials restricted stock units, restricted shares and performance share units equity awards assumed), \$0.9 billion of debt

retired and approximately \$0.3 billion of acquired cash. We financed the cash portion of the purchase price through debt financing.

On February 10, 2023, the Company terminated a definitive agreement to sell its Pipeline and Industrial Materials (“PIM”) business, which became part of the Company with the acquisition of CMC Materials, to Infineum USA L.P. At the time of the termination, the transaction had not received clearance under the Hart-Scott-Rodino Antitrust Improvements Act of 1976.

On March 1, 2023, the Company completed the sale of QED Technologies International, Inc. (“QED”), which became part of the Company with the acquisition of CMC Materials, to an affiliate of Quad-C Management, Inc. for \$134.3 million.

On June 5, 2023, the Company terminated an Alliance Agreement (the “Alliance Agreement”) between the Company and MacDermid Enthone Inc., a global business unit of Element Solutions Inc (“MacDermid Enthone”). In connection with the termination of the Alliance Agreement, Entegris received net proceeds of approximately \$191.2 million.

On October 2, 2023, the Company completed the sale of its Electronic Chemicals (“EC”) business to FUJIFILM Holdings America Corporation (“Fujifilm”) for cash proceeds of \$737.1 million, or net proceeds of \$675.2 million, subject to customary final post-closing adjustments. The EC business, which was a separate reporting unit within the MS reportable segment, was acquired by Entegris with the acquisition of CMC Materials in July 2022.

THE SEMICONDUCTOR ECOSYSTEM

The manufacture of semiconductors requires hundreds of highly complex and sensitive manufacturing steps, during which a variety of materials are repeatedly applied to a silicon wafer to build integrated circuits on the wafer surface. The areas of the semiconductor ecosystem that rely most heavily on our products and solutions are described below.

Photolithography. Photolithography, a process repeated during semiconductor fabrication, is used to print complex circuit patterns onto the wafer. During this process, the wafer is coated with a thin film of light-sensitive material, called photoresist. Light is projected to expose the photoresist, which is then developed to create a pattern. Our product offerings that are used throughout the photolithography process include:

- Liquid filtration, high-purity packaging and high-precision dispense systems designed to ensure the pure, accurate and uniform distribution of contamination-free photoresists onto the wafer, enabling manufacturers to achieve optimum yields in the manufacturing process; and
- Gas microcontamination control solutions designed to eliminate airborne contaminants that often disrupt effective photolithography processes.

Etch and Resist Strip. During the etch process, specific areas of thin film that have been deposited on the surface of a wafer are removed to leave a desired circuit pattern. After the etch process, the hardened resist must be completely removed and the etched area must be cleaned, which requires the use of high purity chemicals. Several of our products are utilized during and after the etch process, including:

- Selective etch chemistries to enable high aspect ratio structures, such as 3D-NAND;
- Formulated cleaning solutions to remove photoresists and post-etch residues;
- Filters and purifiers, which help to ensure the purity of formulated cleaning chemistries and to achieve desired yields in the etch processing steps; and
- Precision-engineered coatings to provide barriers to corrosive chemistries in the etch environment, protect surfaces of equipment components from erosion and minimize particle generation.

Deposition. Deposition is a process during which certain materials are transferred to the surface of a wafer. Deposition processes include physical vapor deposition, or PVD, chemical vapor deposition, or CVD, atomic-layer deposition, or ALD, and electro-plating. We provide products that are used during these deposition processes and that are critical to enabling new device architectures. These products, which are designed to ensure device performance and achieve the targeted manufacturing yields of semiconductor manufacturers, include:

- Advanced precursor materials, which are utilized to meet the semiconductor industry’s composition, uniformity and thickness requirements of deposited films; and

- Filtration and purification products, which are used to remove contaminants during the deposition process, consequently reducing defects on wafers.

Ion Implant. Ion implantation is a method repeated many times during semiconductor fabrication where dopants are introduced into a semiconductor wafer enhancing conductivity. Our products used during the ion implant process include:

- Safe Delivery Source® (“SDS®”) and Vacuum Actuated Cylinders (“VAC®”) gas delivery systems designed to ensure the safe, effective and efficient delivery of the necessary specialty gases; and
- Electrostatic chucks and proprietary low temperature plasma coating processes for core components, which are critical elements of ion implantation equipment.

Chemical Mechanical Planarization. CMP is a polishing process used by semiconductor manufacturers to planarize, or flatten, many of the layers of material that have been deposited on silicon wafers. With the acquisition of CMC Materials, we expanded our offerings used during and immediately following the CMP process. Our offerings include:

- CMP slurries, used for polishing a wide range of materials used in semiconductors, including tungsten, dielectric materials, copper, tantalum (commonly referred to as “barrier”), aluminum, silicon carbide (“SiC”) and gallium nitride (“GaN”);
- CMP polishing pads, which are used in conjunction with slurries in the CMP process on a variety of polishing tools and wafers over a range of technology nodes and applications, including tungsten, copper, and dielectrics;
- Formulated cleaning chemistries, which remove residues from wafer surfaces after the CMP process;
- Filtration and purification solutions, which are used to remove select particles and contaminants from slurries and cleaning chemistries that can cause defects on a wafer’s surface;
- Roller brushes, which are used in conjunction with our formulated cleaning chemistries to clean the wafer after completion of the CMP process in order to prepare the wafer for subsequent steps in the manufacturing process; and
- Process monitoring and control equipment, which maintain the integrity of the CMP slurries.

Wafer and Reticle Transport. Our wafer carriers are high-purity “micro-environments” that carry wafers between manufacturing process steps. These critical products protect wafers from damage or abrasion and minimize contamination during transportation and automated processing. Protection of processed wafers is essential to our customers because wafer processing involves hundreds of steps and can take several weeks, making the scrapping of damaged wafers costly. Our extreme ultraviolet (“EUV”) reticle pod is designed to provide defect-free protection of EUV reticles during shipping, storage, handling, and vacuum-transferring operations.

Chemical Handling. Semiconductor manufacturing and other high-technology manufacturing processes utilize large volumes of high-purity and hazardous chemicals. We provide solutions for the handling of such chemicals, including:

- Ultra-high purity chemical container products, such as drums, flexible packaging and associated coded connection systems, which are designed to maintain chemical purity, maximize utilization and ensure safe transport, containment and dispense of valuable, ultra-clean process fluids, from bulk chemical manufacturing to point-of-use in the manufacturing process; and
- Ultra-pure valves, fittings, tubings and sensing and control products, which are used to distribute these chemicals around the fab and in wet process tools.

Wafer and Package Testing. In our Advanced Cleaning Materials business, which was added as part of the CMC Materials acquisition, we develop and manufacture high-performance consumable products for cleaning advanced probe cards and test sockets at semiconductor manufacturing facilities. We also design innovative polymer products for semiconductor fabs that improve front-end tool uptime and reduce operating costs.

INDUSTRY TRENDS

Emerging and Existing Applications. The market for semiconductors has grown significantly over the past few decades, and we expect this long-term trend to continue. We believe that smartphones, wearable technology, self-driving vehicles, artificial intelligence, the Internet of Things, gaming and virtual reality, high performance and cloud computing, and smart healthcare will drive growth in the demand for semiconductors, drive wafer starts and create significant opportunities for our products. Existing applications in data processing, wireless communications, broadband infrastructure, personal computers, handheld

electronic devices and other consumer electronics are also expected to drive demand for semiconductors, and in turn, demand for our products.

Manufacturing Complexity and Architecture. Emerging applications require more powerful, faster and more energy-efficient semiconductors. In response, semiconductor architectures are changing, with transistor design increasing in complexity, the use of multilayered patterning (for example, extreme ultraviolet lithography), structures such as FinFET, 3D NAND and gate-all-around, and shrinking dimensions. These advanced architectures require more process steps, new and innovative materials and more sophisticated contamination control solutions. For example, leading-edge semiconductor manufacturers are moving towards atomic layer scale, where the precision of the manufacturing process and purity of the materials used is vital to maintain device integrity. These materials need to be supplied and delivered at increasing levels of purity and control, from point-of-production to point-of-dispense on the wafer to improve and maximize yields. We believe that demand for our materials and consumable products will benefit from the increase in process steps in lithography, deposition, CMP and etch and clean required to manufacture leading-edge semiconductors.

New and Advanced Materials. New and advanced materials have played a significant role in enabling improved device performance, and we expect this trend to continue. As dimensions get smaller, more novel materials will be required to enable transistor connectivity. We believe our portfolio of critical materials addresses the challenges our customers face as they introduce more complex architectures and search for new materials to improve the performance of their devices. These critical materials include advanced deposition materials, implant gases, CMP slurries, formulated cleaning chemistries, selective etch chemistries and high-purity wet chemicals.

Materials Purity. As feature size decreases and 3D structures proliferate, contamination control has become a critical enabler for our semiconductor customers in achieving acceptable device yields. Our advanced filtration and purification products and solutions for air, bulk or specialty gas, and wet chemicals are designed to reduce defects and enable higher yields for our customers. Our materials handling solutions protect critical materials throughout the fabrication process, allowing our customers to store, process and transport critical materials in ultra-pure environments throughout the manufacturing process. We believe that the trend for greater materials purity will provide opportunities to utilize our capabilities to provide innovative materials management, filtration, purification, transport and process solutions to semiconductor customers.

Geopolitical Implications of the Semiconductor Industry. We have seen, and expect to continue to see, governments have an interest in fostering the development of a domestic or local semiconductor ecosystem. Examples include the United States (“U.S.”) and European Union (“EU”) CHIPS Acts and similar initiatives in Japan and Korea. We have been proactive in light of these trends by developing a manufacturing strategy to better serve our customers as they build new fabs in various countries and seek local reliable supply chain partners. Recent examples of this strategy include our new facilities located in Kaohsiung Science Park (“KSP”) in Taiwan and in Colorado Springs, Colorado. Our KSP site, which opened in May 2023, will be our largest manufacturing facility and will enhance our ability to serve our customers efficiently and effectively in Taiwan and other Asia-Pacific locations. Additionally, we recently began constructing our new state-of-the-art Colorado Springs manufacturing facility, which is intended to increase our service levels to new fabs expected to be built in the U.S. and provide us with greater manufacturing resiliency in the form of enhanced business continuity plans.

Reliance on Trusted Suppliers. Our customers require that their key materials suppliers demonstrate greater capabilities and efficiencies in their processes, including sustainability, scalability, flexible manufacturing, quality control, supply chain management and the ability to effectively collaborate on solutions to problems. We believe that we will be able to leverage our manufacturing, operational and technical capabilities, along with our broad technology portfolio and expanding scale, to become an increasingly important strategic supplier to our customers. We have deployed technical and manufacturing resources in strategic locations to enable us to collaborate with our customers. Furthermore, we believe that the greater scale we achieved from the acquisition of CMC Materials will allow us to better serve our customers, invest more in engineering, research and development (“ER&D”) and bring complementary, co-optimized solutions to market faster than ever before.

Continued Consolidation. Our customer base within the semiconductor industry has consolidated in recent years through mergers and acquisitions. As a result, the importance of maintaining and developing strong and close relationships with our customers becomes even more essential. We also seek to further broaden our customer base by leveraging our products, technologies, expertise and core capabilities in serving semiconductor applications to address adjacent market opportunities, including in manufacturing processes for hydrogen purification, clean energy, batteries, LEDs, optical space systems and products for life sciences applications.

OUR COMPETITIVE STRENGTHS AND BUSINESS STRATEGY

We believe that our platform is well-positioned and sets us apart from our competitors for several reasons.

- Approximately 75% of our revenue during 2023 was unit driven or recurring in nature, from products repeatedly consumed as a result of the semiconductor manufacturing process. As a result, our revenue is generally more impacted by overall global semiconductor demand and global GDP growth, rather than the sales of semiconductor capital equipment, which has historically been more cyclical.
- Our solutions are increasingly specified and tailored to meet our customers' unique process conditions and technical roadmaps. We collaborate closely with our customers to create end-to-end solutions across platforms and modules allowing them to optimize value and accelerate time to yield. Therefore, switching away from our products may be costly and time consuming for our customers and may introduce risk to their manufacturing yields.
- Our product portfolio is broad and not overly concentrated on any single product or product platform. As of December 31, 2023, we offered over 28,000 standard and customized products, and in 2023 no single product platform represented more than 4% of our net sales.
- We have a broad and diverse customer base. As of December 31, 2023, our top ten customers make up 43% of our sales. Our customers include a broad cross-section of the semiconductor ecosystem, from chemical companies, and equipment manufacturers, to semiconductor fabs.
- We have been actively assessing certain portions of our portfolio and are executing transactions to streamline our platform to focus on the core areas of our businesses, which we believe have the greatest strategic value in supporting our customers and their technology roadmaps. To that end, as further described above, during 2023, we completed the divestiture of QED and our EC business and terminated the Alliance Agreement with MacDermid Enthone.
- We believe the cash generated from our business, together with proceeds received from the strategic transactions described above will allow us to pay down our debt, while also investing in research and development and the advanced manufacturing capabilities necessary to maintain and expand our technology leadership and to drive organic growth.

Customers Collaboration. We view the strong relationships we have with our customers, which include leading logic and memory semiconductor manufacturers, original equipment manufacturers ("OEMs") and semiconductor materials suppliers, as critical to our long-term success. Our expansive global presence allows us to meet our customers where they operate, which has enabled us to build strong relationships with them. The construction of our KSP manufacturing facility in Taiwan and a new research center in South Korea are examples of the Company's commitment to effectively collaborate with our customers locally to jointly uncover novel solutions to their yield, reliability and performance challenges. We are actively engaged with our key customers to design technology roadmaps specifically tailored to their short- and long-term strategic plans. These customer relationships provide us with collaboration opportunities at the early product design stage (in certain cases years ahead of commercialization), which facilitate our ability to introduce new products and applications that serve our customers' needs. We intend to reinforce and further strengthen these relationships through, among other things, collaborations and joint development activity. Due to the specialized nature of our products, complexity of our customers' manufacturing processes, customer qualification requirements and costs associated with re-formulation and re-qualification, we believe we have a strong position with our customers.

Supporting the Integration of New Materials. We understand the significant challenges our customers face as they introduce new materials into processes to manufacture increasingly innovative and complex semiconductor chips. New materials must outperform incumbent materials and deliver equivalent or higher yields, without causing integration issues with other process steps. For example, the decision to introduce a new material at the deposition stage of the semiconductor manufacturing process will impact CMP and the post-CMP clean, as well as the selection of filters in several other stages of the process. We believe one of our value propositions is our ability to both manufacture new materials and to support our customers in evaluating how those new materials interact with other stages in the manufacturing process. Specifically, we leverage our understanding of upstream and downstream interactions between unit process steps and tailor our product offerings to lower the risk of issues arising as a result of new material introduction into these processes. We believe this approach is critical for accelerating the introduction of new material innovations because it reduces development cycles of learning while accelerating the time to market and yield for our customers.

Technology Leadership and Strong, Diverse Portfolio. Our customers need suppliers that can provide a broad range of advanced, customized, reliable and cost-effective products and materials, as well as the technological and application expertise necessary to enhance their productivity, quality and yield, especially as they drive towards more advanced technology nodes. We are committed to our strategy of providing customers with innovative technologies and solutions for their evolving manufacturing needs. For example, we have introduced sub-5 nanometer filtration products, advanced deposition materials for

next generation transistor and interconnect technologies, polishing slurry and pad solutions with post-cleaning formulations to meet the needs of advanced memory applications, advanced reticle pods for EUV photolithography applications, advanced 300 millimeter wafer carriers and advanced coatings to meet the rigorous defectivity specifications for the manufacturing of advanced technology nodes. We believe our comprehensive offering of materials and products creates a competitive advantage as it enables us to meet a broad range of customer needs and provide a single source of product offerings for semiconductor device and equipment manufacturers, which can often translate to shorter time-to-solution and time-to-market for our customers. Additionally, it allows us to serve many aspects of the semiconductor manufacturing ecosystem and to leverage our technology to develop co-optimized solutions.

We have made significant investments in ER&D initiatives to continue to advance our technology and product offerings, particularly to meet the needs of next generation technology nodes. We spent approximately \$277.3 million, \$229.0 million and \$167.6 million on such activities in 2023, 2022 and 2021, respectively, representing 7.9%, 7.0% and 7.3% of our net sales, in 2023, 2022 and 2021, respectively. Our ER&D efforts have been increasingly directed towards innovation for advanced technology nodes. We plan to continue making substantial investments in ER&D activities.

Global Infrastructure. We have a global infrastructure of design, manufacturing, logistics, distribution, service and technical support facilities to meet the needs of our global customers. We further enhanced this footprint with the opening of a new manufacturing center of excellence in Taiwan, our KSP facility, in May 2023, which will become our largest manufacturing facility. In addition, we recently began construction on a new manufacturing facility in Colorado Springs, Colorado and a new, state-of-the-art research facility in South Korea. Additionally, we have recently added new capacity in liquid filtration in Billerica, Massachusetts and Yonezawa, Japan, in deposition materials in Toronto, Ontario, and materials handling in Chaska, Minnesota and JangAn, Korea. These investments are intended to better support our customers regionally and to be even more responsive to our customers' future growth and innovation.

Operational Excellence. Our customers are increasingly focused on the effectiveness, dependability and consistency of their supply chains. Our strategy is to continue to develop and improve our extensive supply chain and manufacturing capabilities into a competitive advantage by driving operational excellence and operating in a manner that ensures the safety of our employees and the quality of our products. Our significant investments in our new KSP facility in Taiwan and our facility in Colorado Springs, Colorado are intended to enhance our operational excellence as we focus on the following priorities that we believe enable us to perform at the high level that our customers expect.

- Investing in and using manufacturing equipment and facilities incorporating leading-edge process technology, including advanced cleanroom and cleaning procedures;
- Implementing automated manufacturing, statistical process controls, quality and supply chain management systems; and
- Maintaining a highly-skilled and agile organization, capable of rapid design, prototyping and ramping to high volume manufacturing while promptly responding to new customer requirements and feedback.

Leveraging Our Collective Expertise. We leverage our expertise across our three segments and across our broad portfolio of advanced materials, materials handling and purification capabilities to create innovative, new and co-optimized solutions to address unmet customer needs. For example, certain of our formulated cleaning chemistry products are developed and manufactured by our MS segment, with collaboration from our filtration expertise in our MC segment, packaged with our ultra-clean container and connector system made by our AMH segment, and delivered to the process tools through fluid handling systems also made by our AMH segment. In process tools, these chemistries may go through purification systems produced by our MC segment. Similarly, our advanced deposition materials business requires comprehensive capabilities across several disciplines, including the synthesization of unique molecules, specialized knowledge of how to purify these materials and the capability to safely transport and deliver them onto the wafer at a high throughput. With the addition of CMC Materials and through the creation of our MS segment, we are working to develop co-optimized, end-to-end solutions and bring them to market more quickly, such as polishing solutions for new deposition materials and optimized filtration solutions for new abrasive materials. Further, as the semiconductor industry looks to new interconnect metals like molybdenum, our portfolio of deposition precursors, CMP slurries and pads, post-CMP cleans, selective etch formulations, combined with our filtration, sensing, and delivery products will enable us to create end-to-end solutions and position our customers to enhance their device performance and optimize time to yield.

Corporate Social Responsibility. We seek to embed our corporate social responsibility program into our business strategy. Our program is built around the four core pillars of Innovation, Safety, Personal Development and Inclusion and Sustainability. The program includes goals for each of the four pillars to guide us towards 2030. During 2023, we released our third annual corporate social responsibility report, which introduced new and updated 2030 goals to include the impact of the acquisition of CMC, provided an update on our progress toward our existing 2030 goals and performance on our objectives from our 2020

baseline. Our recent corporate social responsibility accomplishments included achieving a “Gold” rating from EcoVadis, with a ranking in the 97th percentile, and an “A” rating from MSCI. The annual corporate social responsibility report is published on our website at <http://www.Entegris.com> under “About Us - Corporate Social Responsibility.”

Adjacent Markets. We leverage the expertise that we have gained from serving the semiconductor industry, as well as our core capabilities in material science and material purity, to develop products for other industries that employ technologies and production processes that require materials integrity management, high-purity fluids and integrated dispense systems. For example, in only a few years, we brought to market our Aramus high-purity bag assemblies which are used in the production of biologics, including COVID-19 vaccines. We plan to expand the use of these solutions into non-COVID-19 biologics, provide ancillary solutions around our Aramus bags, and expand our filter offerings for bioprocessing applications. In addition, our products and technologies are well-suited to create innovation in industries like hydrogen purification, clean energy, batteries, light-emitting diodes (“LEDs”) and optical space systems. We plan to continue identifying and selectively developing derivative products that address needs in adjacent markets. In doing so, we expect to increase the total available market for our products and increase our return on ER&D investments.

Strategic Acquisitions, Partnerships and Related Transactions. We have largely completed the integration of CMC Materials into the Company and have made significant progress towards reducing our outstanding debt as a result of the divestitures of QED and our EC business and the termination of the Alliance Agreement with MacDermid Enthone. As we continue making progress toward achieving our debt reduction targets, we will continue to pursue strategic acquisitions and business partnerships that enable us to address gaps in our product offerings, secure new customers, diversify into complementary product markets, broaden our technological capabilities and product offerings, access local or regional markets and achieve benefits of increased scale. We believe we have a strong track record of executing these transactions and their integration. Our acquisition of CMC Materials significantly broadened our product and technology capabilities and increased our scale. In the last several years, we have strengthened and expanded our product portfolio with the following acquisitions: BASF’s precision microchemicals business in 2021; Sinmat in 2020 (CMP slurries in hard substrate applications); and Global Measurement Technologies, Inc. in 2020 (analytical instruments for chemistry management and monitoring). Further, we will reevaluate our existing businesses from time to time and may decide to sell, restructure or replace one or more businesses. Finally, we regularly evaluate opportunities for strategic alliances, joint development programs and other strategic investments to achieve a variety of objectives including expanding our manufacturing capacity, producing products closer to our customers, developing optimized products more quickly and developing new sources of supply to provide us with a competitive advantage.

OUR SEGMENTS

Following a segment realignment in the third quarter of 2023, our business is organized and operated in three segments which align with the key elements of the advanced semiconductor manufacturing ecosystem: Materials Solutions, or MS; Microcontamination Control, or MC; and Advanced Materials Handling, or AMH. We leverage our expertise from these three segments to create new and increasingly integrated solutions for our customers. The following is a detailed description of our three segments.

MATERIALS SOLUTIONS SEGMENT

The MS segment is the segment resulting from combining the Advanced Planarization Solutions (“APS”) segment and the Specialty Chemicals and Engineered Materials (“SCEM”) segment, both of which were unit-driven and offered highly complementary products. MS provides end-to-end materials solutions around the primary modules in the semiconductor manufacturing process and in the emerging area of advanced packaging. These modules include integrated circuit chemical mechanical polishing solutions, high-performance etch and clean chemistries, gases and materials, and safe and efficient materials delivery systems that enhance our customers’ product performance. Our ability to deliver advanced materials at high purity, together with critical products like CMP slurries and pads, enables our customers’ technical roadmap, improves device performance, enhances their yields and is critical to enabling the performance of leading-edge logic and memory devices. We believe the growing long-term demand in the advanced logic and memory market, challenges with new materials and device design schemes and the need for specialized cleaning solutions will drive demand in our MS segment.

The MS segment partners closely with our other two segments to create solutions for our customers across various processes and modules. For example, the MS segment leverages the expertise of the AMH segment to ensure that its products and solutions are transported, delivered and monitored in a way that ensures maximum purity and stability. In addition, as products such as CMP slurries and cleans require advanced filtration both in manufacturing and at the point of use in the semiconductor manufacturing environment, the MS segment collaborates with our MC segment to optimize its products and processes in order to achieve industry-leading purity levels and maximize yield.

Deposition and Etch Solutions. We offer the following Deposition and Etch Solutions products:

Advanced Deposition Materials Products. Our advanced deposition materials include advanced liquid, gaseous and solid precursors, including organometallic precursors for the deposition of tungsten, titanium, cobalt, aluminum, molybdenum and other emerging metal films and organosilane precursors for the deposition of silicon oxide, silicon nitride and advanced dielectric materials films. These precursors are designed in close collaboration with OEM process tool manufacturers and device makers to produce application specific solutions that are compatible with complex integrations of material solutions used to build the semiconductor device. We offer delivery systems and containers that allow for reliable storage and delivery of low volatility solid and liquid precursors required in atomic layer deposition processes. When combined with our proprietary corrosion-resistant coatings and filtration solutions from our MC segment, we believe our advanced deposition solutions enable the industry's highest purity levels, resulting in improved device performance.

Surface Preparation and Integration Products. We offer a range of materials used to prepare the surface of a semiconductor wafer during the manufacturing process and to integrate with materials being used on the wafer. We offer a broad range of cleaning solutions for applications such as semiconductor post-etch residue removal, wafer etching, organics removal, negative resist removal, edge bead removal and corrosion prevention. In addition, we offer selective etch products designed to enable advanced architectures such as 3D-NAND. Our wet chemistry solutions, combined with filtration solutions from our MC segment and fluid handling solutions from our AMH segment, are designed to provide enhanced purity, which results in improvements in our customers' processes.

Advanced Cleaning Materials. We develop and manufacture high-performance consumable products for cleaning advanced probe cards and test sockets at semiconductor manufacturing facilities. These engineered polymer solutions are designed to improve customer yields and throughput in wafer and package test operations at semiconductor device manufacturers, foundries, and outsourced semiconductor assembly and test (OSAT) facilities. We also design innovative polymer products for semiconductor fabs that improve front-end tool uptime and reduce operating costs.

Dry Process Solutions. We offer the following Dry Process Solutions products:

Specialty Gases. Our specialty gas solutions provide advanced safety and process capabilities to semiconductor, display and solar panel manufacturers. Our SDS cylinders safely store and deliver hazardous gases, such as arsine, phosphine, germanium tetrafluoride and boron trifluoride, at sub-atmospheric pressure through the use of our proprietary carbon-based adsorbent materials. These products are designed to minimize potential leaks during transportation and use and allow more gas to be stored in the cylinder. These features provide significant safety, environmental and productivity benefits over traditional high-pressure cylinders. We also offer VAC, a complementary technology to SDS, where select implant gases and gas mixtures are stored under high pressure but are delivered sub-atmospherically.

Specialty Materials. Our high-performance specialty coatings, such as our Pegasus™ and Cearus™ coatings, provide erosion resistance, minimize particle generation and prevent contamination on critical components in semiconductor environments and other high-technology manufacturing operations. Our specialty materials provide customized solutions for applications challenged with unique temperature, corrosive, chemical or process environments, such as electrostatic chucks used to hold wafers during processing.

Integrated Circuits ("IC") Polishing Solutions. Our IC Polishing Solutions enables us to fully leverage our capabilities as a CMP solutions provider to the semiconductor industry by providing the following products:

CMP Slurries. We develop, produce, and sell CMP slurries for polishing a wide range of materials used in semiconductor devices, including tungsten, dielectric materials, copper, barrier, aluminum, and other emerging materials used in semiconductor device fabrication. We believe that we are uniquely positioned to be able to develop and optimize new slurries that can be utilized on emerging materials used in semiconductor device fabrication, such as molybdenum and ruthenium.

CMP Pads. CMP pads are critical in the CMP process to flatten and polish wafers and can have a significant impact on process performance. Our CMP Pads, such as our NexPlanar™, Medea™ and Ultra pad products are designed to provide the exact hardness, pore sizes, compressibility, and groove patterns needed to meet and exceed the requirements of various CMP applications. Our Epic Power™ CMP Pads are designed for SiC wafers and offer a balance of best-in-class performance, quality, and cost of ownership.

Post-CMP Cleans. Our post-CMP clean chemistry products, such as PlanarClean® and ESC 784, are designed to efficiently remove the abrasive slurry particles and organic residue from the wafer after the CMP process, removing residue that might affect yield while not contributing to contamination. In addition, our consumable polyvinyl alcohol roller brush products are used to clean the wafer following the CMP process.

Advanced Materials Markets (“AMM”). AMM focuses on developing and selling products to customers in new and emerging market areas outside of the semiconductor manufacturing process. AMM includes our POCO® premium graphite products, used to make precision consumable electrodes for electrical discharge machining, hot glass contact materials for glass product manufacturing and forming and other consumable products for various industrial applications, including aerospace, optical, medical devices, air bearings and printing. It also includes our slurry products used for polishing bare silicon wafers and other ultra-hard surface materials, including SiC and GaN substrates as well as disk substrates and magnetic heads used in hard disk drives, which are utilized in power electronics and advanced communications end-markets. AMM also provides specialty chemicals and specialty materials to enable advanced performance of product solutions in a wide range of end markets, including aircraft, aerospace, wound care and medical devices.

In addition, our PIM business, which consists of drag reducing agents, valve greases, cleaners and sealants, and related equipment supporting pipeline and adjacent industries, reports into our MS segment.

MICROCONTAMINATION CONTROL SEGMENT

The MC segment offers solutions to purify critical liquid chemistries and process gases used in semiconductor manufacturing processes and other high-technology industries. Our liquid and gas filtration and purification products are critical to the semiconductor manufacturing process because they remove contamination, directly reduce defects, improve manufacturing yield and enhance the long-term reliability of the semiconductor device. Our proprietary filters remove organic and inorganic nanometer-sized contaminants from various fluids and gases used in the manufacturing process, including photolithography, deposition, planarization and surface etching and cleaning. We believe demand for purification and filtration products is being driven by the continuous node shrink in logic semiconductors and the ramp in the 3D NAND market, as the risk and cost of yield loss grows with the incremental manufacturing steps needed for the production of these devices. We utilize expertise from the AMH segment in polymer science and from the MS segment in formulated cleaning chemistries and in slurry formulation to develop differentiated filtration and purification solutions for our customers.

Liquid Microcontamination Control Products. We offer a variety of products that control contaminants in our customers’ wet processes both in the fab environment and upstream at the chemical manufacturers. For example, our Torrento® series of filters is used for the filtration of aggressive acid and base chemistries for both semiconductor fabs as well as specialty chemical manufacturers, including our MS segment. Manufacturers of high purity chemicals and semiconductor fabs use our Trinzik® and Microgard™ products for the filtration of chemicals and ultra-pure water. Our Impact® series of filters are used in point-of-use photochemical dispense applications, including those provided by our AMH segment, where the delivery of superior flow rate performance and reduced microbubble formation is critical. Our Protego® series of liquid purifier/filter products are used to reduce metallic contamination in chemical manufacturing and in critical wafer rinsing and drying applications by our customers. In addition, we provide membrane and liquid filtration offerings serving semiconductor, pharmaceutical and medical applications.

Gas Microcontamination Control Products. We offer a broad portfolio of products designed to remove particulate and molecular contaminants from controlled environments and gas streams in semiconductor, flat panel display and LED fabs. Our Wafergard® gas filters reduce outgassing and remove particle contamination. Our GateKeeper® gas purifiers and large facility-wide gas purification systems provide continuous purified gas supply to customer fabs from the point of creation on the gas pads to the point-of-use at the wafer by chemically reacting and absorbing contaminants, effectively removing gaseous contaminants down to part-per-trillion levels. Our Chambergard™ gas diffusers provide semiconductor equipment manufacturers with the capability to rapidly vent their tools to atmosphere to dramatically reduce process cycle times without adding particles to the wafers. In addition, our Vaporsorb products are used to eliminate airborne molecular contamination from critical process tool areas or cleanrooms in the fab. These products are used in or alongside critical processing tools to improve yield and reduce tool downtime.

ADVANCED MATERIALS HANDLING SEGMENT

The AMH segment develops solutions to monitor, protect, transport and deliver critical liquid chemistries, wafers and substrates for a broad set of applications in the semiconductor and other high-technology industries. These systems and products improve our customers’ yields by protecting wafers from abrasion, degradation and contamination during

manufacturing and transportation and by assuring the consistent, clean and safe delivery of advanced chemicals from the chemical manufacturer to the point-of-use in the semiconductor fab. The AMH segment collaborates closely with our MS segment in developing products that are compatible with advanced chemistries to enhance yields and integrates liquid filtration technology to deliver consistent and pure chemistry.

Microenvironment Solutions. Our high-volume line of Ultrapak® products for wafers ranging from 100 to 200 millimeters ensure the clean and secure transport of wafers from the wafer manufacturers to the semiconductor fabs. We also offer a front-opening shipping box (“FOSB”) for the transportation and automated interface of 300 millimeter wafers. We lead the market for 300 millimeter front-opening unified pods (“FOUPs”), wafer transport and process carriers and standard mechanical interface pods (“SMIF pods”) for 200 millimeter wafer applications. We are a leader in reticle protection products for photolithography, including products that protect the high-value EUV lithography masks during both the mask manufacturing process and their use in the semiconductor fab.

Fluid Management Products. Our broad portfolio of packaging and container products, from low-volume containers to transport high-value photoresist chemistries, such as our NOWPak® products, to large intermediate bulk containers, such as our FluoroPure® products, ensures the purity of the chemistries they contain. We are a leader in high-purity fluid handling products such as valves, fittings, tubing, piping and associated connection systems, such as our PrimeLock® connections, for high-purity chemical applications. Our proprietary digital flow control technology improves the uniformity of chemicals applied on wafers. For example, our IntelliGen® integrated, high-precision liquid dispense systems enable the uniform application of advanced chemistries during the wafer fabrication process, integrating our valve control expertise with filter device technologies from our MC segment, in order to conserve high-value chemistry and reduce defects on wafers. Further, we provide market-leading instrumentation solutions to ensure consistency and monitoring of complex blended chemistries, such as our on-tool Accusizer® system, which performs automated online particle size and count analysis with applications in both semiconductor and life science industries, and our SemiChem® systems and our Invue® products, which measure chemical concentration in CMP slurries and formulated cleaning chemistries.

OUR CUSTOMERS AND MARKETS

Our customers include logic and memory semiconductor device manufacturers, semiconductor equipment makers, gas and chemical manufacturing companies and wafer grower companies serving the global semiconductor industry. We also sell our products to outsourced semiconductor assembly and test (OSAT) facilities, flat panel display equipment makers, panel manufacturers, manufacturers of hard disk drive components and devices and their related ecosystems.

Our other high-technology markets include manufacturers and suppliers in the solar and life science industries, electrical discharge machining customers, glass and glass container manufacturers, aerospace manufacturers and manufacturers of biomedical implantation devices.

Below is a table showing the percentage of our net sales to top customers and the percentage of our net sales that are international during the three most recent fiscal years.

	2023	2022	2021
Percentage of net sales to top customers:			
TSMC	11 %	12 %	12 %
Remaining top ten customers	32 %	31 %	31 %
Total top ten customers	43 %	43 %	43 %
Percentage of net sales by market:			
Domestic/U.S.	25 %	24 %	23 %
Foreign/International	75 %	76 %	77 %

We may enter into supply agreements with our customers. These agreements typically do not contain any long-term purchase commitments. Instead, we work closely with our customers to develop non-binding forecasts of the future volume of orders. However, customers may cancel their orders, change production quantities from forecasted volumes or delay production for reasons beyond our control.

SALES, MARKETING AND SUPPORT

We sell our products worldwide, primarily through our direct sales force and strategic independent distributors located in all major semiconductor markets. We also use independent distributors in other market territories and for specific market segments. As of December 31, 2023, our sales and marketing force consisted of approximately 783 employees worldwide.

Our unique capabilities and long-standing industry relationships have provided us with the opportunity for significant collaboration with our customers at the product design stage, which has facilitated our ability to introduce new materials and new solutions that meet our customers' needs. We continuously seek to identify for our customers a variety of materials, contamination and process control challenges that may be addressed by our product solutions. Our sales representatives provide our customers with worldwide technical support and information about our products and materials.

We believe that our technical and application support services are important to our sales and marketing efforts. These services include assisting in defining a customer's needs, evaluating alternative products and materials, designing a specific system to perform the desired operation, training users and assisting customers in compliance with relevant government regulations. Additionally, our field application engineers, located in major markets we serve, work directly with our customers on product qualification and process improvements in their facilities. We maintain a network of service centers, applications laboratories and technology centers located in key markets internationally and in the U.S. to support our products and our customers with their advanced development needs, provide local technical service, application support and help ensure fast turnaround time.

COMPETITION

The market for our products is highly competitive. While price is an important factor, we compete primarily on the basis of the following factors:

technical expertise;	time to solution;
product quality and performance;	complementary solutions;
advanced manufacturing capabilities;	supply chain resiliency;
total cost of ownership;	breadth of geographic presence;
historical customer relationships;	customer collaboration, service and support; and
breadth of product offerings;	after-sales service.

We believe that we compete favorably with respect to the factors listed above. We believe that our key competitive strengths include our broad product offerings, our strong research and development infrastructure and investment, our manufacturing excellence, our advanced quality control systems, the low total cost of ownership of our products, our willingness to closely collaborate with our customers to create technical roadmaps aligned with their short- and long-term strategies, our ability to co-optimize our products and our applications expertise in semiconductor manufacturing processes. However, our competitive position varies depending on the market segment and specific product areas within these segments. While we have longstanding relationships with a number of semiconductor and other electronic device manufacturers, we still face significant competition from companies that also have longstanding relationships with other semiconductor and electronic device manufacturers and, as a result, have been able to have their products specified by those customers for use in their fabrication facilities.

The competitive landscape is varied, ranging from business segments within large multinational companies to small regional or regionally-focused companies. While product quality and technology remain critical, overall, industry trends overall indicate a shift to localized, cost-competitive and consolidated supply chains. Because of the unique breadth of our capabilities, we believe that there are no global competitors that compete with us across the full range of our product offerings. Notable competitors with respect to certain specific product areas include Pall Corporation (part of Danaher Corporation), Shin-Etsu Polymer Co., Ltd., the EMD Performance Materials division of Merck KGaA, the Electronics & Industrial division of DuPont de Nemours, Inc., the Electronics Advanced Materials division of Air Liquide, Linde plc, Anji Microelectronics (Shanghai) Co., Ltd., and Mersen.

ENGINEERING, RESEARCH AND DEVELOPMENT

We believe that technology is important to the success of our businesses. We plan to continue to devote significant resources to ER&D, balancing efforts between shorter-term market needs and longer-term investments. As of December 31, 2023, we had approximately 1,361 employees in ER&D. We have supplemented and may continue to supplement our internal research and development efforts by licensing technology from third parties and/or acquiring rights with respect to products incorporating externally owned technologies. Our ER&D expenses consist of personnel and other direct and indirect costs for internally funded project development, including the use of outside service providers.

We believe we have a rich pipeline of development projects. Our ER&D efforts focus on developing and improving our technology platforms for semiconductor and advanced processing applications and identifying and developing products for new applications, often working directly with our customers to address their particular needs.

We have ER&D capabilities in many locations where our customers operate, including Taiwan, South Korea, the U.S., Japan, Canada, China, Singapore and Malaysia. We use sophisticated methodologies to research, develop and characterize our materials and products. Our capabilities to test and characterize our materials and products are focused on continuously reducing risks and threats to the integrity of the critical materials that our customers use in their manufacturing processes.

In addition, we collaborate with leading universities and industry consortia, such as Stanford University, Yale University, the Massachusetts Institute of Technology (MIT), University of Illinois (Champaign Urbana), SUNY Albany, the Fraunhofer Institute, the Interuniversity Microelectronics Center (imec®) and CEA-LETI. We undertake this work to extend the reach of our internal ER&D and to gain access to leading ideas and concepts beyond the time horizon of our internal development activities.

PATENTS AND OTHER INTELLECTUAL PROPERTY RIGHTS

As of December 31, 2023, we owned approximately 4,400 active patents worldwide, of which about 815 were U.S. patents. Additionally, we owned about 2,200 pending patent applications globally. We also license certain patents owned by third parties. We rely on a combination of patent, copyright, trademark and trade secret laws and license agreements to establish and protect our proprietary rights. We seek to refresh our intellectual property on an ongoing basis through continued innovation. While we license and expect to continue to license technology used in the manufacture and distribution of products from third parties, we do not consider any particular patent or license to be material to our business.

We vigorously protect and defend our intellectual property. We require each of our employees, including our executive officers, to enter into agreements with us pursuant to which the employee agrees to keep our proprietary information confidential and to assign to us inventions made during the course of employment. We also require outside scientific collaborators, sponsored researchers and other advisors and consultants who are provided confidential information to execute confidentiality agreements with us. These agreements generally provide that all confidential information developed or made known to the entity or individual during the course of the entity's or individual's relationship with the Company is to be kept confidential and not disclosed to third parties except in specific limited circumstances.

MANUFACTURING

Our customers rely on our products and materials to ensure the integrity of the critical materials used in their manufacturing processes by providing purity, cleanliness, consistent performance, dimensional precision and stability. Our ability to meet our customers' expectations, combined with our substantial investments in worldwide manufacturing capacity and comprehensive supply chain strategy, positions us well to respond to the increasing demands from our customers for yield-enhancing materials and solutions.

To meet our customers' needs worldwide, we have established an extensive global manufacturing network with facilities in the U.S., Canada, China, Japan, Malaysia, Singapore, South Korea and Taiwan. Because we work in an industry where contamination control is paramount, we maintain Class 100 to Class 10,000 cleanrooms for manufacturing and assembly. We believe that our worldwide advanced manufacturing capabilities are important competitive advantages. These include:

engineered polymer conversion and processing;	specialty coating capabilities;
advanced membrane modification and cleaning;	solids and powders compounding and handling;
chemical formulation, blending, distillation, synthesis and purification;	graphite synthesis;
gas delivery systems;	blow molding;
high-purity gas handling and transfilling;	rotational molding;
high-purity materials packaging;	machining; and
membrane casting;	assembly.
cartridge manufacturing and assembly;	

We have made significant investments in systems and equipment to create innovative products and tool designs, including metrology and 3D printing capabilities for rapid analysis and prototype production. In addition, we use contract manufacturers for certain of our products both in the U.S. and Asia.

RAW MATERIALS

Our products are made from a wide variety of raw materials that are generally available from multiple sources of supply. Our strategy is to secure various sources of different raw materials, as appropriate, to enable the desired performance of our products, and monitor those sources as necessary to provide supply assurance. While we seek to have several sources of supply for raw materials, certain materials included in our products, such as certain filtration membranes in our MC segment, certain engineered abrasive particles, specialty and commodity chemicals and petroleum coke in our MS segment, and certain polymer resins in our AMH segment, are obtained from a single source, a limited group of suppliers or from suppliers in a single country. We have entered into multi-year supply agreements with certain suppliers for the purchase of raw materials in the interests of supply assurance and cost control.

GOVERNMENTAL REGULATION

Our operations are subject to federal, state and local regulatory requirements relating to export controls, environmental, waste management and health and safety matters, including measures relating to the release, use, storage, treatment, transportation, discharge, disposal and remediation of contaminants, hazardous substances and wastes, as well as practices and procedures applicable to the construction and operation of our plants. Although some risk of costs and liabilities related to these matters is inherent in our business, we believe that our business is operated in substantial compliance with applicable regulations. However, new, modified or more stringent requirements or enforcement policies could be adopted, which could adversely affect us. While we expect that capital expenditures will be necessary to ensure that any new manufacturing facility is in compliance with environmental and health and safety laws, we do not expect these expenditures to be material.

See “Item 1A. Risk Factors” for a more detailed description of the regulatory risks we face.

HUMAN CAPITAL RESOURCES

We believe that our employees are a critical asset in achieving our mission of helping our customers improve their productivity, performance and technology by providing enhanced materials and process solutions for the most advanced manufacturing environments. In order to attract and retain top talent, we are focused on creating a diverse, inclusive and safe workplace. We are committed to providing competitive total rewards and quality development and training opportunities for our employees.

As of December 31, 2023, we had approximately 8,000 employees, of whom approximately 55%, 13%, 9%, 9%, 6%, 5% and 2% are located in North America, Southeast Asia, Japan, Taiwan, South Korea, China and Europe, respectively. Given the variability of business cycles in the semiconductor industry and the rapid response time required by our customers, it is critical that we be able to quickly adjust the size of our production staff to meet our customers’ demands and maximize efficiency and we use skilled temporary labor when possible. None of our employees is represented by a labor union or covered by a collective bargaining agreement other than statutorily-mandated programs in certain international jurisdictions. We believe that our labor relations have generally been good.

Culture. Our organization is built around what we refer to as our PACE values: our core values of treating people with respect and dignity, acting honestly and consistently, encouraging creativity and innovation and a dedication to excellence. We believe that by continuing to focus on these values, we provide our employees with a positive work environment that allows them to develop professionally and encourages them to continue innovating.

We regularly conduct surveys of our employees to understand their perspectives on a number of topics. During 2023, these topics included commitment to Entegris’ core values, safety and general employee satisfaction. Management uses the information gathered from these surveys to inform its decision making with respect to employee matters, aiming to continue to be an employer of choice.

Diversity and Inclusion. We believe that maintaining a culture of diversity and inclusion helps enable us to innovate more effectively and perform better overall. We are committed to making progress on our diversity and inclusion journey. To that end, we seek to promote diverse backgrounds and perspectives throughout our organization and strive to provide fair and equal opportunity for career development and advancement to all our employees. An example of our commitment to fostering and promoting diversity and inclusion at Entegris is our Employee Network groups, which are designed to advance diversity and inclusion and to promote our workplace as an environment where all individuals are valued for their talents and feel empowered to reach their fullest potential. As of December 31, 2023, our six Employee Networks included groups focused on gender identity, people of color, sexual orientation, age, sustainability and veteran status.

Health and Safety. Our success depends on the well-being of our employees. We maintain a culture with an intense focus on safety and strive to identify, eliminate and control risk in the workplace in an effort to prevent injury and illness. Our employees have access to a global safety management system and are encouraged to report incidents, near misses or other observations in the system. Management uses the information generated by the system to set safety-related policies and to set goals for future performance.

We also design our products with the safety of the people who are using them in mind. Our Safe Delivery Source products are designed to minimize potential leaks during transportation and use of hazardous gases, features which provide significant safety, environmental and productivity benefits over traditional high-pressure cylinders. In addition, our fluid-handling products, such as tubing, valve, fittings and drum products, are used to safely store, transport and dispense volatile and dangerous chemistries, protecting those who work with them.

Total Rewards. Our total rewards program is designed to be attractive and competitive and to enable our employees to reach their highest potential by directly impacting their financial security, career growth opportunities, and the health and well-being of them and their families. We seek to attract and retain talented employees by providing a compelling total rewards package consisting of competitive pay, health and welfare, work/life benefits and financial wellness programs. We design our programs with the core belief that our employees are at their best when they prioritize their emotional and physical health. We offer a Global Employee Support Program through which our employees and their families have access to resources in support of their mental and emotional well-being. Our medical programs encourage healthy behaviors by rewarding employees for completing wellness activities. Our Employee Education Assistance Program is designed to encourage our employees to continue their education in courses that will help them advance their career at Entegris.

Talent Development and Training. We are committed to the ongoing training and development of our employees. We foster an on-the-job training and development culture by investing in rotational development programs in operations, supply chain, and engineering. We are continuously expanding and delivering technical and leadership training for internal talent through our Entegris Great Leader Profile, Management Achievement, and Supervisor Training programs that are aimed at advancing leadership and management skills for current and future career growth. Employees are provided feedback and continuous development discussions through formal and informal review sessions throughout the year. While we continue to search for new perspectives and insights with external hires, we also seek to provide opportunities for our employees to grow their careers at the Company and regularly fill open vacancies with internal candidates. In addition, management periodically assesses succession planning for certain key positions and reviews our workforce to identify high potential employees for future growth and development. It remains crucial for our organization to invest in the growth of our team members so that their unique talents and perspectives are cultivated to drive innovation and excellence.

Philanthropy. Recognizing our unique opportunity as a science-based company to effect positive change, the Entegris Foundation was established in 2020 to expand access to science, technology, engineering and math (“STEM”) education in underrepresented communities. The Entegris Foundation provides scholarship opportunities to underrepresented students pursuing a STEM major in colleges across the U.S. and in Korea, Taiwan and Japan. In 2023, Entegris invested \$3 million in the Entegris Foundation and we have set a goal of investing more than \$35 million in STEM scholarships and engineering internships for women and individuals from underrepresented communities by 2030.

Oversight. Our Board of Directors, through the Management Development and Compensation Committee, provides oversight on human capital matters through a variety of methods and processes. These include receiving regular updates from our Senior Vice President, Global Human Resources, and facilitating discussion related to human capital management efforts and other initiatives impacting the workforce, health and safety matters, employee survey results, hiring and retention, employee demographics, labor relations, compensation and benefits, succession planning and employee training initiatives. We believe the Board’s oversight of these matters helps identify and mitigate exposure to labor and human capital management risks, and is part of the broader framework that guides how we attract, retain and develop a workforce that aligns with our values and strategies.

For additional information on these important initiatives, see our annual corporate social responsibility report on our website at <http://www.Entegris.com> under “About Us - Corporate Social Responsibility.”

OUR HISTORY

The Company was incorporated in Delaware on March 17, 2005 in connection with a merger between Entegris, Inc., a Minnesota corporation, and Mykrolis Corporation, a Delaware corporation. On April 30, 2014, the Company acquired ATMI, based in Danbury, Connecticut. On July 6, 2022, the Company acquired CMC Materials, based in Aurora, Illinois. Entegris has

been helping its customers solve their critical materials challenges and enhance their manufacturing yields for over 55 years, tracing its corporate origins back to Fluoroware, Inc., which began operating in 1966.

AVAILABLE INFORMATION

Our Internet address is www.entegris.com. On this website, under the “About Us-Investor Relations-Financial Information” section, we post the following filings as soon as reasonably practicable after they are electronically filed with, or furnished to, the U.S. Securities and Exchange Commission, or SEC: our annual, quarterly, and current reports on Forms 10-K, 10-Q, and 8-K; our proxy statements; any amendments to those reports or statements, and Form SD. All such filings are available on our website free of charge. The SEC also maintains a website (www.sec.gov) that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC. The content on our website and any other website as referred to in this Annual Report on Form 10-K is not incorporated by reference into this Annual Report on Form 10-K unless expressly noted.

Item 1A. Risk Factors.

In addition to the other information in this Annual Report on Form 10-K, the following risk factors should be carefully considered in evaluating us and our common stock. Any of the following 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” in Item 7 of this Annual Report on Form 10-K.

Risks Related to Our Business and Industry

Fluctuations in the demand for semiconductors and the overall volume of semiconductor manufacturing may decrease demand for our products and may adversely affect our business.

Our revenue is primarily dependent upon demand from the semiconductor ecosystem. The semiconductor industry has historically been, and is likely to continue to be, cyclical with periodic downturns, resulting in decreased demand for our products. The semiconductor industry may be negatively impacted by factors such as decreased consumer spending, macroeconomic uncertainty and slow or negative economic growth. Each of these factors could decrease consumer spending and business investment in technologies and products that contain semiconductors. We have previously experienced a reduction in revenue and operating losses during downturns in the semiconductor industry, which can occur suddenly. During such downturns, we typically experience greater pricing pressure and shifts in product and customer mix, which can adversely affect our gross margin and net income. The semiconductor industry is also affected by seasonal shifts in demand, and as a result, we may experience short-term fluctuation in our results of operations from one period to the next. We are unable to predict the timing, duration or severity of any current or future downturns in the semiconductor industry.

To remain competitive in the semiconductor industry, we may maintain or even increase our ER&D activity and invest in our infrastructure, even during downturns. As a result of such expenditures, a lower volume of sales can have a large and disproportionate impact on our profitability. The fluctuating nature of the semiconductor industry requires us to maintain flexibility to respond to changes in demand, particularly during industry downturns, which may impact our ability to effectively manage our production capacity, workforce and inventory. Additionally, we may incur unexpected or additional costs to align our operations with demand. If we do not, or are unable to, adequately anticipate changes in our business environment, we may lack the infrastructure, manufacturing capacity and resources to scale up our business to meet customer expectations and compete successfully during a period of growth. Conversely, we may expand our capacity too rapidly, resulting in excess fixed costs, and lower profitability.

Global economic uncertainty may materially and adversely affect our business, financial condition and results of operations.

Uncertain and volatile economic conditions, including uncertain and volatile financial markets, rising inflation and interest rates, economic slowdowns and/or recessions, national debt and bank failures, could materially and adversely impact our operating results. Such uncertain and volatile conditions in any of our key sales or manufacturing regions can cause or exacerbate negative trends in business and consumer spending and have historically impacted customer demand for our products and costs of manufacturing and delivering 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 would have an immediate negative 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;
- limiting our suppliers' ability to deliver parts and raw materials, which would negatively affect our ability to manage operations, manage our costs and sell our products;
- consolidation or strategic alliances among other suppliers to semiconductor manufacturers, which could adversely affect our ability to compete effectively;

- 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.

Our revenues and operating results have fluctuated in the past and may do so in the future, which could impact our stock price.

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:

- legal, tax, accounting or regulatory changes (including changes in import/export regulations and tariffs, such as regulations imposed by the U.S. government restricting exports to China) or changes in the interpretation or enforcement of existing requirements;
- trends in the semiconductor industry, macroeconomic and market conditions and geopolitical uncertainty, including impacts caused by the Russian invasion of Ukraine, the war between Israel and Hamas, the current conflict in the Red Sea or bank failures;
- the size and timing of customer orders;
- consolidation of our customers, which could impact their purchasing decisions and negatively affect our revenues;
- procurement shortages, increased prices, the failure of suppliers to perform their obligations and additional expenses to respond promptly to any supply shortages 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;
- changes in our capital expenditure requirements, such as our new facilities in Taiwan and Colorado, and the schedule and timing, including potential delays, thereof;
- manufacturing difficulties;
- customer decisions to decelerate orders in order to draw down their inventory;
- 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 or decision to delay expansion projects;
- 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;
- disruptions in transportation, communication, demand, information technology ("IT") or supply, including strikes, acts of God, wars, terrorist activities and natural or man-made disasters;
- changes in our estimated tax rate; and
- foreign currency exchange rate fluctuations.

Interruptions in our supply chain, including those from our single and limited source suppliers, could affect our ability to manufacture our products and meet demand, which, in turn, could have an adverse effect on our revenue and results of operations.

Our ability to increase sales of our products depends in part upon our ability, in a very short timeframe, to ramp up our manufacturing capacity and to mobilize our supply chain. If we are unable to expand our manufacturing capacity on a timely basis, manage the expansion effectively and obtain larger quantities of raw materials, our customers could obtain products from our competitors, which would reduce our market share, harm our reputation as a trusted partner and impact our results of operations. Ensuring a robust and resilient supply chain is critical in order for us to meet the demand, quality and technological requirements of our customers. We rely on the timely delivery of parts, materials and services, including components and subassemblies, from our suppliers and contract manufacturers. While we seek to limit instances where we rely on sole or limited source suppliers and utilize alternative sources to mitigate the risk that the failure of any single provider or supplier will adversely affect our business, these strategies are not feasible or practical solution in all circumstances. For example, we rely on single or limited source suppliers for certain raw materials that are critical to the manufacturing of our products, such as plastic polymers, filtration membranes, abrasive particles, petroleum coke and other materials. If we were to lose any one of these or other critical sources, or there is as an industry-wide increase in demand for, or the discontinuation of, raw materials or other

components used in our products, it could be difficult for us, or we may be unable, to find an alternative supplier to provide certain raw materials and components, in which case our operations could be adversely affected.

Demand for semiconductors and other factors outside of our control have resulted in, and may in the future result in, a shortage of raw materials and components needed to manufacture and deliver our products, higher raw materials costs, costly and time-consuming re-qualification of products manufactured with new raw materials and delays in, and unpredictability of, shipments due to transportation interruptions. These results could harm our reputation or the competitiveness of our products. Such shortages, delays and unpredictability have adversely impacted, and may continue to adversely impact or impact in the future (1) our suppliers' ability to meet our demand requirements, (2) our manufacturing operations, (3) our ability to meet customer demand, (4) our gross margins and (5) our other operating results. Our actions to counteract adverse impacts to our gross margins and other operating results could be unsuccessful or reduce demand, which would adversely impact our revenue. Additionally, our suppliers may not have the capacity to meet increases in our demand for raw materials and other components, in turn, making us unable to meet customer demand for our products. If our suppliers or sub-suppliers are unable to maintain their operations, due to operational restrictions or financial hardship caused by an economic slowdown or recession, we may increase our safety stocks of raw materials or components or alter our payment terms with such suppliers, including prepaying for raw materials, which could put downward pressure on our cash flow.

Further, increased restrictions imposed on a class of chemicals known as per- and polyfluoroalkyl substances ("PFAS"), which are used in a number of products, including parts and materials that are incorporated into our products, may negatively impact our supply chain due to the potentially decreased availability, or non-availability, of PFAS-containing products. Proposed regulations under consideration could require that we transition away from the usage of PFAS-containing products, which could adversely impact our business, operations, revenue, costs, and competitive position. Suitable replacements for PFAS-containing parts and materials may not be available at similar costs, or at all.

Because a significant amount of our sales and manufacturing activity occurs outside the U.S., we are exposed to risks inherent in operating a global business.

Sales to customers outside the U.S. accounted for approximately 75%, 76% and 77% of our net sales in 2023, 2022 and 2021, 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 U.S. and depend 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:

- changes and uncertainties with respect to trade and export regulations (including new and changing regulations for exports of certain technologies to China), trade policies and sanctions, tariffs, international trade disputes and any retaliatory measures, which impact countries in which we conduct significant business could (1) impose additional costs on our operations, (2) limit our ability to operate our business and (3) adversely impact us, our customers or our suppliers;
- positions taken by governmental agencies regarding possible national, commercial and/or security issues posed by the development, sale or export of certain raw materials, products and technologies;
- geopolitical tensions or conflicts, such as Russia's invasion of Ukraine, the war between Israel and Hamas, the current conflict in the Red Sea and increasing tensions with China, and other 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, volatility in unemployment rates, increased logistics costs and delays and uncertainty about economic stability;
- 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, data privacy, cybersecurity and other regulatory requirements that vary by jurisdiction;
- 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, and related implications thereof;

- expense and complexity of complying with U.S. and foreign import and export regulations, including the ability to obtain and renew 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 the Japanese yen, euro, Taiwanese dollar, Korean won, Chinese renminbi, Singapore dollar, Malaysian ringgit, Canadian dollar or Israeli shekel, which could cause our sales and profitability to decline;
- liability for foreign taxes assessed at rates higher than those applicable to our domestic operations;
- imposition of a global minimum tax rate, including by the Organization of Economic Co-operation and Development (“OECD”);
- challenges and costs associated with the protection of our intellectual property throughout the world;
- challenges associated with managing global and regional third-party service providers, including certain engineering, software development, manufacturing, IT and other functions; and
- customer or government efforts to encourage operations and sourcing in a particular country, such as Korea or China, including efforts to develop and grow local competitors, require local manufacturing, and provide special incentives to government-backed local customers to buy from local competitors.

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. Furthermore, there is inherent risk, based on the complex relationships among China, Japan, Korea, Taiwan, and the U.S., that political, diplomatic and national security influences could lead to trade disputes, impacts and/or disruptions, in particular those affecting the semiconductor industry. This can adversely affect our business with China, Japan, Korea, and/or Taiwan and potentially the entire Asia Pacific region or global economy. A significant trade dispute, impact and/or disruption in any area where we do business could have a materially adverse impact on our future revenue and profits.

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, especially as they relate to China, could have an adverse impact on our operations and reduce the competitiveness or availability of our products relative to local and global competitors.

Tariffs, additional taxes, trade barriers and other measures, particularly those arising out of relations between the U.S. and China, 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. Both the U.S. and China have implemented several rounds of tariffs and countermeasures with respect to certain products imported from the other country, some of which have impacted certain raw materials we use.

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 countries (and nationals thereof), to certain end users, and for certain end uses. These restrictions may prohibit the transfer of certain of our products, services and technologies, and they may require us to obtain a license from the U.S. government before delivering the controlled item or service. Obtaining export licenses may be difficult, costly and time-consuming, and we may fail to receive licenses that we apply for on a timely basis or at all. We must also comply with export control and economic sanctions laws and regulations imposed by other countries. Our export and trade control 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 decline, which could have a material adverse effect on our business, financial condition and results of operations.

Over the last several years, 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. On October 17, 2023, the U.S. Department of Commerce, Bureau of Industry and Security (“BIS”) announced updates to export control regulations, originally issued on October 7, 2022, regarding the sale of certain products and services related to advanced computing items, semiconductor manufacturing equipment, and items that can support end uses related to the development and production of advanced-node integrated circuits and semiconductor manufacturing equipment, among others. The updated rules modify and expand restrictions on the sale of products and the provision of certain services by U.S. persons to certain companies and domestic fabs located in countries of concern, including China, without prior U.S. governmental authorization. Additionally, 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. These and other regulations have reduced our ability to sell our products to customers in China and it is possible future regulation could further

reduce demand for our products. As a result of these restrictive measures, certain of our customers have made efforts to source products domestically in order to mitigate perceived risks to their supply chain. If these efforts are successful, are widespread amongst our customers and expand to our products and solutions broadly, overall global demand for our customers' products or for other products produced or manufactured in the United States or based on U.S. technology may be reduced, in turn reducing demand for our products, which could have a material adverse effect on our business, financial condition and results of operations. Furthermore, government authorities may take retaliatory actions, impose conditions that require the use of local suppliers or partnerships with local companies, or require the license or other transfer of intellectual property, which could have a significant adverse impact on our business. Such risks may be especially exacerbated as they relate to China, a market that is important to our business, representing approximately 16% of our sales in 2023.

A significant portion of our sales is concentrated on a limited number of key customers, and our net sales and profitability may materially decline if we were to lose one or more of these customers.

Sales to a limited number of large customers constitute a significant portion of our overall revenue, shipments, cash flows, collections and profitability. Our top ten customers accounted for 43%, 43% and 43% of our net sales in 2023, 2022 and 2021, respectively. We would have no or limited contractual recourse if our customers decided to stop buying and using our products in their manufacturing processes with limited advance notice to us. The cancellation, reduction or deferral of purchases of our products by any one of these customers could significantly reduce our revenues in any particular quarter. If we were to lose any of our significant customers, if our products are not specified for our significant customers' products or if we suffer a material reduction in their purchase orders, our revenue could decline and our business, financial condition and results of operations could be materially and adversely affected. Due to the long design and development cycle and lengthy customer product qualification periods required for most of our products, we may be unable to replace these customers quickly, if at all. In addition, our principal customers hold considerable purchasing power and may be able to negotiate sales terms that result in decreased pricing, increased costs, lower margins and/or limit our ability to share jointly-developed technology with others. The semiconductor industry may continue to undergo consolidation, and if any of our customers merge or are acquired, we may experience lower overall sales to the merged or combined companies.

Our customer base is also geographically concentrated, particularly in Taiwan, Korea, Japan, China and the U.S. As a result, export regulations or other trends that apply to customers in certain countries, such as those in China, have exposed and may further expose our business and results of operations to greater volatility. The geographic concentration of our customer base could shift over time as a result of government policy and incentives to develop regional semiconductor industries.

If we are unable to anticipate and respond to rapid technological change and customer requirements by continuing to innovate and introduce new and enhanced products and solutions, we may experience a loss of market share, decreased sales, revenue, profitability and damage to our reputation.

The semiconductor industry is subject to rapid technological change, changing customer requirements and frequent new product introductions. In our industry, the first company to introduce an innovative product that addresses an identified market need will often have a significant advantage over competing products. Following development, it may take several years for sales of a new product to reach a substantial level, if ever. If a product concept does not progress beyond the development stage or only achieves limited acceptance in the marketplace, we may not receive a direct return on our expenditures, we may lose market share and our revenue, and profitability may decline. In the past, we incurred significant impairment charges for capital expenditures related to developing the capability to manufacture shippers and FOUPs for 450 millimeter wafers, which major semiconductor manufacturers announced that they would not initiate manufacturing for in the foreseeable future.

We believe that our future success will depend upon our ability to continue to develop mission-critical solutions to maximize our customers' manufacturing yields and enable higher performance semiconductor devices. A failure to successfully anticipate and respond to technological changes by developing, marketing and manufacturing new products or enhancements to our existing products could harm our business prospects and significantly reduce our sales. We cannot guarantee that the new products and technology we choose to develop and market will be successful. In addition, if new products have reliability or quality problems, we may experience reduced orders, higher manufacturing costs, delays in acceptance and payment, additional service and warranty expense and damage to our reputation.

Manufacturing interruptions or delays, or other disruptions to our operations, could adversely affect our business, financial condition and results of operations.

Our manufacturing processes are complex and require the use of expensive and technologically sophisticated equipment and materials. These processes are frequently modified to improve manufacturing yields, process stability and product quality. We

have, on occasion, experienced manufacturing difficulties, such as critical equipment breakdowns or the introduction of impurities in the manufacturing process. Any future difficulties could cause lower yields, make our products unmarketable and/or delay deliveries to customers. In addition, any modification to the manufacturing process of a product could require that the product be re-qualified by customers, which can increase our costs and delay our ability to sell this product to our customers. We have moved, and we may again move, the manufacture of certain products from one plant to another. If we fail to transfer and re-establish the manufacturing processes in the destination plant efficiently and effectively, we may not be able to meet customer demand, we may lose credibility with our customers and our business may be harmed. Even if we successfully move our manufacturing processes, we may not achieve the anticipated levels of cost savings or efficiencies, if any. These and other manufacturing difficulties may result in the loss of sales and exposure to warranty and product liability claims.

Disruptions to our operations may be caused by factors outside of our control, including severe weather events and natural catastrophes, civil unrest, outbreaks of disease, and terrorist actions. Our continuity plans designed to mitigate the impact of disruptions to our operations may be insufficient, and any prolonged disruption may impede our ability to manufacture and deliver products to our customers, resulting in an adverse impact on our business and results of operations.

Our operations use hazardous materials that expose us to various risks, including potential liability for personal injury and potential remediation obligations.

Our operations involve, and we are exposed to the risks associated with, the use and manufacture of hazardous materials. In particular, we manufacture specialty chemicals, which is an inherently hazardous process that may result in accidents, and store and transport hazardous raw materials, products and waste in, to and from various facilities. Potential risks that may disrupt our operations or expose us to significant losses and liabilities include explosions and fires, chemical spills and other discharges, releases of toxic or hazardous substances or gases, and pipeline and storage tank leaks and ruptures. These and other hazards may result in (1) liability for personal injury, death, damage to property and contamination of the environment; (2) suspension of operations; (3) the imposition of civil or criminal fines, penalties and other sanctions; (4) cleanup costs; (5) claims by governmental entities or third parties; (6) reputational harm; (7) increases in our insurance costs; and (8) other adverse impacts on our results of operations. Moreover, a failure of one of our products at a customer site could interrupt the business operations of the customer. For example, while we believe that our SDS and VAC delivery systems are safe to transport, store and deliver toxic gases, any leakage could cause serious damage, including injury or death, to any person exposed to those toxic gases, potentially creating significant product liability exposure for us. Our insurance coverage may be inadequate to satisfy any such liabilities, and our financial results or financial condition could be adversely affected.

We carry a significant amount of goodwill on our balance sheet.

As of December 31, 2023, we had goodwill of \$3,945.9 million. The future occurrence of a potential indicator of impairment, such as a significant adverse change in business climate, an adverse action or assessment by a regulator, unanticipated competition, a material negative change in relationships with significant customers, strategic decisions made in response to economic or competitive conditions, loss of key personnel, or a more-likely-than-not expectation that a reporting unit or a significant portion of a reporting unit will be sold or disposed of, could result in goodwill impairment charges. We have recorded goodwill impairment charges in the past, and such charges have materially affected our historical results of operations. For additional information, see Note 10 – Goodwill and Intangible Assets to the accompanying consolidated financial statements.

Loss of any of our key personnel could harm our business, and our inability to attract and retain new qualified personnel could inhibit our ability to operate and grow our business successfully.

Many of our key personnel have significant experience in the semiconductor industry and deep technical expertise. The loss of the services of any of our key employees or an inability to attract, hire, train and retain qualified and skilled employees, particularly research and development and engineering personnel, including as a result of changes to immigration policies, could cause business interruptions and inhibit our ability to operate and grow our business. As the semiconductor industry has grown in recent years, competition for qualified talent, particularly those with significant industry experience, has intensified. We have experienced in the past, and may in the future continue to experience, an increasingly competitive and constrained labor market, which may limit our ability to add headcount required to meet our customers' demand, decrease our productivity due to an influx of inexperienced workers and cause our labor costs to increase and our profitability to decline. As a result, the difficulty and costs associated with attracting and retaining employees has risen and may continue to rise.

If we fail to obtain, protect and enforce intellectual property rights, our business and prospects could be harmed.

Our future success and competitive position depend in part upon our ability to obtain, maintain and enforce intellectual property rights. We rely on patent, trade secret and trademark laws to protect many of our major product platforms. Although we often file new applications for patents, our pending applications may not be approved. Moreover, any patents that we own or obtain may not provide us with any competitive advantage or may be designed around. These patents may also expire or be challenged, invalidated, circumvented, rendered unenforceable or otherwise compromised by third parties. In addition, any failure to obtain intellectual property protection in the international jurisdictions we serve could expose us to increased competition, which could limit our growth and future revenue. The confidentiality agreements we enter into with our employees and certain third parties to protect our proprietary information and technology may be inadequate to protect our interests, and the remedies available to us for any breach may not adequately mitigate any breach. Our confidential and proprietary information and technology may be replicated or obtained through lawful means. Additionally, we may lose trade secret protection as a result of actions or omissions by us, our employees or third parties. Furthermore, the failure to effectively implement artificial intelligence strategies may result in the loss of intellectual property and raise complex compliance, intellectual property and other issues. Infringement or misappropriation of our intellectual property rights could result in uncompensated lost market and revenue opportunities, which could adversely affect our business and financial condition.

Third parties may misappropriate our intellectual property rights, and disputes regarding intellectual property rights may arise. We may bring litigation in order to enforce our patents, copyrights or other intellectual property rights, to protect our trade secrets, to determine the validity and scope of the proprietary rights of others or to defend against claims of infringement. Such litigation could (1) result in substantial costs and the diversion of resources, (2) require us to pay damages or royalties, alter our products or processes, or obtain a license to continue selling the impacted product, which we may be unable to do on commercially acceptable terms, or at all and (3) negatively affect our sales, profitability and prospects. We continue to vigorously defend and enforce our patents and rights, which will cause us to incur costs. We may initiate other costly litigation against our competitors or other third parties in order to protect our intellectual property rights. We cannot predict how any existing or future litigation will be resolved or what impact it may have on us.

From time to time third parties have asserted, and may continue to assert, intellectual property claims against us and our products. Claims that our products infringe the rights of others, whether or not meritorious, can be expensive and time-consuming to defend and resolve, and may divert the efforts and attention of management and personnel. The inability to obtain rights to use third-party intellectual property on commercially reasonable terms could have an adverse impact on our business. We may face claims based on the theft, unauthorized use or disclosure of third-party trade secrets and other confidential business information. Any such incidents and claims could severely harm our business and reputation, result in significant expenses, harm our competitive position, and prevent us from selling certain products, all of which could have a material and adverse impact on our business and results of operations.

We may be subject to IT system failures, network disruptions and breaches in data security, which could damage our reputation and adversely affect our financial condition, results of operations and cash flows. New laws and regulations regarding data privacy may also increase our costs.

In conducting our business, we use, collect and store sensitive data, including our financial information, intellectual property, confidential information, proprietary business information and personally identifiable information of our employees and others, as well as similar information of our customers, suppliers and business partners. We maintain this information in our data centers, on our networks and on IT systems owned and maintained by third parties. The secure processing, maintenance and transmission of this information is critical to our operations. All IT systems are subject to disruptions, security breaches, outages and failures. We and our third-party suppliers have experienced, and expect to continue to be subject to, cybersecurity threats and incidents ranging from employee or contractor error or misuse, to individual attempts to gain unauthorized access to systems, to sophisticated and targeted measures known as advanced persistent threats. Cybersecurity threats may target us directly or indirectly through our third-party providers and global supply chain. Cybersecurity attacks are increasing in number and the attackers are increasingly organized and well-financed, or at times supported by state actors. Geopolitical tensions or conflicts, such as Russia's invasion of Ukraine or increasing tensions with China, may create a heightened risk of cybersecurity attacks. Artificial intelligence capabilities may be used by threat actors to identify vulnerabilities and craft increasingly sophisticated cybersecurity attacks. The use of artificial intelligence by us, our customers, suppliers and other business partners and third-party providers may introduce vulnerabilities onto our IT systems and data. We continue to devote significant resources to network security, threat monitoring and other measures to protect our systems and data from unauthorized access or misuse, and we may be required to expend greater resources in the future, especially in the face of evolving and increasingly sophisticated cybersecurity threats and laws, regulations, and other actual and asserted obligations to which we are or may become subject relating to privacy, data protection, and cybersecurity.

IT system failures, network disruptions and breaches of data security could (1) cause disruption in our operations, issues with customer communication and order management, the unauthorized or unintentional disclosure of sensitive information, or disruptions in our transaction processing or (2) undermine the integrity of our disclosure controls and procedures and our

internal control over financial reporting, which could affect our reputation, result in significant liabilities and expenses, adversely affect our ability to report our financial results in a timely manner and could have a material adverse effect on our financial condition, results of operations and cash flows.

Our efforts to comply with current and evolving laws, regulations and other obligations, such as contractual or commercial obligations from our customers or other third parties, concerning privacy, cybersecurity, and data protection, increase our compliance costs and could result in significant additional expenses. Any actual or alleged failure to comply with these obligations could result in inquiries, investigations, and other proceedings against us by regulatory authorities or other third parties.

Our environmental, social and governance commitments could result in additional costs, and our inability to achieve them could have an adverse impact on our reputation and performance.

From time to time we communicate our strategies, commitments and targets related to sustainability, carbon emissions, diversity and inclusion, human rights, and other environmental, social and governance matters. These strategies, commitments and targets reflect our current plans and aspirations, and we may be unable to achieve them. Changing customer sustainability requirements, as well as our sustainability targets, could cause us from time to time to alter our manufacturing, operations or products, and incur substantial additional expense to meet such requirements and targets. Any failure or perceived failure to timely meet these sustainability requirements or targets could adversely impact the demand for our products and subject us to significant costs and liabilities and reputational risks that could adversely affect our business, financial condition and results of operations. In addition, standards and processes for measuring and reporting carbon emissions and other sustainability metrics may change over time and result in inconsistent data or significant revisions to our strategies, commitments and targets, and our ability to achieve them. Any scrutiny of our carbon emissions or other sustainability disclosures or our failure to achieve related strategies, commitments and targets, or our failure to disclose our sustainability measures consistent with applicable laws and regulations or to the satisfaction of our stakeholders, could negatively impact our reputation or performance.

Risks Related to Our Acquisition of CMC Materials

Our acquisition of CMC Materials involves a number of risks that could adversely affect our business, and we may not realize the financial and strategic goals we anticipate.

In July 2022, we completed our acquisition of CMC Materials, which we refer to in this risk factor as the “acquisition”. The ultimate success of the acquisition will depend on, among other things, the ability to continue to combine the two businesses in a manner that facilitates growth opportunities. While we have completed many key integration steps, such as migrating the core legacy CMC Materials businesses onto our Enterprise Resource Planning system, there are other processes, policies, procedures, operations and systems that we continue to integrate. The combined company has and may continue to incur ongoing restructuring, integration and other costs associated with combining the operations of the two companies. For example, we have recently combined two legacy segments, the Advanced Planarization Solutions and the Specialty Chemicals and Engineered Materials segments, to form the Materials Solutions segment to better position our business to service our customers across critical semiconductor process steps such as etch, deposition, CMP and post-CMP, which resulted in an organizational restructuring. It is possible that the ongoing integration process could result in (1) the loss of customers, (2) the disruption of ongoing businesses, (3) inconsistencies in standards, controls, procedures and policies, (4) unexpected integration issues, (5) higher than expected integration costs and (6) an overall integration process that takes longer than originally anticipated. Actual growth, if achieved, may be lower than what we expect and may take longer to achieve than anticipated. Even if we successfully integrate CMC Materials, we may not be able to do so in a way that maximizes the combined business to the fullest extent. If we are not able to successfully achieve our objectives, the benefits of the acquisition may not be fully realized or may take longer to achieve than expected. Furthermore, in connection with the completed sale of the EC business to Fujifilm, we are actively working to transition corporate support services relating to this business to Fujifilm, and it is possible that this process could result in distraction from our core business, unexpected transition issues, higher than expected transition costs and a transition process that takes longer than originally anticipated.

Risks Related to Government Regulation

We are subject to a variety of environmental laws and regulations that could cause us to incur significant liabilities and expenses.

The wide variety of federal, state, local and non-U.S. regulatory requirements relating to the release, use, storage, treatment, transportation, discharge, disposal and remediation of, and human exposure to, hazardous chemicals could result in future

liabilities, remediation efforts or the suspension of production or shipment. These requirements are dynamic and have become more strict over time. These laws and regulations, among others, increase the complexity and costs of transporting our products from the country in which they are manufactured to our customers. Further changes to or our failure to comply with these and similar regulations could (1) restrict our ability to expand, build or acquire new facilities, (2) require us to acquire costly control equipment, (3) cause us to incur expenses associated with remediation of contamination, (4) cause us to modify our manufacturing or shipping processes or (5) otherwise increase our cost of doing business, which may have a negative impact on our financial condition, results of operations and cash flows. In addition, the potential adoption of new laws, rules or regulations related to climate change and the use or sale of PFAS-containing products poses risks, including subjecting us to future costs and liabilities, that could harm our results of operations or affect the way we conduct our businesses. For example, new or modified regulations could require us to make substantial expenditures to enhance our environmental compliance efforts.

We are exposed to various risks from our regulatory environment.

We are subject to risks related to new, different, inconsistent, or even conflicting laws, rules, and regulations that may be enacted by legislative or executive bodies and/or regulatory agencies in the countries where we operate; disagreements or disputes related to international trade; and the interpretation and application of laws, rules, and regulations. As a public company with global operations, we are subject to the laws of multiple jurisdictions and the rules and regulations of various governing bodies, including those related to health and safety, export controls, financial and other disclosures, corporate governance, privacy, anti-corruption, such as the Foreign Corrupt Practices Act and other local laws prohibiting corrupt payments to governmental officials or customers, conflict minerals or other social responsibility legislation, employment practices, immigration or travel regulations and antitrust regulations, among others. Each of these laws, rules and regulations imposes costs on our business, including financial costs and potential diversion of our management's attention, and may present risks to our business, including potential fines, restrictions on our actions and reputational damage if we do not fully comply. The volume of changes to such laws, rules and regulations may increase in the countries where we operate.

To maintain high standards of corporate governance and public disclosure, we intend to invest in appropriate resources to comply with evolving standards. Changes in or ambiguous interpretations of laws, regulations and standards may create uncertainty regarding compliance matters. Efforts to comply with new and changing regulations have resulted in, and are likely to continue to result in, increased administrative expenses and diversion of management's time and attention from revenue-generating activities to compliance activities. If we are found by a court or regulatory agency not to be in compliance with laws and regulations, our reputation, business, financial condition and/or results of operations could be adversely affected, we may be disqualified or barred from participating in certain activities and we may be forced to modify our operations to achieve full compliance.

Changes in taxation or adverse tax rulings could adversely affect our results of operations.

We operate in many foreign countries and are subject to taxation at various rates and audit by multiple taxing authorities. Our results of operations could be affected by tax audits, changes in tax rates, changes in laws and regulations governing the calculation, location and taxation of earned profit, changes in laws and regulations affecting our ability to realize deferred tax assets on our balance sheet and changes in laws and regulations relating to the repatriation of cash into the United States. Each quarter, we forecast our tax liability based on our forecast of our performance for the year in each tax jurisdiction. If our performance forecast changes, our forecasted tax liability would also likely change, perhaps materially.

We have undertaken and expect to continue to undertake a number of complex internal reorganizations of our foreign subsidiaries in order to rationalize and streamline our foreign operations, focus our management efforts on certain local opportunities and take advantage of favorable business conditions in certain localities. These or any future reorganizations could result in adverse tax consequences in one or more jurisdictions, which could adversely impact our profitability from foreign operations and result in a material reduction in our results of operations.

Various other jurisdictions, including members of the Organization for Economic Cooperation and Development, are considering changes to their tax laws, including provisions intended to address base erosion and profit shifting by taxpayers. Any tax reform adopted in these or other countries may exacerbate the risks described above.

Risks Related to Our Indebtedness

We have a substantial amount of indebtedness and may in the future incur substantially more debt, each of which could adversely affect our ability to obtain financing in the future and react to changes in our business.

As of December 31, 2023, we had an aggregate principal amount of \$4.7 billion of indebtedness outstanding, including the \$1.4 billion from our senior secured term loan facility due 2029 (the “Term Loan Facility”), \$1.6 billion aggregate principal amount of the 4.75% senior secured notes due April 15, 2029, \$1.7 billion aggregate principal amount of the 5.95% senior unsecured notes due June 15, 2030, our 4.375% senior unsecured notes due April 15, 2028, and our 3.625% senior unsecured notes due May 1, 2029 (collectively, the “Notes”). In addition, we have approximately \$575.0 million of unutilized capacity under our senior secured revolving credit facility due 2027 (the “Revolving Facility”). We refer to the Term Loan Facility and the Revolving Facility as the “Credit Facilities”. The credit agreements that govern the Credit Facilities are referred to collectively as the “Amended Credit Agreement”. Further, we may incur significant additional secured and unsecured indebtedness in the future.

Although the indentures governing the Notes (the “Indentures”), and the Amended Credit Agreement restrict our ability to incur additional indebtedness, the restrictions have a number of significant qualifications and exceptions. For example, the Amended Credit Agreement provides that we can request additional loans and commitments up to the greater of \$1.1 billion or 100% of our EBITDA, as well as additional amounts if our secured net leverage ratio is less than a specified ratio. Further, these restrictions do not prevent us from incurring monetary obligations that do not constitute indebtedness. If we add new indebtedness and other monetary obligations to our current debt levels, the related risks that we now face would intensify.

Our debt could have important consequences, including:

- limiting our ability to obtain additional financing to fund future working capital, capital expenditures, acquisitions or other general corporate purposes;
- requiring a substantial portion of our cash flow to be dedicated to debt service payments instead of other purposes;
- increasing our vulnerability to adverse changes in general economic, industry and competitive conditions;
- exposing us to increased interest expense for borrowings with variable interest rates, including borrowings under the Credit Facilities; and
- placing us at a disadvantage compared to other, less leveraged competitors or competitors with comparable debt having more favorable terms.

We may be unable to generate sufficient cash to service our indebtedness and may be forced to take other actions, which may not be successful, to satisfy our obligations under our indebtedness.

We may be unable to maintain sufficient cash flow from operating activities to permit us to pay the principal of, premium, if any, and interest on our indebtedness. Our ability to make scheduled payments on or to refinance our debt obligations depends on our financial condition and operating performance and the condition of the capital markets, which are subject to prevailing economic, industry and competitive conditions, as well as many financial, business, legislative, political, regulatory and other factors beyond our control. If our cash flow and capital resources are insufficient to fund our debt service obligations, we could face substantial liquidity problems, be forced to reduce or delay investments and capital expenditures, dispose of material assets or operations, seek additional debt or equity capital or restructure or refinance our indebtedness, any of which could have a material adverse effect on our business, financial position and results of operations. In addition, the level and quality of our earnings, operations, business and management, among other things, will impact the determination of our credit ratings. A decrease in the ratings assigned to us by the ratings agencies may negatively impact our access to the debt capital markets and increase our cost of borrowing. In addition, we may be unable to maintain the current credit worthiness or prospective credit rating of the Company. Any actual or anticipated changes or downgrades in such credit rating may have a negative impact on our liquidity, capital position or access to capital markets and affect our ability to obtain any future required financing on acceptable terms or at all.

Any refinancing of our debt could be at higher interest rates and may require us to comply with more onerous covenants, which could further restrict our business operations. We may not be able to implement any refinancing on commercially reasonable terms or at all and, even if successful, a refinancing may not allow us to meet our scheduled debt service obligations. The agreements governing our indebtedness restrict our ability to dispose of assets and use the proceeds of such dispositions, and we may be unable to consummate any dispositions or generate proceeds sufficient to meet our debt service obligations.

If we cannot make scheduled payments on our debt, holders of the Notes and lenders under the Credit Facilities could declare all outstanding principal and interest to be due and payable, the lenders under the Revolving Facility could terminate their commitments to advance further loans, our secured lenders could foreclose against the assets securing their borrowings and we could be forced into bankruptcy or liquidation.

The terms of the Amended Credit Agreement and the Indentures may restrict our operations, particularly our ability to respond to changes or raise additional funds.

The Amended Credit Agreement contains restrictive covenants that impose significant operating and financial restrictions that may limit our and our restricted subsidiaries' ability to take actions that may be in our long-term best interest, including restrictions on our and our restricted subsidiaries' ability to:

- incur additional indebtedness and guarantee indebtedness;
- pay dividends or make other distributions in respect of, or repurchase or redeem, capital stock;
- prepay, redeem or repurchase certain debt;
- make investments, loans, advances and acquisitions;
- engage in sale-leaseback or hedging transactions;
- create liens on, sell or otherwise dispose of assets, including capital stock of our subsidiaries;
- enter into transactions with affiliates;
- enter into agreements that restrict the ability to create liens, pay dividends or make loan repayments;
- alter the businesses we conduct; and
- merge or sell all or substantially all of our assets or incur a change of control in our capital stock ownership.

Also, the Indentures contain limited covenants, such as a covenant restricting our ability and certain of our subsidiaries' ability to incur certain debt secured by liens, engage in sale-leaseback and incur additional indebtedness by any restricted subsidiary.

In addition, the restrictive covenants under the credit agreement governing the Revolving Facility may, depending on the amount of revolving borrowings, unreimbursed letter of credit drawings and undrawn letters of credit, require us to maintain a secured net leverage ratio, which we may be unable to meet. Our failure to comply with these covenants could result in the acceleration of some or all of our indebtedness, which could lead to bankruptcy, reorganization or insolvency.

Risks Related to Owning our Common Stock

The price of our common stock has been and may remain volatile.

The price of our common stock has been volatile. In 2023, the closing price of our stock on The Nasdaq Global Select Market ("Nasdaq") ranged from a low of \$64.13 to a high of \$121.60, and, as in past years, the price of our common stock may show even greater volatility in the future. 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, including the following:

- changes to our financial guidance, as well as potential decreased confidence in any guidance we do provide;
- changes in global economic and geopolitical conditions, including those resulting from trade tensions, rising inflation, and fluctuations in foreign currency exchange and interest rates;
- failure to meet the expectations of securities analysts, which may vary 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;
- high volatility in price and volume in the markets for high-technology stocks;
- public perception of equity values of publicly traded companies;
- fluctuations in our results of operations; and
- other risks and uncertainties described in this Annual Report on Form 10-K and in our other filings with the SEC.

Fluctuations in our results of operations 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.

We may decrease or discontinue cash dividends and may never adopt a new program to repurchase our shares of common stock.

Future payments of quarterly dividends and any future repurchases of shares of our common stock are subject to capital availability and periodic determinations by our Board of Directors that they are in the best interest of our stockholders and comply with all laws and applicable agreements. Future dividends and any future share repurchases may be affected by, among other factors, potential capital requirements for acquisitions and the funding of our research and development activities; legal risks; changes in federal and state income tax laws or corporate laws; contractual restrictions, such as financial or operating covenants in our debt arrangements; availability of domestic cash flow; and changes to our business model. The amounts of our

dividend payments may change from time to time, and we may decide at any time to reduce, suspend or discontinue the payment of dividends or the repurchase of shares. A reduction, suspension or discontinuation of our dividend payments or the cessation of our share repurchase program could have a negative effect on the price of our common stock and may harm our reputation.

Provisions in our charter documents and Delaware law may delay or prevent an acquisition of us, which could decrease the value of our shares.

Our certificate of incorporation, our by-laws and Delaware law contain provisions that could make it harder for a third party to acquire us without the consent of our board of directors. These provisions include limitations on actions by written consent of our stockholders.

Our certificate of incorporation makes us subject to the anti-takeover provisions of Section 203 of the Delaware General Corporation Law. In general, Section 203 prohibits publicly held Delaware corporations from engaging in a “business combination” with an “interested stockholder” for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in a prescribed manner. This provision could discourage parties from bidding for our shares of common stock and could, as a result, reduce the likelihood of an increase in the price of our common stock that would otherwise occur if a bidder sought to buy our common stock.

Our certificate of incorporation authorizes our Board of Directors to issue, without further stockholder approval, up to 5,000,000 shares of preferred stock in one or more series and to fix and designate the rights, preferences, privileges and restrictions of the preferred stock, including dividend rights, conversion rights, voting rights, redemption rights and liquidation preferences. The holders of any shares of preferred stock could have preferences over the holders of our common stock with respect to dividends and liquidation rights. Any issuance of preferred stock may have the effect of delaying, deterring or preventing a change in control. Any issuance of preferred stock could decrease the amount of earnings and assets available for distribution to the holders of common stock and could adversely affect the rights and powers, including voting rights, of the holders of common stock. The issuance of preferred stock could have the effect of decreasing the market price of our common stock.

General Risks

Competition from new or existing companies could harm our financial condition, results of operations and cash flow.

We operate in a highly competitive, global industry. We face many domestic and international competitors, some of which have substantially greater manufacturing, financial, research and development and marketing resources than we do. In addition, some of our competitors may have better-established customer relationships than we do, which may enable them to have their products specified for use more frequently and more quickly by these customers. We also face competition from smaller, regional companies that focus on serving customers in their regions. Further, customers continually evaluate the benefits of internal manufacturing versus outsourcing, and a customer’s decision to internally manufacture products that we provide may negatively impact us. If we are unable to maintain our competitive position, we could experience downward pressure on prices, fewer customer orders, reduced margins, the inability to take advantage of new business opportunities and a loss of market share, any of which could have a material adverse effect on our results of operations. Further, we expect that existing and new competitors will improve their products and introduce new products with enhanced performance characteristics. The introduction of new products or more efficient production of existing products by competitors could diminish our market share and increase pricing pressure on our products.

Our competitors include companies outside of the U.S., including companies in countries where foreign governments seek to build a domestic-centric semiconductor ecosystem. From time to time, governments around the world may provide incentives or make other investments that could benefit and give competitive advantages to our competitors. For example, in August 2022, the U.S. government enacted the CHIPS and Science Act of 2022 (the “CHIPS Act”) to provide financial incentives to the U.S. semiconductor industry. Government incentives, including any that may be offered in connection with the CHIPS Act, may not be available to us on acceptable terms or at all. If our competitors can benefit from such government incentives and we cannot, it could strengthen our competitors’ relative position and have a material adverse effect on our business.

We may acquire other businesses, form joint ventures or divest businesses, any of which could negatively affect our financial performance.

We intend to continue to engage in business combinations, acquisitions, joint ventures, investments, divestitures or other types of collaborations to (1) address gaps in our product offerings, (2) adjust our business and product portfolio to meet our ongoing strategic objectives, (3) diversify into new and complementary markets, (4) increase our scale or (5) accomplish other strategic objectives. These transactions involve numerous risks to our business, financial condition and operating results, including but not limited to:

- difficulty in identifying suitable acquisition candidates and completing transactions at appropriate valuations, in a timely manner, on a cost-effective basis or at all, due to substantial competition for acquisition targets;
- inability to successfully integrate any acquired businesses into our business operations;
- failure to realize the anticipated synergies or other benefits of any such transaction;
- entry into markets in which we have limited or no prior experience;
- finding acquirors and obtaining adequate value for businesses that no longer meet our strategic objectives;
- difficulties surrounding the disentanglement of a divested business, including the diversion of resources away from our business operations to address such matters;
- inability to complete proposed or pending transactions due to factors such as the failure or inability to obtain regulatory or other approvals, which may be exacerbated by the recent, more aggressive regulatory approaches to merger control globally, such as the July 19, 2023 joint statement of antitrust policy by the Department of Justice and Federal Trade Commission and the April 15, 2023 Provisions on the Review of Concentrations of Undertakings issued by China's State Administration for Market Regulation, among others;
- requirements imposed by government regulators in connection with their review of a transaction, which may include, among other things, divestitures and restrictions on the conduct of our existing business or the acquired business;
- undertaking multiple transactions at the same time in order to take advantage of acquisition or divestiture opportunities that do arise, which could strain our ability to effectively execute and integrate such transactions;
- diversion of management's attention from our day-to-day business due to dedication of significant management resources to such transactions;
- employee uncertainty and lack of focus during the integration process that may also disrupt our business;
- risk of litigation or claims associated with a proposed or completed transaction;
- challenges associated with managing new, more diverse and more widespread operations, projects and people, potentially located in regions where we have not historically conducted or operated our business;
- dependence on unfamiliar or less secure supply chains and inefficient scale of the acquired entity;
- increasing costs of performing due diligence to meet the expectations of investors and government regulators;
- despite our due diligence, we could assume unknown, underestimated or contingent liabilities, such as potential environmental, health and safety liabilities, any of which could lead to costly litigation or mitigation actions;
- an acquired technology or product may have inadequate or invalid intellectual property protection or may be subject to claims of infringement by a third party, which may result in claims for damages and lower than anticipated revenue;
- negative effects on our reported results of operations from dilutive results from operations and/or from future potential impairment of acquired assets, including goodwill, related to acquisitions;
- an acquired company may have inadequate or ineffective internal controls over financial reporting, disclosure controls and procedures, cybersecurity, privacy, environmental, health and safety, anti-bribery, anti-corruption, human resource or other policies or practices, which may require unexpected or additional integration, mitigation and remediation costs;
- reductions in cash or increases in debt to finance transactions, which reduce the cash flow available for general corporate or other purposes, including share repurchases and dividends; and
- difficulties in retaining key employees or customers of an acquired business.

Climate change may have a long-term impact on our business.

There are inherent climate-related risks wherever our business is conducted. Changes in market dynamics, stakeholder expectations, local, national and international climate change policies, and the frequency and intensity of extreme weather events on critical infrastructure in the United States and abroad, all have the potential to disrupt our business and operations. Such events could result in a significant increase in our costs and expenses and harm our future revenue, cash flows and financial performance. Global climate change is resulting in, and may continue to result, in certain natural disasters and adverse weather events, such as drought, wildfires, storms, sea-level rise and flooding, occurring more frequently or with greater intensity, which could cause business disruptions and impact employees' abilities to commute or to work from home effectively.

Item 1B. Unresolved Staff Comments.

Not Applicable.

Item 1C. Cybersecurity

Risk management and strategy

As a key supplier to in the semiconductor ecosystem, security and risk management of our technology systems and processes is critical to ensuring our ability to serve our customers without interruption.

Management of Cybersecurity Risks

Our management of cybersecurity risks is integrated into our company-wide enterprise risk management program. As part of this process, our risk management team works closely with our IT department to identify and evaluate potential cybersecurity risks to the Company and to develop controls to mitigate and protect against those risks.

Each quarter, our Chief Information Security Officer (“CISO”) presents an overview of the Company’s cybersecurity risk landscape to our Enterprise Risk Management Committee, which includes our Executive Leadership Team and Vice President, Internal Audit. In addition, our CISO Council, which includes our CISO and our Chief Information and Digital Officer, holds meetings with our Executive Leadership Team on a quarterly basis to review these cybersecurity risks and mitigation measures in further detail.

Our cybersecurity risk management program is aligned with the National Institute of Standards and Technology (NIST) Cybersecurity Framework. We identify key assets that are critical to our business and assess potential cyber threats and vulnerabilities associated with those assets and the operations they enable. Following that assessment, we implement strategies and design controls to manage those risks. For example, we use single sign-on to limit access to our networks and multi-factor authentication to verify users’ identities. We also continuously monitor our systems and networks to protect against internal and external threat actors. We have policies and procedures in place, such as our Privileged Access Management process, to limit and control access to our confidential information by our vendors and other third parties. We also conduct due diligence and reviews of cybersecurity policies of third parties that access our systems or data. Additionally, we are focused on segregating our manufacturing processes from the Company’s other networks to minimize the risk of interruptions to our manufacturing operations resulting from cyber breaches. To increase our employees’ vigilance of cybersecurity risks and educate them on best practices relating to those risks, we conduct cybersecurity trainings and awareness campaigns, such as quarterly phishing campaigns.

Engagement of Third Parties

Given the complex and evolving nature of cybersecurity threats, the Company engages third parties to assist us in developing and maintaining effective cybersecurity risk management. Partnering with third parties enables us to leverage specialized knowledge and insights, ensuring our cybersecurity strategies and processes are well-designed and effective. For example, in 2023, we engaged a global law firm to conduct an external assessment of our cybersecurity governance framework and processes and provide recommendations to improve our cybersecurity readiness and posture. We also work with third party specialists who perform threat and vulnerability assessments, audits and develop strategies to mitigate cybersecurity-related risks.

Oversight of Third-party Risk

We are aware of the cybersecurity risks associated with engaging third-party service providers. To mitigate such risks, we conduct security assessments of high-risk third-party providers before engagement and maintain ongoing monitoring to ensure compliance with our cybersecurity standards. The monitoring includes annual assessments by our CISO and ongoing assessments by our security engineers. This approach is designed to mitigate risks related to data breaches or other security incidents originating from third-parties.

Risks from Cybersecurity Threats

The Company’s information and operational technology systems and its third-party providers’ systems have been, and will likely continue to be, subject to cybersecurity threats, such as computer viruses or other malicious codes, ransomware,

unauthorized access attempts, business email compromise, cyber extortion, denial of service attacks, phishing, social engineering, hacking and other cyberattacks attempting to exploit vulnerabilities.

To date, the Company is not aware that its business or operations have been materially impacted by these cyberattacks. However, the Company's security efforts and the efforts of its third-party providers may not prevent or timely detect attacks and resulting breaches or breakdowns of the Company's, or its third-party service providers', databases or systems.

Governance

Board of Directors' Oversight

The Audit and Finance Committee (the "Audit and Finance Committee") of our Board of Directors is responsible for reviewing and monitoring general information technology and cybersecurity matters, including related risks and reporting to the Board its determinations, actions and recommendations related thereto. Our Audit and Finance Committee is composed of independent directors with extensive executive leadership and risk management experience. Our CISO, together with our Chief Information and Digital Officer ("CIDO"), provide quarterly updates to our Audit and Finance Committee regarding the cybersecurity risk landscape, specific risks affecting the Company and solutions to mitigate those risks, and legal and regulatory requirements relating to cybersecurity. These updates assist the Board in performing its oversight and risk management function. In addition, the full Board receives an annual report on cybersecurity directly from the CISO.

Management's Role Managing Risk

Our CISO is responsible for the implementation, operation and monitoring of our cybersecurity risk management program. Our current CISO, who reports to our CIDO, has over 20 years of experience managing the information technology and cybersecurity operations within large, global organizations. His extensive experience assessing and mitigating cybersecurity risk, implementing governance structures and developing employee training programs is critical in developing and executing our cybersecurity strategies.

Monitoring of Cybersecurity Incidents

Our Cybersecurity Incident Response Plan establishes how we monitor and respond to cybersecurity incidents impacting our environment. The CISO works closely with members of our Executive Leadership Team and his cybersecurity team to monitor the prevention, detection, mitigation, and remediation of cybersecurity incidents. We engage a third-party managed security services provider (MSSP) to provide 24/7 continuous monitoring of the Company's IT and operational technology environments for potential cybersecurity incidents. In the event such an incident is identified by our MSSP or any of our employees, the incident is assigned a severity classification (minor, moderate or major) by our cybersecurity team and escalated accordingly. Depending on the severity of the incident, certain key personnel are notified and work together to further investigate the incident and take actions to respond, which may include engaging with external specialists, regulatory authorities and our cybersecurity insurance carrier. The CISO receives daily and weekly updates on all incidents and incident responses, which the CISO shares with our Executive Leadership Team on a weekly basis. Our cybersecurity team conducts a post-incident review of all major cybersecurity incidents, which review includes identification of vulnerabilities, assessment of the incident's impact on the Company and recommendations to help prevent similar incidents in the future.

Item 2. Properties.

Our principal executive offices are located in Billerica, Massachusetts. Information about our principal and certain other facilities is set forth below:

Location	Principal Function	Approximate Square Feet	Leased/Owned	Reporting Segment
Bedford, Massachusetts	Research & Manufacturing	80,000	Owned	MC & MS
Billerica, Massachusetts ⁽¹⁾	Executive Offices, Research & Manufacturing	175,000	Leased	MC, MS & AMH
Burnet, Texas	Research & Manufacturing	86,000	Owned	MS
Decatur, Texas	Manufacturing	359,000	Owned	MS
Waller, Texas	Manufacturing	210,000	Owned	MS
Chaska, Minnesota	Executive Offices, Research & Manufacturing	186,000	Owned	AMH
Colorado Springs, Colorado	Manufacturing	82,000	Owned	AMH
Danbury, Connecticut	Research & Manufacturing	73,000	Leased	MS
San Luis Obispo, California	Manufacturing	57,867	Owned	MC
San Luis Obispo, California	Manufacturing	59,124	Leased	MC
Aurora, Illinois	Manufacturing	414,000	Owned	MS
Hillsboro, Oregon	Manufacturing	112,344	Leased	MS
Hsin-chu, Taiwan	Executive Offices, Sales Research & Manufacturing	146,330	Leased	MC, MS & AMH
Kaohsiung City, Taiwan (North)	Manufacturing	105,874	Owned	MS
Kaohsiung City, Taiwan (South)	Manufacturing	573,696	Owned	MC, MS & AMH
JangAn, South Korea	Manufacturing	127,000	Owned	MC, MS & AMH
Oseong, South Korea	Manufacturing	108,355	Owned	MS
Suwon, South Korea	Executive Offices & Research	42,000	Leased	MC & MS
Kulim, Malaysia	Manufacturing	195,000	Owned	MS & AMH
Yonezawa, Japan	Manufacturing	185,000	Owned	MC & AMH
Tsu, Mie, Japan	Manufacturing	160,259	Owned	MS
Singapore	Manufacturing	215,235	Owned	MS

⁽¹⁾ This lease has been extended through September 30, 2026 and is subject to one five-year renewal option.

In addition, we own and lease space for manufacturing, distribution, technical support, sales, service, repair, and general administrative purposes in the U.S., Canada, China, Germany, France, Israel, Japan, Malaysia, Singapore, South Korea and Taiwan. Leases for our facilities expire through October 2031. We currently expect to be able to extend the terms of expiring leases or to find suitable replacement facilities on reasonable terms. We believe that our facilities are well-maintained and suitable for their respective operations. We regularly assess the size, capability and location of our global infrastructure and periodically make adjustments based on these assessments.

Item 3. Legal Proceedings.

We are, from time-to-time, involved in various claims, proceedings and lawsuits relating to our business, employees, intellectual property and other matters. The outcomes of these matters are not within our complete control and may not be known for prolonged periods of time. In some actions, the claimants seek damages, as well as other relief, that could require significant expenditures or result in lost revenues. We record a liability for these matters when a loss is known or considered probable and the amount can be reasonably estimated. If the reasonable estimate of a known or probable loss is a range, and no amount within the range is a better estimate than any other, the minimum amount of the range is accrued. There is judgment required in the determination of the likelihood of outcome, and if necessary determination of the estimate or range of potential outcomes. Based on the current information, the Company does not believe any known matters have a reasonable possibility of a material amount for litigation or other contingencies related to legal proceedings.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities.

Market Information and Holders

Entegris' common stock, \$0.01 par value per share, trades on the Nasdaq Global Select Market under the symbol "ENTG". As of February 12, 2024, there were 1,030 shareholders of record.

Dividend Policy

Holders of the Company's common stock are entitled to receive dividends when and if they are declared by the Company's Board of Directors. The Company's Board of Directors declared cash dividends of \$0.10 per share during each of the first, second, third and fourth quarters of 2023, which totaled \$60.3 million.

On January 17, 2024, the Company's Board of Directors declared a quarterly cash dividend of \$0.10 per share to be paid on February 21, 2024 to shareholders of record as of January 31, 2024.

Future dividend declarations, if any, as well as the record and payment dates for such dividends, are subject to the final determination of our Board of Directors. Furthermore, the credit agreement governing the Credit Facilities contains restrictions that may limit our ability to pay dividends.

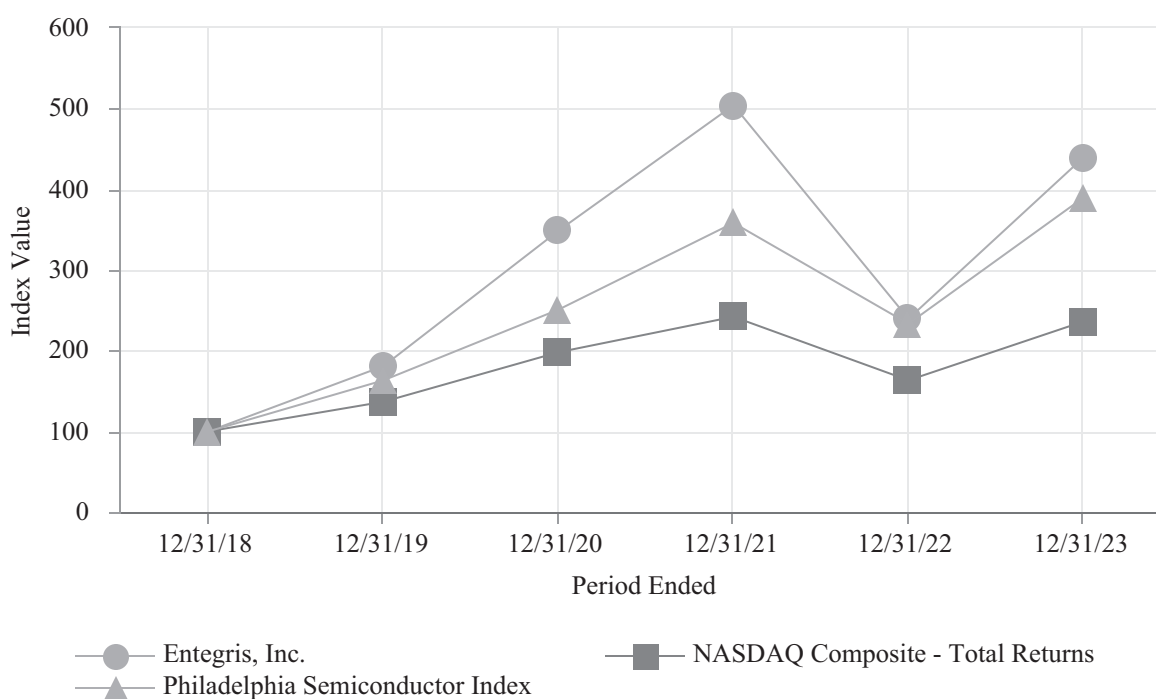
Issuer Sales of Unregistered Securities During the Past Three Years

None.

Comparative Stock Performance

The following graph compares the cumulative total shareholder return on the common stock of Entegris, Inc. from December 31, 2018 through December 31, 2023 with the cumulative total return on (1) The Nasdaq Composite Index, and (2) The Philadelphia Semiconductor Index, assuming \$100 was invested at the close of trading on December 31, 2018 in Entegris, Inc. common stock, the Nasdaq Composite Index and the Philadelphia Semiconductor Index and that all dividends are reinvested.

Comparison of Five-Year Cumulative Total Return Assumes Initial Investment of \$100 December 31, 2023



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	December 31, 2018	December 31, 2019	December 31, 2020	December 31, 2021	December 31, 2022	December 31, 2023
Entegris, Inc.	\$100.00	\$180.85	\$348.72	\$504.19	\$239.52	\$439.54
Nasdaq Composite	100.00	136.69	198.09	242.03	163.27	236.15
Philadelphia Semiconductor Index	100.00	163.26	250.87	358.36	233.36	389.73

Issuer Purchases of Equity Securities

The Company did not repurchase any of its common stock in 2023 under a Board-authorized common stock repurchase plan.

The Company issues common stock awards under its equity incentive plans. In the 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 pursuant to a Board-authorized common stock repurchase plan.

Item 6. [Reserved]

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

The following discussion and analysis of the Company's consolidated financial condition and results of operations should be read along with the consolidated financial statements and the accompanying notes thereto included elsewhere in this Annual Report on Form 10-K. This discussion contains forward-looking statements that involve numerous risks and uncertainties, including, but not limited to, those described in Item 1A, "Risk Factors" and the "Cautionary Statements" section of this Item 7 below. You should review Item 1A "Risk Factors" of this Annual Report on Form 10-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 has elected to omit discussion of the earliest of the three years covered by the consolidated financial statements presented except for the segment analysis. Information pertaining to fiscal year 2021 results of operations and the year-over-year comparison of changes in our Financial Condition and Results of Operations as of and for the year ended December 31, 2022 and 2021 can be found in Part II, Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations" of our Annual Report on Form 10-K for the year ended December 31, 2022, filed on February 23, 2023.

Cautionary Statements

This Annual Report on Form 10-K and the portions of the Company's Definitive Proxy Statement incorporated by reference in this Annual Report on Form 10-K contain "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 supply chain matters; inflationary pressures; 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; the development of new products and the success of their introductions; the focus of the Company's ER&D projects; the Company's ability to execute on our business strategies, including with respect to the Company's expansion of its manufacturing presence in Taiwan and in Colorado Springs; 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 and divestitures the Company has made and commercial partnerships the Company has established, including the acquisition of CMC Materials (now known as CMC Materials LLC) ("CMC Materials"); trends relating to the fluctuation of currency exchange rates; 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 Annual 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, 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 level of, and obligations associated with, the Company's indebtedness, including the debts incurred in connection with the acquisition of CMC Materials; risks related to the acquisition and integration of CMC Materials, including unanticipated difficulties or expenditures relating thereto, the ability to achieve the anticipated synergies and value-creation contemplated by the acquisition of CMC Materials and the diversion of management time on transaction-related matters; raw material shortages, supply and labor constraints, price increases, inflationary pressures and rising interest rates; operational, political and legal risks of the Company's international operations; the Company's dependence on sole source and limited source suppliers; 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; substantial competition; the Company's concentrated customer base; the Company's ability to identify, complete and integrate acquisitions, joint ventures, divestitures or other similar transactions; the Company's ability to effectively implement any organizational changes; the Company's ability to protect and enforce intellectual property rights; the impact of regional and global instabilities, hostilities and geopolitical uncertainty, including, but not limited to, the ongoing conflicts between Ukraine and Russia, between Israel and Hamas and the current conflict in the Red Sea, as well as the global responses thereto; the increasing complexity of certain manufacturing processes; changes in government regulations of the countries in which the Company operates, including the imposition of tariffs, export controls and other trade laws and restrictions and changes to national security and international trade policy, especially as they relate to China; fluctuation of currency exchange rates; fluctuations in the market price of the Company's stock; and other matters. These forward-looking statements are based on current management expectations and assumptions only as of the date of this Annual Report on Form 10-K. They 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, the risk factors and additional information described in this Annual Report on Form 10-K under the caption "Risk Factors," elsewhere in this Annual Report on Form 10-K and in the Company's other periodic filings. Except as required under the federal securities laws and the rules and regulations of the SEC, the Company undertakes

no obligation to update publicly any forward-looking statements or information contained herein, which speak as of their respective dates.

Overview

This overview is not a complete discussion of the Company's financial condition, changes in financial condition and results of operations; it is intended merely to facilitate an understanding of the most salient aspects of its financial condition and operating performance and to provide a context for the detailed discussion and analysis that follows, and 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 supplier of mission-critical advanced materials and process solutions for the semiconductor and other high-technology industries. We leverage our unique breadth of capabilities to help our customers improve their productivity, performance and technology in the most advanced manufacturing environments.

In the third quarter of 2023, the Company realigned its segments into three reportable segments discussed below, which align with the key elements of the advanced semiconductor manufacturing ecosystem. The current annual and succeeding annual periods will disclose the reportable segments with prior periods recast to reflect the change.

- The Materials Solutions segment, or MS, provides materials-based solutions, such as chemical mechanical planarization (“CMP”) slurries and pads, deposition materials, process chemistries and gases, formulated cleans, etchants and other specialty materials that enable our customers to achieve better device performance and faster time to yield, while providing for lower total cost of ownership.
- The Microcontamination Control segment, or MC, offers advanced solutions that improve customers’ yield, device reliability and cost by filtering and purifying critical liquid chemistries and gases used in semiconductor manufacturing processes and other high-technology industries.
- The Advanced Materials Handling segment, or AMH, develops solutions that improve customers’ yields by protecting critical materials during manufacturing, transportation, and storage, including products that monitor, protect, transport and deliver critical liquid chemistries, wafers, and other substrates for a broad set of applications in the semiconductor, life sciences and other high-technology industries.

These segments share common business systems and processes, technology centers and technology roadmaps. With the complementary capabilities across these segments, we believe we are uniquely positioned to create new, co-optimized and increasingly integrated solutions for our customers, which should translate into improved device performance, lower cost of ownership and faster time to market. This capability has been further enhanced with the acquisition of CMC Materials. For example, we can now develop and provide complementary offerings solving customers’ complex manufacturing challenges across the deposition, CMP process and post-CMP modules with co-optimized products from each of our divisions, such as advanced deposition materials, CMP slurries, pads and post-CMP cleaning chemistries from our MS segment, CMP slurry filters from our MC segment, and CMP slurry high-purity packaging and fluid monitoring systems from our AMH segment.

Impact of New Export Control Regulations

On October 17, 2023, the U.S Department of Commerce, Bureau of Industry and Security (“BIS”) announced updates to export control regulations, originally issued on October 7, 2022, regarding the sale of certain products and services related to advanced computing items, semiconductor manufacturing equipment, and items that can support end uses related to the development and production of advanced-node integrated circuits and semiconductor manufacturing equipment, among others. The updated rules modify and expand restrictions on the sale of products and the provision of certain services by U.S. persons to some companies and domestic fabs located in certain countries, including China, without prior U.S. governmental authorization. See Item 1A, “Risk Factors,” in this Annual Report on Form 10-K for additional information regarding risk associated with the impact of new export control regulations, including under the caption “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, especially as they relate to China, could have an adverse impact on our operations and reduce the competitiveness or availability of our products relative to local and global competitors.”

Impact of Conflicts in the Middle East

The military conflict between Israel and militant groups led by Hamas and the current conflict in the Red Sea have caused uncertainty in the global markets, including, but not limited to, disruptions to shipping routes. Revenue relating to products manufactured from raw materials or components sourced from or through this region does not constitute a material portion of our business and historically we have not had significant revenue in this region. There continues to be uncertainty regarding the ultimate impact these conflicts will have on the global economy, supply chains, logistics, fuel prices, raw material pricing and our business.

Recent Events

On February 10, 2023, the Company terminated the definitive agreement with Infineum to sell its PIM business. At the time of the termination, the transaction had not received clearance under the HSR Act. In accordance with the terms of the definitive agreement, the Company received a \$12.0 million termination fee from Infineum in the first quarter of 2023. Also in the first quarter of 2023, the Company incurred a fee of \$1.1 million to the third-party financial adviser it had engaged to assist with the transaction. The assets and liabilities of the PIM business are classified as held for sale as of December 31, 2023. See Note 5 to our consolidated financial statements for further discussion.

On March 1, 2023, the Company completed its divestiture of the QED business. The Company received proceeds of \$134.3 million. See Note 5 to our consolidated financial statements for further discussion.

On March 10, 2023 and September 11, 2023, the Company amended its Existing Credit Agreement. The First Amendment, dated March 10, 2023, provided for, among other things, the refinancing of the Company's then-outstanding term loans B under the senior secured term loan facility due 2029 in an aggregate principal amount of \$2.495 billion with a new tranche of term loans B in an aggregate principal amount of \$2.495 billion. The amended loans under the First Amendment bore interest at a rate per annum equal to the Secured Overnight Financing Rate ("SOFR") plus an applicable margin of 2.75% which was a reduction from the applicable margin of 3.00% prior to the First Amendment. The Second Amendment, dated September 11, 2023, provides for, among other things, the refinancing of the Company's outstanding term loans B under the senior secured term loan facility due 2029 in an aggregate principal amount of \$2.318 billion with a new tranche of term loans B in an aggregate principal amount of \$2.318 billion. The outstanding term loans B under the amended senior secured term loan facility due 2029 bear interest, at a rate per annum equal to the SOFR plus an applicable margin of 2.50% which is a reduction from the applicable margin of 2.75% provided for in the First Amendment. See Note 11 to our consolidated financial statements for further discussion.

On June 5, 2023, the Company announced the termination of an Alliance Agreement (the "Alliance Agreement") between the Company and MacDermid Enthone Inc., a global business unit of Element Solutions Inc. ("MacDermid Enthone"). In connection with the termination of the Alliance Agreement, Entegris received net proceeds of \$191.2 million in 2023. See Note 5 to our consolidated financial statements for further discussion.

On October 2, 2023, the Company completed its divestiture of the Electronic Chemicals ("EC") business. The Company received cash proceeds of \$737.1 million, or net proceeds of \$675.2 million. See Note 5 to our consolidated financial statements for further discussion.

Critical Accounting Policies and Estimates

Management's discussion and analysis of financial condition and results of operations are based upon the Company's consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States ("GAAP"). The preparation of these 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. At each balance sheet date, management evaluates its estimates, including, but not limited to, those related to long-lived assets (property, plant and equipment, and identified intangible assets), goodwill and income taxes. The Company bases its estimates on historical experience and various other assumptions that management believes to be reasonable under the circumstances. Management's utilization of different judgments or estimates could result in material differences in the amount and timing of the Company's results of operations for any period. In addition, actual results could be different from the Company's current estimates, possibly resulting in increased future charges to earnings.

Our critical accounting policies that are most significantly affected by estimates, assumptions and judgments used in the preparation of the Company's consolidated financial statements relate to business acquisitions and are discussed below. See Note 1 to the Company's consolidated financial statements for additional information about the Company's other significant accounting policies.

Impairment of Goodwill

Goodwill is tested for impairment annually as of August 31. If circumstances change during interim periods between annual tests that would more likely than not reduce the fair value of a reporting unit below its carrying value, the Company will test goodwill for impairment. Factors that would necessitate an interim goodwill impairment assessment include a sustained decline in the Company's stock price, effects on a reporting unit such as a change in the composition or carrying amounts of its net assets, prolonged negative industry or economic trends, or significant under-performance relative to expected, historical or projected future operating results. Management uses judgment to determine whether to use a qualitative analysis or a quantitative fair value measurement for its goodwill impairment testing. The Company's fair value measurement approach combines the income and market valuation techniques for each of the Company's reporting units that carry goodwill. These valuation techniques use estimates and assumptions including, but not limited to, the determination of appropriate market

comparable, projected future cash flows (including timing and profitability), the discount rate reflecting the risk inherent in future cash flows, the perpetual growth rate, and projected future economic and market conditions.

If a reporting unit fails the quantitative impairment test, impairment expense is immediately recorded as the difference between the reporting unit's fair value and carrying value not to exceed the amount of goodwill recorded.

Business Acquisitions

The Company accounts for acquired businesses using the acquisition method of accounting, which requires that the assets acquired and liabilities assumed be recorded at the date of acquisition at their respective fair values. The judgments made in determining the estimated fair value assigned to each class of assets acquired and liabilities assumed, as well as asset lives, can materially impact net income. Accordingly, for significant items, the Company typically obtains assistance from a third-party valuation firm.

There are several methods that can be used to determine the fair value of assets acquired and liabilities assumed in a business combination. For intangible assets, the Company normally utilizes the "income method," which starts with a forecast of all of the expected future net cash flows attributable to the subject intangible asset. These cash flows are then adjusted to present value by applying an appropriate discount rate that reflects the risk factors associated with the cash flow streams. Depending on the asset valued, the key assumptions included one or more of the following: (1) future revenue growth rates, (2) future gross margin, (3) future selling, general and administrative expenses, (4) royalty rates, and (5) discount rates.

Estimating the useful life of an intangible asset also requires judgment. For example, different types of intangible assets will have different useful lives, influenced by the nature of the asset, competitive environment, and rate of change in the industry. Certain assets may even be considered to have indefinite useful lives. All of these judgments and estimates can significantly impact the determination of the amortization period of the intangible asset, and thus net income.

Results of Operations

Year ended December 31, 2023 compared to year ended December 31, 2022

The following table sets forth the results of operations and the relationship between various components of operations, stated as a percent of net sales, for 2023 and 2022.

	2023		2022	
		% of net sales		% of net sales
<i>(Dollars in thousands)</i>				
Net sales	\$ 3,523,926	100.0 %	\$ 3,282,033	100.0 %
Cost of sales	2,026,321	57.5	1,885,620	57.5
Gross profit	1,497,605	42.5	1,396,413	42.5
Selling, general and administrative expenses	576,194	16.4	543,485	16.6
Engineering, research and development expenses	277,313	7.9	228,994	7.0
Amortization of intangible assets	214,477	6.1	143,953	4.4
Goodwill impairment	115,217	3.3	—	—
Gain on termination of Alliance Agreement	(184,754)	(5.2)	—	—
Operating income	499,158	14.2	479,981	14.6
Interest expense	312,378	8.9	212,669	6.5
Interest income	(11,257)	(0.3)	(3,694)	(0.1)
Other expense, net	25,367	0.7	23,926	0.7
Income before income taxes	172,670	4.9	247,080	7.5
Income tax (benefit) expense	(8,413)	(0.2)	38,160	1.2
Equity in net loss of affiliates	414	—	—	—
Net income	\$ 180,669	5.1	\$ 208,920	6.4

Net sales For 2023, net sales were \$3,523.9 million, increased by \$241.9 million, or 7%, from 2022. An analysis of the factors underlying the increase in net sales is presented in the following table:

<i>(In thousands)</i>	
Net sales in 2022	\$ 3,282,033
Increase associated with CMC Materials acquisition	537,837
Decrease associated with divestitures	(116,211)
Decrease mainly associated with volume exclusive of CMC Materials	(146,503)
Decrease associated with effect of foreign currency translation	(33,230)
Net sales in 2023	\$ 3,523,926

The sales increase was attributable, in part, to a total of \$537.8 million of sales of new products resulting from the acquisition of CMC Materials. This increase was partially offset by an absence of sales totaling \$116.2 million resulting from the divestitures of QED and the Electronic Chemicals business as well as the termination of the Alliance Agreement. Total net sales also reflected unfavorable foreign currency translation effects of \$33.2 million, mainly due to the significant weakening of the Japanese yen relative to the U.S. dollar, and decreased demand from customers in the semiconductor market, resulting in a decrease of \$146.5 million compared to the year ago period ended December 31, 2022.

Sales percentage on a geographic basis for 2023 and 2022 and the percentage increase (decrease) in sales for 2023 compared to sales for 2022 were as follows:

	Year ended		Percentage increase (decrease) in sales
	December 31, 2023	December 31, 2022	
North America	25 %	24 %	12 %
Taiwan	17 %	20 %	(11)%
China	16 %	15 %	13 %
South Korea	13 %	13 %	7 %
Japan	10 %	11 %	5 %
Europe	11 %	10 %	24 %
Southeast Asia	7 %	7 %	12 %

The increase in sales to customers for all countries and regions, except Taiwan, in the table above was principally driven by the inclusion of sales from the acquisition of CMC Materials. The decrease in sales in Taiwan primarily relates to lower sales demand of AMH and MC products partially offset by an increase in sales resulting from the inclusion of sales from the CMC Materials acquisition.

Gross margin

The following table sets forth gross margin as a percentage of net sales:

	2023	2022	Percentage point change
Gross margin as a percentage of net sales:	42.5 %	42.5 %	—

Gross margin was unchanged for 2023 compared to 2022, which was primarily due to the absence of a \$61.9 million charge for fair value write-up of acquired CMC Materials inventory sold during the year ended December 31, 2022, partially offsetting the effect of lower plant utilization in 2023.

Selling, general and administrative expenses

Selling, general and administrative (“SG&A”) expenses consist primarily of payroll and related expenses for the sales and administrative staff, professional fees (including accounting, legal and technology costs and expenses), and sales and marketing costs. SG&A expenses for 2023 increased \$32.7 million, or 6%, to \$576.2 million from \$543.5 million in 2022.

An analysis of the factors underlying the increase in SG&A expenses is presented in the following table:

(In thousands)

Selling, general and administrative expenses in 2022	\$ 543,485
Employee costs, mainly driven by the inclusion of CMC Materials	35,671
Impairment on long-lived assets, see Note 3 to the Company’s Consolidated Financial Statements	30,464
Loss on sale of businesses, see Note 5 to the Company’s Consolidated Financial Statements	23,822
Professional costs, mainly driven by the inclusion of CMC Materials	14,321
Computer supplies expense, mainly driven by the inclusion of CMC Materials	6,367
Project related expense, mainly driven by the inclusion of CMC Materials	3,995
Integration, deal and transaction costs, mainly due to CMC Materials acquisition in prior year	(95,712)
Other increases, net	13,781
Selling, general and administrative expenses in 2023	<u>\$ 576,194</u>

Engineering, research and development expenses

ER&D expenses consist of expenses for the support of current product lines and the development of new products and manufacturing technologies. These expenses were \$277.3 million in 2023 and \$229.0 million in 2022.

An analysis of the factors underlying the increase in ER&D expenses is presented in the following table:

(In thousands)

Engineering, research and development expense in 2022	\$	228,994
Employee costs, mainly driven by the inclusion of CMC Materials		27,434
Depreciation expense, mainly driven by the inclusion of CMC Materials		11,983
Project related costs, mainly driven by the inclusion of CMC Materials		4,902
Other increases, net		4,000
Engineering, research and development expense in 2023	\$	277,313

The Company's overall ER&D efforts will continue to focus on developing and improving its technology platforms for semiconductor and advanced processing applications and identifying and developing products for new applications. The Company often works directly with its customers to address their particular needs.

Amortization of intangible assets Amortization of intangible assets was \$214.5 million in 2023 compared to \$144.0 million for 2022. The increase primarily reflects the full-year of amortization expense associated with the intangible assets acquired in the CMC Materials acquisition.

Goodwill impairment The Company recorded a goodwill impairment charges of \$115.2 million in 2023. See Note 3 to the Company's consolidated financial statements for further discussion.

Gain on termination of Alliance Agreement In connection with the termination of the Alliance Agreement, the Company recognized a pre-tax gain, net of \$184.8 million in 2023. See Note 5 to the Company's consolidated financial statements for further discussion.

Interest expense Interest expense was \$312.4 million in 2023 and \$212.7 million in 2022. Interest expense includes interest associated with debt outstanding and the amortization of debt issuance costs associated with such borrowings. The increase was primarily driven by a full year of interest expense based on timing on CMC Materials close in 2022.

Interest income Interest income was \$11.3 million in 2023 and \$3.7 million in 2022. The increase reflects rising average interest rates and cash balances.

Other expense, net Other expense, net, was \$25.4 million in 2023 compared to \$23.9 million in 2022.

In 2023, other expense, net consisted mainly of loss of extinguishment and modification of debt of \$29.9 million associated with the repayments on the Company's bridge credit facility and senior secured term loan facility and the amendments of the Company's Existing Credit Agreement (see Note 11 to the Company's consolidated financial statements) and foreign currency transaction losses of \$5.7 million, partially offset by net proceeds received of \$10.9 million resulting from the termination of the definitive agreement with Infineum related to the PIM business.

In 2022, other expense, net consisted mainly of consisted mainly of foreign currency transaction losses of \$23.0 million.

Income tax expense The Company recorded income tax benefit of \$8.4 million in 2023 compared to income tax expense of \$38.2 million in 2022. The Company's effective tax rate was (4.9)% in 2023 compared to an effective tax rate of 15.4% in 2022.

The decrease in the effective tax rate from 2022 to 2023 relates to a tax benefit of \$17.4 million recorded in 2023 related to divestiture and impairment activity. Additionally, the tax rate was lower in 2023 due to changes to the jurisdictional income mix resulting from the acquisition of CMC Materials and the temporary changes in the U.S. tax regulations pertaining to foreign tax credits. The tax rate in 2022 was higher due to non-deductible acquisition related costs and a decrease in discrete benefits related to share-based compensation.

Net income Net income was \$180.7 million, or \$1.20 per diluted share, in 2023 compared to net income of \$208.9 million, or \$1.46 per diluted share, in 2022. The decrease reflects the Company's aforementioned operating results described in greater detail above.

Non-GAAP Financial Measures Information The Company's consolidated financial statements are prepared in conformity with accounting principles generally accepted in the United States. 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 "Non-GAAP Information" included below in this section for additional detail, including the reconciliation of the Company's non-GAAP measures to the most directly comparable GAAP measures.

The Company's non-GAAP financial measures include Adjusted EBITDA and Adjusted Operating Income, together with related percentage changes, and Non-GAAP Earnings Per Share, or EPS.

Adjusted EBITDA decreased to \$942.4 million in 2023, compared to \$973.2 million in 2022. Adjusted EBITDA as a percent of net sales was 26.7% in 2023 compared to 29.7% in 2022. Adjusted Operating Income decreased by 8.1% to \$769.7 million in 2023, compared to \$837.9 million in 2022. Adjusted Operating Income as a percent of net sales was 21.8% in 2023 compared to 25.5% in 2022. Non-GAAP EPS decreased 29.2% to \$2.64 in 2023, compared to \$3.73 in 2022. The decreases in Adjusted EBITDA and Adjusted Operating Income are primarily due to lower plant utilization and higher operating expenses. The decrease in Non-GAAP EPS is primarily attributable to higher interest expense associated with debt financing in connection with the CMC Materials acquisition.

Segment Analysis

In the third quarter of 2023, in order to align its segment financial reporting with a change in its business structure, the Company realigned its segments. Following the segment realignment, the Company's three reportable segments are as follows (1) Materials Solutions, (2) Microcontamination Control, and (3) Advanced Materials Handling. Accordingly, our segment information was restated retroactively in the third quarter of fiscal year 2023. The segment realignment had no impact on the Microcontamination Control or Advanced Materials Handling segment financial reporting. See Note 21 to the consolidated financial statements for additional information on the Company's three segments.

The following table and discussion reflects the results of operations of the Company's three reportable segments for the years ended December 31, 2023, 2022 and 2021.

<i>(In thousands)</i>	2023	2022	2021
Materials Solutions			
Net sales	\$ 1,689,467	\$ 1,380,208	\$ 711,291
Segment profit	296,375	219,189	167,807
Microcontamination Control			
Net sales	\$ 1,127,555	\$ 1,105,996	\$ 919,363
Segment profit	395,348	411,475	321,300
Advanced Materials Handling			
Net sales	\$ 758,648	\$ 846,492	\$ 704,946
Segment profit	136,100	183,738	159,995
Unallocated general and administrative expenses	\$ 114,188	\$ 190,468	\$ 49,478

Materials Solutions (MS)

For 2023, MS net sales increased to \$1,689.5 million, up 22% from \$1,380.2 million in 2022. The sales increase primarily reflects the inclusion of sales of product lines resulting from the acquisition of CMC Materials totaling \$537.8 million, partially offset by an absence of sales totaling \$116.2 million resulting from the divestitures of QED and the EC business, the termination of the Alliance Agreement and decline in demand across the semiconductor market.

MS reported a segment profit of \$296.4 million for 2023, up 35% compared to \$219.2 million in 2022. The increase in MS's profit in 2023 was primarily associated with a gain of \$184.8 million resulting from the termination of the Alliance Agreement (see Note 5 to our consolidated financial statements for further discussion), the absence of a \$61.9 million charge for a fair value write-up resulting from the sale of acquired CMC Materials inventory that was recorded in the year-ago period and segment profit attributed to the CMC Materials acquisition, partially offset by a goodwill impairment charge of \$104.8 million related to the EC reporting unit (see Note 3 to our consolidated financial statements for further discussion), a \$8.9 million loss on asset held for sale related to the EC reporting unit, a goodwill impairment charge of \$10.4 million, long-lived asset impairment charge of \$30.5 million (see Note 3 to our consolidated financial statements for further discussion) and a \$14.9 million loss on the sale of QED.

For 2022, MS net sales increased to \$1,380.2 million, up 94% from \$711.3 million in 2021. The sales increase primarily reflects the inclusion of sales of \$594.4 million attributed to acquisitions, primarily of CMC Materials, and also reflects modestly improved sales of advanced deposition materials, formulated cleans, selective etch and specialty coating products.

MS reported a segment profit of \$219.2 million for 2022, up 31% compared to \$167.8 million in 2021. The increase in MS's profit in 2022 was primarily due to the segment profit attributed to the CMC Materials acquisition, partially offset by unfavorable product mix and a \$61.9 million charge for a fair value write-up resulting from the sale of acquired CMC Materials inventory.

Microcontamination Control (MC)

For 2023, MC net sales increased to \$1,127.6 million, up 2% from \$1,106.0 million in 2022. The sales increase was primarily due to improved sales from liquid filtration products.

MC reported a segment profit of \$395.3 million for 2023, down 4% compared to \$411.5 million in 2022. The decrease in MC's profit in 2023 was primarily due to increased costs associated with the ramp up of our new manufacturing facility in Taiwan and increased investment in research and development.

For 2022, MC net sales increased to \$1,106.0 million, up 20% from \$919.4 million in 2021. The sales increase was due to improved performance across substantially all platforms, with growth especially strong in liquid filtration and gas filtration products.

MC reported a segment profit of \$411.5 million for 2022, up 28% compared to \$321.3 million in 2021. The increase in MC's profit in 2022 was primarily due to higher gross profit related to the increased sales volume, partially offset by higher operating expenses of 17%, primarily due to higher compensation costs.

Advanced Materials Handling (AMH)

For 2023, AMH net sales decreased 10% to \$758.6 million from \$846.5 million in 2022. The sales decrease was mainly due to lower sales from our microenvironment solutions products.

AMH reported a segment profit of \$136.1 million for 2023, down 26% compared to \$183.7 million in 2022. The decrease in AMH's profit in 2023 was primarily due to lower sales and lower factory utilization.

For 2022, AMH net sales increased 20% to \$846.5 million from \$704.9 million in 2021. The sales increase was mainly due to improved sales from wafer handling and fluid handling.

AMH reported a segment profit of \$183.7 million for 2022, up 15% compared to \$160.0 million in 2021. The increase in AMH's profit in 2022 was primarily due to higher sales volume, partially offset by a 16% increase in operating expenses, primarily due to higher compensation costs.

Unallocated general and administrative expenses

Unallocated general and administrative expenses for 2023 totaled \$114.2 million compared to \$190.5 million for 2022. The \$76.3 million decrease is primarily due to a \$95.7 million decrease in deal, transaction and integration costs related to the acquisition of CMC Materials, partially offset by an increase in employee costs of \$14.1 million.

Liquidity and Capital Resources

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

<i>In thousands</i>	December 31, 2023	December 31, 2022
Cash, cash equivalents and restricted cash	\$ 456,929	\$ 563,439
Working capital	1,463,332	1,573,254
Total debt	4,577,141	5,784,893

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.

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 and for the longer term.

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. During 2023, we did not experience difficulty accessing capital and credit markets, but 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:

<i>(in thousands)</i>	Year ended December 31, 2023	Year ended December 31, 2022
Net cash provided by operating activities	\$ 629,562	\$ 352,283
Net cash provided by (used in) investing activities	553,071	(4,945,709)
Net cash (used in) provided by financing activities	(1,282,629)	4,766,203
(Decrease) increase in cash and cash equivalents	(106,510)	160,874

Operating activities

Cash provided by operating activities is net income adjusted for certain non-cash items and changes in assets and liabilities.

Compared to 2022, the \$277.3 million increase in cash provided by operating activities in 2023 was primarily driven by \$288.9 million of changes in operating assets and liabilities, offset by a \$11.7 million decrease of net income adjusted for non-cash reconciling items.

Changes in operating assets and liabilities were driven by changes in trade accounts and notes receivable, inventories, accounts payable and accrued liabilities, income taxes payable and refundable income taxes. The change for trade receivables was mainly due to lower sales. The change for inventory was driven by the Company's initiative to reduce inventory. The change for accounts payable and accrued liabilities was driven by lower vendor purchases and timing of payments. The change for income taxes payable and refundable income taxes was due to larger tax payments compared to the previous year.

Investing activities

Investing cash flows consist primarily of capital expenditures, cash used for acquisitions, proceeds from sales of businesses and proceeds from sales of property and equipment.

In 2023, there was \$553.1 million of cash provided by investing activities compared to \$4,945.7 million cash used in investing activities in 2022. The decrease resulted primarily from the absence of the prior-year acquisition of CMC Materials, partially offset by proceeds from the sale of QED and the EC businesses totaling \$815.0 million, net proceeds from the termination of the Alliance Agreement totaling \$199.3 million in the current year, and a \$9.4 million decrease in capital expenditures in the current year compared to the prior year.

Acquisition of property and equipment totaled \$456.8 million in 2023, which primarily reflected investments in facilities, equipment and tooling, compared to \$466.2 million in 2022, which also primarily reflected investments in equipment and tooling. Capital expenditures in 2023 generally reflected more spending related to growth capacity, including our previously announced investment in our KSP site and new facility in Colorado Springs, Colorado.

In 2022, the Company acquired CMC Materials. The cash used to acquire these assets was \$4,474.9 million, net of cash acquired. The transaction is described in further detail in Note 4 to the Company's consolidated financial statements.

Financing activities

Financing cash flows consist primarily of repurchases of common stock, payment of dividends to stockholders, issuance and repayment of short-term and long-term debt, and proceeds from the sale of shares of common stock through employee equity incentive plans.

In 2023, there was \$1,282.6 million of cash used in financing activities compared to \$4,766.2 million cash provided by in financing activities in 2022. The change was primarily due to the net debt activity, which was a use of cash of \$1,259.7 million in 2023 compared to a source of cash of \$4,831.3 million. See Note 11 to the Company's consolidated financial statements for further discussion of the debt financing that occurred during the year.

The Company's total dividend payments were \$60.2 million in 2023 compared to \$57.3 million in 2022. The Company has paid a cash dividend in each quarter since the fourth quarter of 2017. On January 17, 2024, the Company's board of directors declared a quarterly cash dividend of \$0.10 per share to be paid on February 21, 2024 to shareholders of record as of January 31, 2024.

Other Liquidity and Capital Resources Considerations

Debt at par value outstanding

<i>(In thousands)</i>	December 31, 2023	December 31, 2022
Senior secured term loan due 2029	\$ 1,373,774	\$ 2,495,000
Senior secured notes due 2029 at 4.75%	1,600,000	1,600,000
Senior unsecured notes due 2030 at 5.95%	895,000	895,000
Senior unsecured notes due 2029 at 3.625%	400,000	400,000
Senior unsecured notes due 2028 at 4.375%	400,000	400,000
Bridge credit facility due 2023	—	135,000
Revolving facility due 2027	—	—
Total debt (par value)	<u>\$ 4,668,774</u>	<u>\$ 5,925,000</u>

On March 10, 2023, and September 11, 2023, the Company amended its Existing Credit Agreement. The First Amendment, dated March 10, 2023, provided for, among other things, the refinancing of the Company's outstanding term loans B under the senior secured term loan facility due 2029 in an aggregate principal amount of \$2.495 billion with a new tranche of term loans B in an aggregate principal amount of \$2.495 billion. The amended loans under the First Amendment bore interest at a rate per annum equal to the Secured Overnight Financing Rate ("SOFR") plus an applicable margin of 2.75% which was a reduction from the applicable margin of 3.00% prior to the First Amendment. The Second Amendment, dated September 11, 2023, provides for, among other things, the refinancing of the Company's outstanding term loans B under the senior secured term loan facility due 2029 in an aggregate principal amount of \$2.318 billion with a new tranche of term loans B in an aggregate principal amount of \$2.318 billion. Under the Second Amendment, the outstanding term loans B under the amended senior secured term loan facility due 2029 will bear interest, at a rate per annum equal to the SOFR plus an applicable margin of 2.50% which is a reduction from the applicable margin of 2.75% provided for in the First Amendment. See Note 11 to our consolidated financial statements for further discussion.

During the fiscal year 2023, the Company repaid \$1.1 billion of the outstanding borrowings under the New Tranche B Term Loan and \$135.0 million in full repayment of all outstanding borrowings under the bridge credit facility.

Through December 31, 2023, the Company was in compliance with all applicable financial covenants included in the terms of its debt arrangements.

The Company has commitments under the Revolving Facility of \$575.0 million. 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 SOFR, plus, in each case, an applicable margin. During the twelve months ended December 31, 2023, there were no borrowings under this Revolving Facility and no balance was outstanding at December 31, 2023.

The Company also has a line of credit with one bank that provides for borrowings of Japanese yen for the Company's Japanese subsidiary equivalent to an aggregate of approximately \$7.1 million. There were no outstanding borrowings under this line of credit and no balance was outstanding at December 31, 2023.

Cash and cash requirements

<i>(In thousands)</i>	December 31, 2023	December 31, 2022
Cash and cash equivalents	\$ 456,929	\$ 561,559
U.S.	154,015	136,262
Non-U.S.	302,914	425,297
Restricted cash - U.S.	—	1,880
Cash, cash equivalents and restricted cash	<u>\$ 456,929</u>	<u>\$ 563,439</u>

Our cash and cash equivalents include cash on hand and highly liquid debt securities with original maturities of three months or less, which are valued at cost and approximate fair value. We utilize a variety of funding strategies in an effort to ensure that our worldwide cash is available in the locations in which it is needed.

Our restricted cash represented cash held in a "Rabbi" trust and is not available for general corporate purposes. See Note 6 to the consolidated financial statements for additional information. The Company had no restricted cash as of December 31, 2023.

Cash requirements

We have cash requirements to support working capital needs, capital expenditures, business acquisitions, contractual obligations, commitments, principal and interest payments on debt and other liquidity requirements associated with our operations. We generally intend to use available cash and funds generated from our operations to meet these cash requirements, but in the event that additional liquidity is required we may also borrow under our Revolving Facility.

The following table summarizes our short and long-term cash requirements as of December 31, 2023:

<i>(In thousands)</i>	Total	Due within one year of December 31, 2023	Due later than one year from December 31, 2023
Long-term debt (principal)	\$ 4,668,774	\$ —	\$ 4,668,774
Interest payments on long-term debt	1,314,383	236,790	1,077,593
Capital purchase obligations	136,357	57,363	78,994
Supply purchase obligations	11,658	6,333	5,325
Operating and financing leases	105,841	20,343	85,498
Income tax liabilities	267,545	77,403	190,142
Total	<u>\$ 6,504,558</u>	<u>\$ 398,232</u>	<u>\$ 6,106,326</u>

Long-term debt and interest payments on long-term debt. We have contractual obligations for principal and interest payments on our long-term debt. See Note 11 of the consolidated financials for additional information. Debt obligations are classified based on their stated maturity date, regardless of their classification on the Company's consolidated balance sheets. Interest projections on both variable and fixed rate long-term debt are based on interest rates effective as of December 31, 2023 and do not include \$91.6 million for net unamortized discounts and debt issuance costs. On July 28, 2022, the Company entered into a floating-to-fixed interest rate swap agreement to hedge the variability in SOFR-based interest payments associated with \$1.95 billion of its \$2.495 billion Initial Term Loan Facility. The notional amount of the swap is \$1.4 billion at December 31, 2023 and is scheduled to decrease quarterly and will expire on December 30, 2025. The impact of the interest rate swap is not considered in the interest payments above.

Capital purchase obligations. We have capital purchase obligations that represent commitments for the construction or purchase of property, plant and equipment. They were not recorded as liabilities on the Company's consolidated balance sheet as of December 31, 2023, as the Company had not yet received the related goods or taken title to the property.

We expect capital expenditure spending to be approximately \$350.0 million in 2024 for growth capacity investments and the construction of our new manufacturing facility in Colorado.

Supply purchase obligations. We have non-cancelable commitments, including take-or-pay contracts, that are not presented as capital purchase commitments above. They were not recorded as liabilities on the Company's consolidated balance sheet as of December 31, 2023, as the Company had not yet received the related goods or taken title to the property.

Operating and financing lease commitments. Commitments under operating and financing leases primarily relate to leasehold properties. See Note 15 of the consolidated financials for additional information.

Income tax liabilities. Of the tax liabilities included in the table above, \$67.7 million relates to uncertain tax positions. We are unable to accurately predict when these amounts will be realized or released. However, it is reasonably possible that there could be significant changes to our unrecognized tax benefits in the next twelve months due to an unforeseeable event (such as a tax audit settlement). See Note 17 of the consolidated financials for additional information.

New Accounting Pronouncements

Recently adopted accounting pronouncements Refer to Note 1 to the Company's consolidated financial statements for a discussion of accounting pronouncements implemented in 2023.

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

Non-GAAP Information The Company's 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 EPS, as well as certain other supplemental non-GAAP financial measures included in the discussion of the Company's financial results.

Adjusted EBITDA is defined by the Company as net income before, as applicable, (1) income tax (benefit) expense, (2) interest expense, (3) interest income, (4) other expense, net, (5) goodwill impairment, (6) deal and transaction costs, (7) integration costs, (8) contractual costs and non-cash integration costs, (9) restructuring costs, (10) loss (gain) on sale of businesses, (11) charge for fair value write-up of acquired inventory sold, (12) gain on termination of the Alliance Agreement, (13) impairment of long-lived assets, (14) amortization of intangible assets and (15) depreciation. Adjusted Operating Income is defined by the Company as Adjusted EBITDA exclusive of the depreciation addback noted above. The Company also utilizes ratios of non-GAAP financial measures such as Adjusted EBITDA to Company net sales and Adjusted Operating Income (referred to as Adjusted EBITDA Margin and Adjusted Operating Margin, respectively).

Non-GAAP Net Income is defined by the Company as net income before, as applicable, (1) goodwill impairment, (2) deal and transaction costs, (3) integration costs, (4) contractual costs and non-cash integration costs, (5) restructuring costs, (6) loss on extinguishment of debt and modification, (7) loss (gain) on sale of businesses, (8) gain on termination of the Alliance Agreement, (9) Infineum termination fee, net, (10) charge for fair value write-up of sale of acquired inventory, (11) interest expense, net, (12) impairment of long-lived assets, (13) amortization of intangible assets, (14) the tax effect of the foregoing adjustments to net income, stated on a per share basis, divided by diluted weighted average shares outstanding. Non-GAAP EPS is defined as our Non-GAAP Net Income divided by our diluted weighted-average shares outstanding.

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 its 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 from period-to-period 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 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, significant recurring expenses 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 and transaction costs, integration costs, asset or goodwill impairments, loss on extinguishment of debt 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.

The reconciliation of GAAP measures to adjusted operating income and Adjusted EBITDA for the years ended December 31, 2023 and 2022 are presented below:

<i>(In thousands)</i>	2023	2022
Net sales	\$ 3,523,926	\$ 3,282,033
Net income	\$ 180,669	\$ 208,920
Net income - as a % of net sales	5.1%	6.4%
Adjustments to net income		
Equity in net loss of affiliates	414	—
Income tax (benefit) expense	(8,413)	38,160
Interest expense	312,378	212,669
Interest income	(11,257)	(3,694)
Other expense, net	25,367	23,926
GAAP – Operating income	499,158	479,981
Operating margin - as a % of net sales	14.2%	14.6%
Goodwill impairment ¹	115,217	—
Deal and transaction costs ²	3,001	39,543
Integration costs:		
Professional fees ³	36,650	35,422
Severance costs ⁴	1,478	6,269
Retention costs ⁵	1,687	1,987
Other costs ⁶	13,710	7,053
Contractual and non-cash integration costs:		
CMC Materials retention costs ⁷	—	18,030
Stock-based compensation alignment ⁸	—	21,584
Change in control costs ⁹	—	22,350
Restructuring costs ¹⁰	14,745	—
Loss (gain) on sale of businesses ¹¹	23,839	(254)
Charge for fair value write-up of acquired inventory sold ¹²	—	61,932
Gain on termination of Alliance Agreement ¹³	(184,754)	—
Impairment of long-lived assets ¹⁴	30,464	—
Amortization of intangible assets ¹⁵	214,477	143,953
Adjusted Operating Income	769,672	837,850
Adjusted Operating Margin	21.8%	25.5%
Depreciation	172,683	135,371
Adjusted EBITDA	\$ 942,355	\$ 973,221
Adjusted EBITDA – as a % of net sales	26.7%	29.7%

¹ Non-cash impairment charges associated with goodwill.

² Deal and transaction costs associated with CMC Materials acquisition and completed and announced divestitures.

³ Represents professional and vendor fees recorded in connection with services provided by consultants, accountants, lawyers and other third-party service providers to assist us in integrating CMC Materials into our operations. These fees arise outside of the ordinary course of our continuing operations.

⁴ Represents severance charges related to the integration of the CMC Materials acquisition.

⁵ Represents retention charges related directly to the CMC Materials acquisition and completed and announced divestitures, and are not part of our normal, recurring cash operating expenses.

⁶ Represents other employee related costs and other costs incurred relating to the CMC Materials acquisition and the completed and announced divestitures. These costs arise outside of the ordinary course of our continuing operations.

⁷ Represents non-recurring costs associated with the CMC Materials retention program that was agreed upon and set forth in the definitive acquisition agreement.

⁸ Represents the non-cash incremental expense associated with adopting retirement vesting obligations on Entegris equity awards, similar to those of CMC Materials equity awards.

⁹ Relates to the change in control agreements that were in place with management of CMC Materials prior to the acquisition and the associated expense post-acquisition.

¹⁰ Restructuring charges resulting from cost saving initiatives.

¹¹ Loss (gain) from the sale of our businesses.

¹² Represents the additional cost of goods sold recognized in connection with the step-up of inventory valuation related to CMC Materials acquisition.

¹³ Gain on termination of the Alliance Agreement with MacDermid Enthone.

¹⁴ Impairment of long-lived assets.

¹⁵ Non-cash amortization expense associated with intangibles acquired in acquisitions.

The reconciliation of GAAP measures to Non-GAAP EPS for the years ended December 31, 2023 and 2022 are presented below:

<i>(In thousands, except per share data)</i>		2023	2022
Net income	\$	180,669	\$ 208,920
Adjustments to net income:			
Goodwill impairment ¹		115,217	—
Deal and transaction costs ²		3,001	39,543
Integration costs:			
Professional fees ³		36,650	35,422
Severance costs ⁴		1,478	6,269
Retention costs ⁵		1,687	1,987
Other costs ⁶		13,710	7,053
Contractual and non-cash integration costs:			
CMC Materials retention costs ⁷		—	18,030
Stock-based compensation alignment ⁸		—	21,584
Change in control costs ⁹		—	22,350
Restructuring costs ¹⁰		14,745	—
Loss on extinguishment of debt and modification ¹¹		29,896	3,287
Loss (gain) on sale of businesses ¹²		23,839	(254)
Gain on termination of Alliance Agreement ¹³		(184,754)	—
Infineum termination fee, net ¹⁴		(10,877)	—
Charge for fair value write-up of acquired inventory sold ¹⁵		—	61,932
Interest expense, net ¹⁶		—	29,822
Impairment on long-lived assets ¹⁷		30,464	—
Amortization of intangible assets ¹⁸		214,477	143,953
Tax effect of adjustments to net income and discrete tax items ¹⁹		(71,284)	(65,728)
Non-GAAP net income	\$	398,918	\$ 534,170
Diluted earnings per common share	\$	1.20	\$ 1.46
Effect of adjustments to net income	\$	1.45	\$ 2.27
Diluted non-GAAP earnings per common share	\$	2.64	\$ 3.73
Diluted weighted average shares outstanding		150,945	143,146

¹ Non-cash impairment charges associated with goodwill.

² Deal and transaction costs associated with the CMC Materials acquisition and completed and announced divestitures.

³ Represents professional and vendor fees recorded in connection with services provided by consultants, accountants, lawyers and other third-party service providers to assist us in integrating CMC Materials into our operations. These fees arise outside of the ordinary course of our continuing operations.

⁴ Represents severance charges related to the integration of CMC Materials.

⁵ Represents retention charges related directly to the CMC Materials acquisition and completed and announced divestitures, and are not part of our normal, recurring cash operating expenses.

⁶ Represents other employee-related costs and other costs incurred relating to the CMC Materials acquisition and completed and announced divestitures. These costs arise outside of the ordinary course of our continuing operations.

⁷ Represents non-recurring costs associated with the CMC retention program that was agreed upon and set forth in the definitive acquisition agreement.

⁸ Represents the non-cash incremental expense associated with adopting retirement vesting obligations on Entegris equity awards, similar to those of CMC Materials equity awards.

⁹ Relates to the change in control agreements that were in place with management of CMC Materials prior to the acquisition and the associated expense post-acquisition.

¹⁰ Restructuring charges resulting from cost saving initiatives.

¹¹ Non-recurring loss on extinguishment of debt and modification of our debt.

¹² Loss (gain) from the sale of our businesses.

¹³ Gain on termination of the Alliance Agreement with MacDermid Enthone.

¹⁴ Non-recurring gain from the termination fee with Infineum.

¹⁵ Represents the additional cost of goods sold recognized in connection with the step-up of inventory valuation related to the CMC Materials acquisition.

¹⁶ Non-recurring interest costs related to the financing of the CMC Materials acquisition.

¹⁷ Impairment of long-lived assets.

¹⁸ Non-cash amortization expense associated with intangibles acquired in acquisitions.

¹⁹ The tax effect of pre-tax adjustments to net income was calculated using the applicable marginal tax rate for each respective year.

Item 7A. Quantitative and Qualitative Disclosure About Market Risks.

Entegris' principal financial market risks are sensitivities to interest rates and foreign currency exchange rates. The Company's interest-bearing cash and cash equivalents and variable rate debt are subject to interest rate fluctuations. The Company's cash and cash equivalents include cash on hand and highly liquid debt securities with original maturities of three months or less. A 100-basis point change in interest rates would potentially increase or decrease annual net income by approximately \$3.4 million and \$15.5 million annually for the years ended December 31, 2023 and 2022, respectively. On July 28, 2022, the Company entered into a floating-to-fixed interest rate swap agreement to hedge the variability in SOFR-based interest payments associated with \$1.95 billion of its \$2.495 billion Initial Term Loan Facility. The notional amount of the swap is \$1.4 billion at December 31, 2023 and is scheduled to decrease quarterly and will expire on December 30, 2025.

The cash flows and results of operations of the Company's foreign-based operations are subject to fluctuations in foreign currency exchange rates. Approximately 22.0% and 22.7% of the Company's sales during 2023 and 2022 were collectively denominated in the South Korean won, New Taiwan dollar, Chinese renminbi, Canadian dollar, Malaysian ringgit, Singapore dollar, euro, Israeli shekel and the Japanese yen. Financial results therefore will be affected by changes in currency exchange rates. If all foreign currencies were to see a 10% reduction versus the U.S. dollar during the years ended December 31, 2023 and 2022, revenue would be negatively impacted by approximately \$76.8 million and \$62.6 million, respectively.

The Company occasionally uses derivative financial instruments to manage the foreign currency exchange rate risks associated with its foreign-based operations. However, we are unlikely to be able to hedge these exposures completely. We do not enter into forward contracts or other derivative instruments for speculative or trading purposes. See Note 13 of the consolidated financials for additional information.

Item 8. Financial Statements and Supplementary Data.

The information called for by this item is set forth in the Consolidated Financial Statements covered by the Report of Independent Registered Public Accounting Firm at the end of this report.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure.

Not applicable.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

Based on management's evaluation (with the participation of our principal executive officer and principal financial officer), as of the end of the period covered by this report, our principal executive officer and principal financial officer have concluded that our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act), are effective to provide reasonable assurance that information required to be disclosed by us in reports that we file or submit under the Exchange Act is recorded, processed, summarized, and reported within the time periods specified in SEC rules and forms, and is accumulated and communicated to management, including our principal executive officer and principal financial officer, as appropriate, to allow timely decisions regarding required disclosure.

Changes in Internal Control Over Financial Reporting

There were no changes to our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) that occurred during the quarter ended December 31, 2023 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Management Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of consolidated financial statements for external purposes in accordance with GAAP.

Management assessed our internal control over financial reporting as of December 31, 2023. Management based its assessment on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework). Management's assessment included evaluation of elements such as the design and operating effectiveness of key financial reporting controls, process documentation, accounting policies, and our overall control environment.

Based on its assessment, management has concluded that our internal control over financial reporting was effective as of the end of the fiscal year to provide reasonable assurance regarding the reliability of financial reporting and the preparation of consolidated financial statements for external reporting purposes in accordance with GAAP. We reviewed the results of management's assessment with the Audit and Finance Committee of our Board of Directors.

KPMG LLP, the independent registered public accounting firm which audited the consolidated financial statements included in this Annual Report on Form 10-K, has issued an attestation report on our internal control over financial reporting.

Inherent Limitations on Effectiveness of Controls

Our management, including our principal executive officer and principal financial officer, does not expect that our disclosure controls and procedures or our internal control over financial reporting will prevent or detect all errors and all fraud. A control system, no matter how well-designed and operated, can provide only reasonable, not absolute, assurance that the control system's objectives will be met. The design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Further, because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud, if any, have been detected.

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
Entegris, Inc.:

Opinion on Internal Control Over Financial Reporting

We have audited Entegris, Inc. and subsidiaries' (the Company) internal control over financial reporting as of December 31, 2023, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2023, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2023 and 2022, the related consolidated statements of operations, comprehensive income, equity, and cash flows for each of the years in the three-year period ended December 31, 2023, and the related notes (collectively, the consolidated financial statements), and our report dated February 14, 2024 expressed an unqualified opinion on those consolidated financial statements.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed 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. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ KPMG LLP

Minneapolis, Minnesota
February 14, 2024

Item 9B. Other Information.

None.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections.

Not Applicable.

PART III**Item 10. Directors, Executive Officers and Corporate Governance.**

Except as set forth below, the information required by this Item 10 has been omitted from this report, and is incorporated by reference to our Definitive Proxy Statement for the Entegris, Inc. Annual Meeting of Stockholders, which is currently scheduled to be held on April 24, 2024, and to be filed with the Securities and Exchange Commission pursuant to Regulation 14A within 120 days after the end of our 2023 fiscal year.

In 2005, our board of directors adopted a code of business ethics, The Entegris, Inc. Code of Business Ethics, applicable to all of our executives, directors and employees, as well as a set of corporate governance guidelines, which have been updated from time to time. The Entegris, Inc. Code of Business Ethics, the Corporate Governance Guidelines and the charters for our Audit & Finance Committee, Environmental, Health, Safety & Sustainability Committee, Governance & Nominating Committee and our Management Development & Compensation Committee all appear on our website at <http://www.Entegris.com> under “Investor Relations - Corporate Governance”. The Entegris, Inc. Code of Business Ethics, Corporate Governance Guidelines and committee charters are also available, free of charge, in print to any shareholder that requests a copy. Copies may be obtained by contacting our Secretary through our corporate headquarters. The Company intends to comply with the requirements of Item 5.05 of Form 8-K with respect to any amendment to, or waiver of, the provisions of the Entegris, Inc. Code of Business Ethics applicable to the registrant’s Chief Executive Officer, Chief Financial Officer, Chief Accounting Officer or Controller by posting notice of any such amendment or waiver at the same location on our website.

INFORMATION ABOUT OUR EXECUTIVE OFFICERS

The following is a list of our Executive Officers, their ages and their offices, as of the date of this Annual Report on Form 10-K.

<u>Name</u>	<u>Age</u>	<u>Office</u>
Bertrand Loy	58	<i>President and Chief Executive Officer</i>
Linda LaGorga	55	<i>Senior Vice President, Chief Financial Officer and Treasurer</i>
Sue Rice	65	<i>Senior Vice President, Global Human Resources</i>
Joe Colella	42	<i>Senior Vice President, General Counsel, Chief Compliance Officer and Secretary</i>
Jim O’Neill	59	<i>Senior Vice President and Chief Technology Officer</i>
Olivier Blachier	50	<i>Senior Vice President, Business and New Markets Development</i>
Clint Haris	51	<i>Senior Vice President and President, Microcontamination Control</i>
William Shaner	56	<i>Senior Vice President and President, Advanced Materials Handling</i>
Daniel Woodland	53	<i>Senior Vice President and President, Materials Solutions</i>
Michael Besnard	53	<i>Senior Vice President and Chief Commercial Officer</i>
Neil Richards	51	<i>Senior Vice President, Global Operations, Supply Chain, and Quality</i>
Michael D. Sauer	58	<i>Vice President, Controller & Chief Accounting Officer</i>

Bertrand Loy has been our Chief Executive Officer, President and a director since November 2012 and Chair of our Board of Directors since 2023. From July 2008 to November 2012, he served as our Executive Vice President and Chief Operating Officer. From August 2005 until July 2008, he served as our Executive Vice President in charge of our IT, global supply chain and manufacturing operations. He served as the Vice President and Chief Financial Officer of Mykrolis, a company spun out of Millipore Corporation, a life science products company, from January 2001 until August 2005. Prior to that, Mr. Loy served as the Chief Information Officer of Millipore Corporation during 1999 and 2000, and previously served in various strategic planning, global supply chain and financial roles with Millipore and Sandoz Pharmaceuticals (now Novartis), a pharmaceutical company. He has served on the board of directors of Harvard Bioscience, Inc., a global manufacturer of a broad range of life sciences solutions, since November 2014, and is currently the lead independent director. Since July 2013, Mr. Loy has also been on the board of directors of SEMI, the global industry association representing the electronics manufacturing supply chain, serving as the chairman of the association until December 2022.

Linda LaGorga has been our Senior Vice President and Chief Financial Officer since May 2023. Ms. LaGorga joined the Company from Honeywell International Inc., where she most recently served from March 2022 until April 2023 as vice president and Chief Financial Officer of Honeywell's UOP business unit, which provides process technology, catalysts, adsorbents, and equipment to the refining, gas processing, and petrochemical industries. Previously, from 2021 until 2022, she served as vice president and Chief Financial Officer of the Honeywell aerospace mechanical systems and components business. From 2018 to 2021, she led Honeywell's corporate financial planning and analysis organization. Prior to joining Honeywell, from 2013 until 2018, Ms. LaGorga served as the global treasurer and led business development for Bausch Health Companies Inc. Earlier in her career, she held various positions of increasing responsibilities at Goldman Sachs, most recently serving as a managing director in the investment banking division.

Sue Rice has been our Senior Vice President of Global Human Resources since September 2017. Prior to that, Ms. Rice served as Senior Vice President and Chief Human Resources Officer for Thermo Fisher Scientific, a scientific equipment company, from 2013 to 2017, Region Vice President HR Asia Pacific & Emerging Markets from 2009 to 2013 and Group Vice President, HR Analytical Technologies Group from 2006 to 2009. Prior to that, Ms. Rice held senior human resource positions with Fidelity Human Resources Services Company and Sherbrooke Associates.

Joe Colella has been our Senior Vice President, General Counsel, Chief Compliance Officer and Secretary since April 2020. Previously, Mr. Colella served as our Vice President, Deputy General Counsel from December 2018 until April 2020, Assistant General Counsel from April 2018 until December 2018 and Senior Corporate Counsel from December 2013 until April 2018. Prior to joining Entegris, Mr. Colella served as an associate at an international law firm from 2007 until 2013.

Jim O'Neill, Ph.D. has been our Senior Vice President and Chief Technology Officer since September 2019, having previously served as our Vice President, Chief Technology Officer beginning in April 2014 when he joined Entegris as part of our acquisition of ATMI. At ATMI, Dr. O'Neill was Senior Vice President of Electronic Materials from January 2012 to April 2014. Prior to that, he held numerous technical and leadership roles in semiconductor research and development with over 23 years at IBM.

Olivier Blachier has been our Senior Vice President, Business and New Markets Development since November 2021 and is responsible for the Company's merger and acquisition activities and for the commercialization of emerging businesses. Before joining Entegris, Mr. Blachier held various senior leadership positions between 2007 and 2021 at Air Liquide Group, a global leader in gases, technologies and services for the industrial and healthcare sectors. Most recently, he served as President of Air Liquide Far Eastern from September 2018 until June 2021 and APAC Vice President, Hydrogen & Energy Transition, from June 2021 until October 2021. From 1997 to 2007, Mr. Blachier worked for Edwards, Ltd., a global vacuum and abatement process leader and subsidiary of BOC Group, where he held multiple roles in the U.S. and United Kingdom, including leading acquisitions and joint ventures.

Clint Haris has been our Senior Vice President and President, Microcontamination Control since July 2022. Previously, he served as our Senior Vice President and General Manager, Microcontamination Control from July 2016 until July 2022 and our Vice President, Liquid Microcontamination Control from August 2014 until July 2016. Prior to joining Entegris, Mr. Haris served in a variety of executive roles at Brooks Automation Inc., including Senior Vice President, Life Science Systems from 2010 until 2014 and Senior Vice President and General Manager, Systems Solutions from 2009 until 2010.

William Shaner has been our Senior Vice President and President, Advanced Materials Handling since July 2022. Previously, he served as our Senior Vice President and General Manager, Advanced Materials Handling from July 2016 until July 2022, our Senior Vice President, Global Operations from February 2014 until July 2016 and our Vice President and General Manager, Microenvironments division from 2007 until February 2014. Prior to that, he served in a variety of sales, marketing, business development and engineering roles since joining Entegris in 1995.

Daniel Woodland, Ph.D. joined Entegris in 2022 as part of the acquisition of CMC Materials. In September 2023, Dr. Woodland became Senior Vice President and President, Materials Solutions. From July 2022 until September 2023, Dr. Woodland served as Senior Vice President and President, Advanced Planarization Solution. Prior to joining Entegris, Dr. Woodland served several roles at CMC Materials (previously Cabot Microelectronics) since 2003, including as Vice President and President, Electronic Materials from September 2019 until July 2022, Vice President and Chief Marketing and Operations Officer from October 2017 until November 2018, and Vice President of Marketing from January 2015 until October 2017.

Michael Besnard has been our Senior Vice President and Chief Commercial Officer since 2016. Prior to that, Mr. Besnard served as Vice President of Global Strategic Accounts from 2014 until 2016. Prior to joining Entegris, Mr. Besnard served ATMI as the vice president of global strategic accounts and MacDermid Enthone (previously Enthone) as director of business development for Copper Plating.

Neil Richards has been our Senior Vice President, Global Operations, Supply Chain, and Quality since September 2019. Prior to that, Mr. Richards served as Vice President of Operations for the Company's Specialty Chemicals and Engineered Materials

division from 2016 until September 2019. Prior to joining Entegris, Mr. Richards held several positions with the BOC Group, which merged with Linde in 2006.

Michael D. Sauer has been our Vice President, Controller and Chief Accounting Officer since June 2012. Prior to that, he served as the Corporate Controller since 2008. From the time of the merger with Mykrolis in August 2005 until April 2008, Mr. Sauer served as Director of Treasury and Risk Management. Mr. Sauer joined Fluoroware, Inc., a predecessor to Entegris Minnesota, in 1988 and held a variety of finance and accounting positions until 2001 when he became the Director of Business Development for Entegris Minnesota, the successor to Fluoroware, serving in that position until the merger with Mykrolis.

Item 11. Executive Compensation.

The information required by this Item 11 has been omitted from this report, and is incorporated by reference to our Definitive Proxy Statement for the Entegris, Inc. Annual Meeting of Stockholders to be held on April 24, 2024, which will be filed with the Securities and Exchange Commission pursuant to Regulation 14A within 120 days after the end of our 2023 fiscal year.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

Securities Authorized for Issuance Under Equity Compensation Plans:

As of December 31, 2023, our equity compensation plan information is as follows:

Equity Compensation Plan Information			
Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights	Weighted-average exercise price of outstanding options, warrants and rights ⁽¹⁾	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) ⁽²⁾⁽³⁾
	(a)	(b)	(c)
Equity compensation plans approved by security holders	2,697,007	\$ 63.08	8,596,920
Equity compensation plans not approved by security holders	—	—	—
Total	2,697,007	\$ 63.08	8,596,920

- (1) The weighted average exercise price does not take into account the shares issuable upon vesting of outstanding restricted stock units, which have no exercise price.
- (2) These shares are available for future issuance under the 2020 Stock Plan in the form of stock options, restricted stock units, performance shares and other stock awards in accordance with the terms of the 2020 Stock Plan.
- (3) Includes 1,067,981 shares remaining available for future issuance under the Company's Employee Stock Purchase Plan as of December 31, 2023.

The other information required by this Item 12 has been omitted from this report, and is incorporated by reference to our Definitive Proxy Statement for the Entegris, Inc. Annual Meeting of Stockholders to be held on April 24, 2024, which will be filed with the Securities and Exchange Commission pursuant to Regulation 14A within 120 days after the end of our 2023 fiscal year.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

The information required by this Item 13 has been omitted from this report, and is incorporated by reference to our Definitive Proxy Statement for the Entegris, Inc. Annual Meeting of Stockholders to be held on April 24, 2024, and which will be filed with the Securities and Exchange Commission pursuant to Regulation 14A within 120 days after the end of our 2023 fiscal year.

Item 14. Principal Accountant Fees and Services.

The information required by this Item 14 has been omitted from this report, and is incorporated by reference to our Definitive Proxy Statement for the Entegris, Inc. Annual Meeting of Stockholders to be held on April 24, 2024, which will be filed with the Securities and Exchange Commission pursuant to Regulation 14A within 120 days after the end of our 2023 fiscal year.

PART IV

Item 15. Exhibits and Financial Statement Schedules.

(a) The following Financial Statements are included in Item 8 herein:

1. Financial Statements:

Report of Independent Registered Public Accounting Firm

Consolidated Balance Sheets at December 31, 2023 and 2022

Consolidated Statements of Operations for the Years Ended December 31, 2023, 2022 and 2021

Consolidated Statements of Comprehensive Income for the Years Ended December 31, 2023, 2022 and 2021

Consolidated Statements of Equity for the Years Ended December 31, 2023, 2022 and 2021

Consolidated Statements of Cash Flows for the Years Ended December 31, 2023, 2022 and 2021

Notes to Consolidated Financial Statements

2. Financial Statement Schedule - All financial statement schedules have been omitted since the information is either not applicable or is included in the consolidated financial statements notes thereof.

3. Exhibits - The following exhibits are incorporated by reference into this Annual Report on Form 10-K:

Reg. S-K Item 601(b) Reference	Document Incorporated	Referenced Document on file with the Commission
2.1	Agreement and Plan of Merger, dated as of December 14, 2021, by and among Entegris, Inc., CMC Materials, Inc. and Yosemite Merger Sub, Inc.	Exhibit 2.1 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on December 16, 2021
3.1	Amended and Restated Certificate of Incorporation of Entegris, Inc., as amended	Exhibit 3.1 to Entegris, Inc. Annual Report on Form 10-K for the fiscal year ended December 31, 2011
3.2	By-Laws of Entegris, Inc., as amended December 8, 2022	Exhibit 3.1 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on December 9, 2022
4.1	Form of certificate representing shares of Common Stock, \$.01 par value per share	Exhibit 4.1 to Form S-4 Registration Statement of Entegris, Inc. and Eagle DE, Inc. (No. 333-124719)
4.2	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
4.3	Indenture, dated as of April 30, 2021, 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 2029 Notes	Exhibit 4.1 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on April 30, 2021
4.4	Indenture, dated as of April 14, 2022, by and among Entegris Escrow Corporation, as escrow issuer and Truist Bank, as trustee and notes collateral agent, including the form of note issuable thereunder	Exhibit 4.1 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on April 15, 2022
4.5	Indenture, dated as of June 30, 2022, by and among Entegris and Truist Bank, as trustee, including the form of note representing the Senior Unsecured Notes	Exhibit 4.1 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on June 30, 2022
4.6	First Supplemental Indenture to the 2029 Secured Notes Indenture, dated as of July 6, 2022, by and among Entegris, certain subsidiaries of Entegris and Truist Bank, as trustee and notes collateral agent	Exhibit 4.3 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on July 6, 2022
4.7	First Supplemental Indenture to the 2030 Unsecured Notes Indenture, dated as of July 6, 2022, by and among Entegris, certain subsidiaries of Entegris and Truist Bank, as trustee.	Exhibit 4.4 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on July 6, 2022

4.8	Equal Priority Intercreditor Agreement, dated as of July 6, 2022, among Entegris, certain subsidiaries of Entegris, Morgan Stanley Senior Funding, Inc., as senior credit facilities collateral agent, and Truist Bank, as notes collateral agent.	Exhibit 4.5 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on July 6, 2022
4.9	First Supplemental Indenture to the 2028 Notes Indenture, dated as of July 6, 2022, by and among Entegris, certain subsidiaries of Entegris and Computershare Trust Company, National Association, as successor to Wells Fargo Bank, National Association, as trustee.	Exhibit 4.7 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on July 6, 2022
4.10	Supplemental Indenture to the 2029 Notes Indenture, dated as of July 6, 2022, by and among Entegris, certain subsidiaries of Entegris and Computershare Trust Company, National Association, as successor to Wells Fargo Bank, National Association, as trustee.	Exhibit 4.9 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on July 6, 2022
4.11	Indenture, dated as of June 30, 2022, by and among Entegris Escrow Corporation, as escrow issuer and Truist Bank, as trustee, including the form of note issuable thereunder.	Exhibit 4.1 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on June 30, 2022
4.12	Amendment and Restatement Agreement, dated as of July 6, 2022, among Entegris, as borrower, certain subsidiaries of Entegris, as guarantors, the lenders party thereto, the issuing banks party thereto and Morgan Stanley Senior Funding, Inc., as administrative agent and collateral agent.	Exhibit 4.10 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on July 6, 2022
4.13	364-Day Bridge Credit and Guaranty Agreement, dated as of July 6, 2022, among Entegris, as borrower, certain subsidiaries of Entegris, as guarantors, the lenders party thereto and Morgan Stanley Senior Funding, Inc., as administrative agent.	Exhibit 4.11 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on July 6, 2022
4.14	Amendment Number 1 to the CMC Materials, Inc. 2021 Omnibus Incentive Plan*	Exhibit 4.3 to Entegris, Inc. Registration Statement on Form S-8 filed with the Securities and Exchange Commission on July 7, 2022
4.15	Amendment No. 1, dated as of March 10, 2023, among Entegris, Inc., as borrower, the other credit parties party thereto, the lenders party thereto and Morgan Stanley Senior Funding, Inc., as administrative agent.	Exhibit 10.1 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on March 13, 2023
4.16	Amendment No. 2, dated as of September 11, 2023, among Entegris, Inc., as borrower, the other credit parties party thereto, the lenders party thereto and Morgan Stanley Senior Funding, Inc., as administrative agent.	Exhibit 10.1 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on September 13, 2023
4.17	Description of Capital Stock	Exhibit 4.1 to Entegris, Inc. Annual Report on Form 10-K filed with the Securities and Exchange Commission on February 7, 2020
10.1	CMC Materials, Inc. 2021 Omnibus Incentive Plan*	Exhibit 10.1 to Entegris Registration Statement on Form S-3 filed with the Securities and Exchange Commission on July 7, 2022
10.2	Cabot Microelectronics Corporation 2012 Omnibus Incentive Plan*	Exhibit 10.2 to Entegris Registration Statement on Form S-3 filed with the Securities and Exchange Commission on July 7, 2022
10.3	Entegris, Inc. – 2010 Stock Plan, as amended*	Exhibit 10.1 to Entegris, Inc. Quarterly Report on Form 10-Q for the period ended July 3, 2010
10.4	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
10.5	Entegris, Inc. Outside Directors' Stock Option Plan*	Exhibit 10.2 to Entegris, Inc. Registration Statement on Form S-1 (No. 333-33668)

10.6	Entegris, Inc. Amended and Restated Employee Stock Purchase Plan*	Exhibit 4.1 to Entegris, Inc. Registration Statement on Form S-8 (No. 333-211444)
10.7	Second Amended and Restated Entegris Incentive Plan*	Exhibit 10.1 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on May 24, 2017
10.8	Entegris, Inc. 2007 Deferred Compensation Plan*	Exhibit 10.2 to Entegris, Inc. Quarterly Report on Form 10-Q for the fiscal period ended June 30, 2007
10.9	Lease Agreement, dated April 1, 2002 between Nortel Networks HPOCS Inc. and Mykrolis Corporation, relating to Executive office, R&D and manufacturing facility located at 129 Concord Road Billerica, MA	Exhibit 10.1.3 to Mykrolis Corporation's Quarterly Report on Form 10-Q for the quarter ended March 31, 2002
10.10	Amendment of Lease between Entegris, Inc. and KBS Rivertech, LLC dated April 1, 2012	Exhibit 10.1 to Entegris, Inc. Quarterly Report on Form 10-Q for the period ended June 30, 2012
10.11	Second Amendment of Lease, dated March 8, 2016, between Entegris, Inc. and KBS Rivertech, LLC	Exhibit 10.1 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on March 11, 2016
10.12	Third Amendment to Lease Agreement, dated as of October 21, 2021, between Entegris, Inc. and Rivertech Owner LLC	Exhibit 10.4 to Entegris, Inc. Annual Report on Form 10-K for the fiscal year ended December 31, 2021
10.13	Fourth Amendment to Lease Agreement, dated as of September 16, 2022, by and between the Company and Rivertech Owner LLC	Exhibit 10.1 to Entegris, Inc. Quarterly Report on Form 10-Q for the period ended October 1, 2022
10.14	Form of Indemnification Agreement between Entegris, Inc. and each of its executive officers and directors*	Exhibit 10.30 to Entegris, Inc. Annual Report on Form 10-K for the fiscal year ended August 27, 2005
10.15	Form of Executive Change of Control Termination Agreement between Entegris, Inc. and certain of its executive officers*	Exhibit 10.31 to Entegris, Inc. Annual Report on Form 10-K for the fiscal year ended August 27, 2005
10.16	Form of Revised Executive Change of Control Termination Agreement between Entegris, Inc. and certain of its executive officers executed in 2015 (other than those executive officers who executed the form previously filed)*	Exhibit 10.1 to Entegris, Inc. Annual Report on Form 10-K filed with the Securities and Exchange Commission on February 29, 2016
10.17	Entegris, Inc. 2017 Stock Option Award Agreement*	Exhibit 10.3 to Entegris, Inc. Annual Report on Form 10-K filed with the Securities and Exchange Commission on February 15, 2018
10.18	Entegris, Inc. 2018 Stock Option Award Agreement*	Exhibit 10.3 to Entegris, Inc. Annual Report on Form 10-K filed with the Securities and Exchange Commission on February 11, 2019
10.19	Entegris, Inc. 2019 Stock Option Award Agreement*	Exhibit 10.3 to Entegris, Inc. Annual Report on Form 10-K filed with the Securities and Exchange Commission on February 7, 2020
10.20	Entegris, Inc. 2020 RSU Award Agreement (under 2010 Stock Plan)*	Exhibit 10.2 to Entegris, Inc. Quarterly Report on Form 10-Q for the period ended March 28, 2020
10.21	Entegris, Inc. 2020 Stock Option Award Agreement (under 2010 Stock Plan)*	Exhibit 10.3 to Entegris, Inc. Quarterly Report on Form 10-Q for the period ended March 28, 2020
10.22	Entegris, Inc. 2020 RSU Award Agreement (under 2020 Stock Plan)*	Exhibit 10.1 to Entegris, Inc. Annual Report on Form 10-K for the fiscal year ended December 31, 2020
10.23	Entegris, Inc. 2021 Performance-Based RSU Award Agreement*	Exhibit 10.2 to Entegris, Inc. Annual Report on Form 10-K for the fiscal year ended December 31, 2020
10.24	Entegris, Inc. 2021 RSU Award Agreement*	Exhibit 10.3 to Entegris, Inc. Annual Report on Form 10-K for the fiscal year ended December 31, 2020

10.25	Entegris, Inc. 2021 Stock Option Award Agreement*	Exhibit 10.4 to Entegris, Inc. Annual Report on Form 10-K for the fiscal year ended December 31, 2020
10.26	Entegris, Inc. 2022 Performance-Based RSU Award Agreement*	Exhibit 10.1 to Entegris, Inc. Annual Report on Form 10-K for the fiscal year ended December 31, 2021
10.27	Entegris, Inc. 2022 RSU Award Agreement*	Exhibit 10.2 to Entegris, Inc. Annual Report on Form 10-K for the fiscal year ended December 31, 2021
10.28	Entegris, Inc. 2022 Stock Option Award Agreement*	Exhibit 10.3 to Entegris, Inc. Annual Report on Form 10-K for the fiscal year ended December 31, 2021
10.29	Entegris, Inc 2023 Performance-Based RSU Award Agreement *	Exhibit 10.1 to Entegris, Inc. Annual Report on Form 10-K for the fiscal year ended December 31, 2022
10.30	Entegris, Inc 2023 RSU Award Agreement *	Exhibit 10.2 to Entegris, Inc. Annual Report on Form 10-K for the fiscal year ended December 31, 2022
10.31	Entegris, Inc 2023 Stock Option Award Agreement *	Exhibit 10.3 to Entegris, Inc. Annual Report on Form 10-K for the fiscal year ended December 31, 2022
10.32	Executive Employment Agreement, effective November 28, 2012, between Entegris, Inc. and Bertrand Loy*	Exhibit 10.1 to Entegris, Inc. Annual Report on Form 10-K for the fiscal year ended December 31, 2012
10.33	Amendment No. 1, dated April 26, 2013, to Executive Change in Control Termination Agreement, between Entegris, Inc. and Bertrand Loy*	Exhibit 99.1 to Entegris, Inc. Current Report on Form 8-K filed with the Securities and Exchange Commission on April 26, 2013
10.34	Amendment No. 2, dated February 5, 2020, to Executive Change in Control Termination Agreement, between Entegris, Inc. and Bertrand Loy*	Exhibit 10.4 to Entegris, Inc. Annual Report on Form 10-K filed with the Securities and Exchange Commission on February 7, 2020
10.35	Separation Agreement and Release, dated as of September 1, 2022, by and between the Company and Todd Edlund*	Exhibit 10.2 to Entegris, Inc. Quarterly Report on Form 10-Q for the period ended October 1, 2022
10.36	Employment Offer Letter, dated April 8, 2023, between Entegris, Inc. and Linda LaGorga*	Exhibit 10.1 to Entegris, Inc. Quarterly Report on Form 10-Q for the period ended April 1, 2023
10.37	Transition Services Agreement, effective April 11, 2023, between Entegris, Inc. and Gregory B. Graves*	Exhibit 10.2 to Entegris, Inc. Quarterly Report on Form 10-Q for the period ended April 1, 2023

* A “management contract or compensatory plan”

The Company hereby files as exhibits to this Annual Report on Form 10-K the following documents:

Reg. S-K

Item 601(b)

Reference	Exhibit No.	Documents Filed Herewith
(10)	10.38	Amended and Restated Supplemental Executive Retirement Plan for Key Salaried Employees of Entegris, Inc.*
(10)	10.39	Form of Entegris, Inc. Performance-Based RSU Award Agreement (2024+)*
(10)	10.40	Form of Entegris, Inc. Global RSU Award Agreement (2024+)*
(10)	10.41	Form of Entegris, Inc. Stock Option Award Agreement (2024+)*
(21)	21.1	Subsidiaries of Entegris, Inc.
(23)	23.1	Consent of Independent Registered Public Accounting Firm
(24)	24.1	Power of Attorney by the Directors of Entegris, Inc.
(31)	31.1	Certification required by Rule 13a-14(a) in accordance with Section 302 of the Sarbanes—Oxley Act of 2002.
(31)	31.2	Certification required by Rule 13a-14(a) in accordance with Section 302 of the Sarbanes—Oxley Act of 2002.
(32)	32.1	Certification required by Rule 13a-14(b) and 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
(32)	32.2	Certification required by Rule 13a-14(b) and 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
(97)	97	Amended and Restated Entegris, Inc. Clawback Policy
(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
(104)	104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)

* A “management contract or compensatory plan”

Item 16. Form 10-K Summary.

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) 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: February 14, 2024

By /s/ BERTRAND LOY

Bertrand Loy
President & Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

<u>SIGNATURE</u>	<u>TITLE</u>	<u>DATE</u>
<u>/s/ BERTRAND LOY</u> Bertrand Loy	President, Chief Executive Officer and Director (Principal executive officer)	February 14, 2024
<u>/s/ LINDA LAGORGA</u> Linda LaGorga	Senior Vice President, Chief Financial Officer (Principal financial officer)	February 14, 2024
<u>/s/ MICHAEL D. SAUER</u> Michael D. Sauer	Vice President, Controller & Chief Accounting Officer (Principal accounting officer)	February 14, 2024
<u>JAMES R. ANDERSON*</u> James R. Anderson	Director	February 14, 2024
<u>RODNEY CLARK*</u> Rodney Clark	Director	February 14, 2024
<u>JAMES F. GENTILCORE*</u> James F. Gentilcore	Director	February 14, 2024
<u>YVETTE KANOUFF*</u> Yvette Kanouff	Director	February 14, 2024
<u>JAMES P. LEDERER*</u> James P. Lederer	Director	February 14, 2024
<u>AZITA SALEKI-GERHARDT*</u> Azita Saleki-Gerhardt	Director	February 14, 2024

*By /s/ LINDA LAGORGA

Linda LaGorga, Attorney-in-fact

ENTEGRIS, INC.
INDEX TO FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm	F-2
Consolidated Balance Sheets at December 31, 2023 and 2022	F-4
Consolidated Statements of Operations for the Years Ended December 31, 2023, 2022 and 2021	F-5
Consolidated Statements of Comprehensive Income for the Years Ended December 31, 2023, 2022 and 2021	F-6
Consolidated Statements of Equity for the Years Ended December 31, 2023, 2022 and 2021	F-7
Consolidated Statements of Cash Flows for the Years Ended December 31, 2023, 2022 and 2021	F-8
Notes to Consolidated Financial Statements	F-10

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
Entegris, Inc.:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Entegris, Inc. and subsidiaries (the Company) as of December 31, 2023 and 2022, the related consolidated statements of operations, comprehensive income, equity, and cash flows for each of the years in the three-year period ended December 31, 2023, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2023 and 2022, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2023, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audit included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audit also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audit provides a reasonable basis for our opinion.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of a critical audit matter does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Goodwill impairment evaluation for APS reporting unit prior to segment realignment

As discussed in Note 10 to the consolidated financial statements, the goodwill balance as of December 31, 2023 was \$3,945.9 million, of which \$3,631.3 million related to the Materials Solutions (MS) reportable segment. The MS reportable segment was the result of the realignment in the third quarter of 2023 combining the Advanced Planarization Solutions (APS) reportable segment and the Specialty Chemicals and Engineered Materials (SCEM) reportable segment. Prior to the realignment, the APS reportable segment was aligned to the APS reporting unit. The Company performs goodwill impairment testing on an annual basis and whenever events or changes in circumstances indicate that the carrying value of a reporting unit exceeds its fair value. The realignment was identified as a triggering event related to the APS reporting unit. In determining the fair value of the APS reporting unit the Company utilized a discounted cash flow model and certain market information.

We identified the goodwill impairment evaluation for the APS reporting unit prior to the segment realignment as a critical audit matter. We performed sensitivity analysis to determine the significant assumptions in the valuation of the goodwill. A high degree of subjective auditor judgment was required to evaluate the Company's estimates of future revenue growth rates used in the discounted cash flow model. Specifically, the revenue growth rates used to estimate the fair value of the reporting unit were challenging to evaluate as they involved subjective assessments of future

market and economic conditions that were sensitive to variation. Minor changes in the revenue growth rates could have had a significant impact on the fair value.

The following are the primary procedures we performed to address this critical audit matter. We evaluated the design and tested the operating effectiveness of certain internal controls related to the Company's goodwill impairment process. This included the control related to the Company's estimates of the future revenue growth rates used to determine the fair value of the APS reporting unit. We evaluated the Company's forecasted revenue growth rates for the APS reporting unit by comparing them to forecasted future growth rates in the Company's and its peer companies' analyst reports and industry reports. In addition, we compared the Company's historical revenue forecasts to actual results to assess the Company's ability to accurately forecast.

/s/ KPMG LLP

We or our predecessor firms have served as the Company's auditor since 1966.

Minneapolis, Minnesota
February 14, 2024

ENTEGRIS, INC. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS

(In thousands, except share and per share data)

	December 31, 2023	December 31, 2022
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 456,929	\$ 561,559
Restricted cash	—	1,880
Trade accounts and notes receivable, net	457,052	535,485
Inventories, net	607,051	812,815
Deferred tax charges and refundable income taxes	63,879	47,618
Assets held-for-sale	278,753	246,531
Other current assets	113,663	129,297
Total current assets	<u>1,977,327</u>	<u>2,335,185</u>
Property, plant and equipment, net	1,468,043	1,393,337
Other assets:		
Right-of-use assets - Operating lease	57,990	79,228
Right-of-use assets - Finance lease	22,409	15,712
Goodwill	3,945,860	4,408,331
Intangible assets, net	1,281,969	1,841,955
Deferred tax assets and other noncurrent tax assets	31,432	28,867
Other noncurrent assets	27,561	36,242
Total assets	<u><u>\$ 8,812,591</u></u>	<u><u>\$ 10,138,857</u></u>
LIABILITIES AND EQUITY		
Current liabilities:		
Short-term debt, including current portion of long-term debt	\$ —	\$ 151,965
Accounts payable	134,211	172,488
Accrued payroll and related benefits	109,559	142,340
Accrued interest payable	24,759	25,571
Liabilities held-for-sale	19,223	10,637
Other accrued liabilities	148,840	160,873
Income taxes payable	77,403	98,057
Total current liabilities	<u>513,995</u>	<u>761,931</u>
Long-term debt, excluding current maturities	4,577,141	5,632,928
Pension benefit obligations and other liabilities	53,733	54,090
Deferred tax liabilities and other noncurrent tax liabilities	190,142	391,192
Long term lease liability - Operating lease	49,719	68,091
Long term lease liability - Finance lease	19,267	12,625
Equity:		
Preferred stock, par value \$.01; 5,000,000 shares authorized; none issued and outstanding as of December 31, 2023 and December 31, 2022	—	—
Common stock, par value \$.01; 400,000,000 shares authorized; issued and outstanding shares as of December 31, 2023: 150,566,007 and 150,363,607, respectively; issued and outstanding shares as of December 31, 2022: 149,339,486 and 149,137,086, respectively	1,506	1,493
Treasury stock, common, at cost: 202,400 shares held as of December 31, 2023 and December 31, 2022	(7,112)	(7,112)
Additional paid-in capital	2,305,367	2,205,325
Retained earnings	1,151,765	1,031,391
Accumulated other comprehensive loss	(42,932)	(13,097)
Total equity	<u>3,408,594</u>	<u>3,218,000</u>
Total liabilities and equity	<u><u>\$ 8,812,591</u></u>	<u><u>\$ 10,138,857</u></u>

See the accompanying notes to consolidated financial statements.

ENTEGRIS, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS

	Year ended December 31, 2023	Year ended December 31, 2022	Year ended December 31, 2021
<i>(In thousands, except per share data)</i>			
Net sales	\$ 3,523,926	\$ 3,282,033	\$ 2,298,893
Cost of sales	2,026,321	1,885,620	1,239,229
Gross profit	1,497,605	1,396,413	1,059,664
Selling, general and administrative expenses	576,194	543,485	292,408
Engineering, research and development expenses	277,313	228,994	167,632
Amortization of intangible assets	214,477	143,953	47,856
Goodwill impairment	115,217	—	—
Gain on termination of Alliance Agreement	(184,754)	—	—
Operating income	499,158	479,981	551,768
Interest expense	312,378	212,669	41,240
Interest income	(11,257)	(3,694)	(243)
Other expense, net	25,367	23,926	31,695
Income before income tax (benefit) expense	172,670	247,080	479,076
Income tax (benefit) expense	(8,413)	38,160	69,950
Equity in net loss of affiliates	414	—	—
Net income	<u>\$ 180,669</u>	<u>\$ 208,920</u>	<u>\$ 409,126</u>
Basic net income per common share	\$ 1.21	\$ 1.47	\$ 3.02
Diluted net income per common share	\$ 1.20	\$ 1.46	\$ 3.00
Weighted average shares outstanding			
Basic	149,900	142,294	135,411
Diluted	150,945	143,146	136,574

See the accompanying notes to consolidated financial statements.

ENTEGRIS, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

<i>(In thousands)</i>	Year ended December 31, 2023	Year ended December 31, 2022	Year ended December 31, 2021
Net income	\$ 180,669	\$ 208,920	\$ 409,126
Other comprehensive (loss) income, net of tax			
Foreign currency translation adjustments	(12,797)	(10,220)	(2,275)
Pension adjustments	397	1,139	(382)
Interest rate swap - cash flow hedge, net of tax (benefit) expense of \$(5,085) and \$10,520 for December 31, 2023 and December 31, 2022	(17,435)	36,069	—
Other comprehensive (loss) income	(29,835)	26,988	(2,657)
Comprehensive income	\$ 150,834	\$ 235,908	\$ 406,469

See the accompanying notes to consolidated financial statements.

ENTEGRIS, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF EQUITY

<i>(In thousands)</i>	Common shares issued	Treasury shares	Common shares outstanding	Common stock	Treasury stock	Additional paid-in capital	Retained earnings	Foreign currency translation adjustments	Defined benefit pension adjustments	Interest Rate Swap - Cash flow hedge	Total
Balance at December 31, 2020	135,149	(202)	134,947	\$ 1,351	\$ (7,112)	\$ 844,850	\$ 577,833	\$ (36,588)	\$ (840)	\$ —	\$ 1,379,494
Shares issued under stock plans	1,133	—	1,133	11	—	8,643	—	—	—	—	8,654
Share-based compensation expense	—	—	—	—	—	29,884	—	—	—	—	29,884
Repurchase and retirement of common stock	(563)	—	(563)	(5)	—	(3,547)	(63,557)	—	—	—	(67,109)
Dividends declared (\$0.32 per share)	—	—	—	—	—	15	(43,626)	—	—	—	(43,611)
Pension adjustment	—	—	—	—	—	—	—	—	(382)	—	(382)
Foreign currency translation	—	—	—	—	—	—	—	(2,275)	—	—	(2,275)
Net income	—	—	—	—	—	—	409,126	—	—	—	409,126
Balance at December 31, 2021	135,719	(202)	135,517	1,357	(7,112)	879,845	879,776	(38,863)	(1,222)	—	1,713,781
Shares issued under stock plans	692	—	692	7	—	(6,659)	—	—	—	—	(6,652)
Share-based compensation expense	—	—	—	—	—	66,578	—	—	—	—	66,578
Issuance of common stock in connection with CMC Materials acquisition	12,928	—	12,928	129	—	1,265,561	—	—	—	—	1,265,690
Dividends declared (\$0.40 per share)	—	—	—	—	—	—	(57,305)	—	—	—	(57,305)
Interest Rate Swap - Cash flow hedge	—	—	—	—	—	—	—	—	—	36,069	36,069
Pension adjustment	—	—	—	—	—	—	—	—	1,139	—	1,139
Foreign currency translation	—	—	—	—	—	—	—	(10,220)	—	—	(10,220)
Net income	—	—	—	—	—	—	208,920	—	—	—	208,920
Balance at December 31, 2022	149,339	(202)	149,137	1,493	(7,112)	2,205,325	1,031,391	(49,083)	(83)	36,069	3,218,000
Shares issued under stock plans	1,227	—	1,227	13	—	38,671	—	—	—	—	38,684
Share-based compensation expense	—	—	—	—	—	61,371	—	—	—	—	61,371
Dividends declared (\$0.40 per share)	—	—	—	—	—	—	(60,295)	—	—	—	(60,295)
Interest Rate Swap - Cash flow hedge	—	—	—	—	—	—	—	—	—	(17,435)	(17,435)
Pension adjustment	—	—	—	—	—	—	—	—	397	—	397
Foreign currency translation	—	—	—	—	—	—	—	(12,797)	—	—	(12,797)
Net income	—	—	—	—	—	—	180,669	—	—	—	180,669
Balance at December 31, 2023	<u>150,566</u>	<u>(202)</u>	<u>150,364</u>	<u>\$ 1,506</u>	<u>\$ (7,112)</u>	<u>\$ 2,305,367</u>	<u>\$ 1,151,765</u>	<u>\$ (61,880)</u>	<u>\$ 314</u>	<u>\$ 18,634</u>	<u>\$ 3,408,594</u>

See the accompanying notes to consolidated financial statements.

ENTEGRIS, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS

<i>(In thousands)</i>	Year ended December 31, 2023	Year ended December 31, 2022	Year ended December 31, 2021
Operating activities:			
Net income	\$ 180,669	\$ 208,920	\$ 409,126
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation	172,683	135,371	90,311
Amortization	214,477	143,953	47,856
Share-based compensation expense	61,371	66,577	29,884
Charge for fair value mark-up of acquired inventory sold	—	61,932	428
Provision for deferred income taxes	(145,606)	(102,744)	(18,433)
Impairment of goodwill	115,217	—	—
Loss on extinguishment of debt	27,865	3,287	23,338
Loss from sale of businesses	23,839	—	—
Impairment on long-lived assets	30,464	—	—
Gain on termination of Alliance Agreement	(184,754)	—	—
Charge for excess and obsolete inventory	38,184	28,896	17,103
Amortization of debt issuance costs	21,243	15,725	1,714
Other	23,341	28,733	(4,142)
Changes in operating assets and liabilities, net of effects of acquisitions:			
Trade accounts receivable and notes receivable	608	(59,643)	(86,766)
Inventories	102,751	(203,335)	(168,372)
Accounts payable and other accrued liabilities	(29,547)	4,519	53,577
Other current assets	(11,912)	(13,641)	2,870
Income taxes payable and refundable income taxes	(10,177)	21,751	(3,292)
Other	(1,154)	11,982	5,252
Net cash provided by operating activities	629,562	352,283	400,454
Investing activities:			
Acquisition of property and equipment	(456,847)	(466,192)	(210,626)
Acquisition of businesses, net of cash acquired	—	(4,474,925)	(91,942)
Proceeds from sale of businesses	814,960	—	—
Proceeds from termination of Alliance Agreement	191,151	—	—
Other	3,807	(4,592)	4,450
Net cash provided by (used in) investing activities	553,071	(4,945,709)	(298,118)
Financing activities:			
Proceeds from revolving credit facility and short-term debt	—	476,000	101,000
Payments of revolving credit facility and short-term debt	(135,000)	(341,000)	(101,000)
Proceeds from long-term debt	217,449	4,940,753	400,000
Payments of long-term debt	(1,338,675)	(145,000)	(550,000)
Payments for debt issuance costs	(3,475)	(99,488)	(5,069)
Payments for debt extinguishment costs	—	—	(19,080)
Payments for dividends	(60,221)	(57,309)	(43,545)
Issuance of common stock from employee stock plans	50,792	16,168	24,744
Taxes paid related to net share settlement of equity awards	(12,108)	(22,820)	(16,090)
Repurchase and retirement of common stock	—	—	(67,109)
Other	(1,391)	(1,101)	(348)
Net cash (used in) provided by financing activities	(1,282,629)	4,766,203	(276,497)
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(6,514)	(11,903)	(4,167)
(Decrease) increase in cash, cash equivalents and restricted cash	(106,510)	160,874	(178,328)
Cash, cash equivalents and restricted cash at beginning of year	563,439	402,565	580,893
Cash, cash equivalents and restricted cash at end of year	\$ 456,929	\$ 563,439	\$ 402,565

See the accompanying notes to consolidated financial statements

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

Supplemental Cash Flow Information

<i>(In thousands)</i>	Year ended December 31, 2023	Year ended December 31, 2022	Year ended December 31, 2021
Non-cash transactions:			
Equity consideration on acquisition of CMC Materials, Inc.	\$ —	\$ 1,265,690	\$ —
Deferred acquisition and divestiture payments, net	5,474	—	250
Equipment purchases in accounts payable	20,573	28,295	29,042
Dividends payable	730	654	658
Schedule of interest and income taxes paid:			
Interest paid	\$ 287,846	\$ 164,183	\$ 46,791
Income taxes paid, net of refunds received	138,875	113,666	88,059

See the accompanying notes to consolidated financial statements

ENTEGRIS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
DECEMBER 31, 2023

1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Nature of Operations Entegris, Inc. (“Entegris”, the “Company”, “we”, or “our”) is a leading supplier of advanced materials and process solutions for the semiconductor and other high-technology industries.

Principles of Consolidation The 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 and Basis of Presentation The preparation of consolidated financial statements in conformity with accounting principles generally accepted in the United States requires management to make judgments, estimates and assumptions that affect the amounts reported in the consolidated financial statements and accompanying notes. On an ongoing basis, Entegris evaluates its estimates, including those related to receivables, inventories, property, plant and equipment, goodwill, intangible assets, accrued liabilities, income taxes and share-based compensation, among others. Actual results could differ from those estimates. Reclassifications of certain prior year amounts have been made to conform to the current year presentation.

Cash and Cash Equivalents Cash and cash equivalents include cash on hand and highly liquid debt securities with original maturities of three months or less, which are valued at cost and approximate fair value.

Allowance for Credit Losses An allowance for uncollectible trade receivables is estimated based on a combination of write-off history, aging analysis and any specific, known troubled accounts. The Company maintains an allowance for credit losses that management believes is adequate to cover expected losses on trade receivables.

Inventories Inventories are stated at the lower of cost and net realizable value. Cost is determined by the first-in, first-out (FIFO) method. The Company records a charge to cost of sales for excess and obsolete inventory to reduce the carrying value of inventories to net realizable value.

Leases The Company determines if an arrangement is a lease at inception. Right-of-use (ROU) assets include operating and financing leases. Short-term operating lease liabilities are classified in “Other accrued liabilities” and Long-term operating lease liabilities are classified in “Long-term lease liability - Operating lease” in the consolidated balance sheet. Short-term finance leases are classified in “Other accrued liabilities” and long-term finance lease liabilities are classified in “Long-term lease liability - Finance lease” in our consolidated balance sheet.

Lease assets and liabilities greater than 12 months are recognized at commencement date based on the present value of the lease payments over the lease term. As most of our leases do not provide an implicit rate, we use our incremental borrowing rate based on the information available at commencement date in determining the present value of lease payments. We use the implicit rate when readily determinable. The ROU assets include prepaid lease payments and exclude lease incentives. Lease terms may include options to extend or terminate the lease when it is reasonably certain that the Company will exercise that option. Lease expense for lease payments is recognized on a straight-line basis over the lease term. Leases with an original term of 12 months or less are not recorded in the accompanying consolidated balance sheet.

Lease and non-lease components are generally accounted for separately for real estate leases. For non-real estate leases, we account for the lease and non-lease components as a single lease component.

Property, Plant and Equipment Property, plant and equipment are carried at cost and are depreciated using the straight-line method over the estimated useful lives of the assets. When assets are retired or disposed of, the cost and related accumulated depreciation are removed from the accounts, and gains or losses are recognized in the same period. Maintenance and repairs are expensed as incurred, while significant additions and improvements are capitalized. Long-lived assets, including property, plant and equipment, are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset or group of assets may not be recoverable based on estimated future undiscounted cash flows. The amount of impairment, if any, is measured as the difference between the net book value and the estimated fair value of the asset(s).

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 instruments. Fair value is defined as the price that would be received from the sale of an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. The three-level hierarchy for disclosure is based on the extent and level of judgment used to estimate fair value. Level 1 inputs consist of valuations based on quoted market prices in active markets for identical assets or liabilities. Level 2 inputs consist of valuations based on quoted prices for similar assets or liabilities, quoted prices for identical assets or

liabilities in an inactive market, or other observable inputs. Level 3 inputs consist of valuations based on unobservable inputs that are supported by little or no market activity.

Goodwill and Intangible Assets Goodwill represents the excess of acquisition costs over the fair value of the net assets of businesses acquired. Goodwill is not subject to amortization, but is tested for impairment annually at August 31, the Company's annual testing date, and whenever events or changes in circumstances indicate that impairment may have occurred. The Company compares the carrying value of its reporting units, including goodwill, to their fair value. For reporting units in which the assessment indicates that it is more likely than not that the fair value is more than its carrying value, goodwill is not considered impaired. If the carrying value of the reporting unit exceeds fair value, goodwill is considered impaired.

In the third quarter of 2023, a triggering event was identified when the Company announced the combination of the Specialty Chemical and Engineered Materials and Advanced Planarization Solutions reportable segments into one reportable segment called Materials Solutions, resulting in a change to the reporting units for purposes of goodwill impairment evaluation. In assessing the fair value of the reporting units before and after the change the Company utilized a discounted cash flow model and certain market information to determine the fair value. The Company determined no impairment of goodwill related to the change in reporting units.

The Company performed its annual goodwill impairment test as of August 31, 2023. No impairment charge was identified in connection with the annual goodwill impairment test with respect to the Company's reporting unit.

Amortizable intangible assets include, among other items, patented, unpatented and other developed technology and customer-based intangibles, and are amortized using the straight-line method over their respective estimated useful lives. The Company reviews intangible assets and other long-lived assets for impairment if changes in circumstances or the occurrence of events suggest the remaining value may not be recoverable.

Derivative Financial Instruments The Company is exposed to various market risks, including risks associated with interest rates and foreign currency exchange rates. We enter into certain derivative transactions to mitigate the volatility associated with these exposures. We have policies in place that define acceptable instrument types we may enter into and we have established controls to limit our market risk exposure. We do not use derivative financial instruments for trading or speculative purposes. In addition, all derivatives, whether designated in hedging relationships or not, are recorded on the consolidated balance sheets at fair value on a gross basis.

Interest Rate Swap

The fair value of the interest rate swap is estimated using standard valuation models using market-based observable inputs over the contractual term, including one-month Secured Overnight Financing Rate ("SOFR") based yield curves, among others. We consider the risk of nonperformance, including counterparty credit risk, in the calculation of the fair value. We have designated this swap agreement as a cash flow hedge. As a cash flow hedge, unrealized gains are recognized as assets and unrealized losses are recognized as liabilities. Unrealized gains and losses are designated as effective or ineffective based on a comparison of the changes in fair value of the interest rate swap and changes in fair value of the underlying exposures being hedged. The effective portion is recorded as a component of accumulated other comprehensive loss, while the ineffective portion is recorded as a component of Interest expense. Changes in the method by which we pay interest from one-month SOFR to another rate of interest could create ineffectiveness in the swap, and result in amounts being reclassified from other comprehensive income (loss) into net income. Hedge effectiveness is tested quarterly to determine if hedge treatment is appropriate. Realized gains and losses are recorded on the same financial statement line as the hedged item, which is Interest expense.

Foreign Currency Contracts Not Designated as Hedges

On a periodic basis, we enter into forward foreign exchange contracts in an effort to mitigate the risks associated with currency fluctuations on certain foreign currency balance sheet exposures. These foreign exchange contracts do not qualify for hedge accounting; therefore, the gains and losses resulting from the impact of currency exchange rate movements on our forward foreign exchange contracts are recognized as Other expense (income), net in the accompanying consolidated statements of operations in the period in which the exchange rates change.

Foreign Currency Translation Assets and liabilities of certain foreign subsidiaries are translated from foreign currencies into U.S. dollars at period-end exchange rates, and the resulting gains and losses arising from translation of net assets located outside the U.S. are recorded as a cumulative translation adjustment, a component of accumulated other comprehensive loss in the consolidated balance sheets. Income statement amounts are translated at the average exchange rates for the year. Translation adjustments are not adjusted for income taxes, as substantially all translation adjustments relate to permanent investments in non-U.S. subsidiaries. Gains and losses resulting from foreign currency transactions are included in Other expense (income), net, in the Company's consolidated statements of operations.

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 sales.

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 with respect to deferred revenue in Note 2 to the consolidated financial statements.

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

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 21 to the 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. All material revenue is being recognized at a point in time.

The Company generally recognizes revenue for sales of services when the Company has satisfied the performance obligation. The payment terms and revenue recognized are based on time and materials.

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. The Company recognizes revenue for a sales-based or usage-based royalty promised in exchange for a license of intellectual property 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 recorded as deferred revenue on the balance sheet and is recognized as revenue when the free product is redeemed or when the likelihood of redemption is remote. The Company has deemed that the amount is immaterial for disclosure.

The Company provides for the estimated costs of fulfilling its 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 adjusts the amounts as necessary.

The Company's contracts are generally short-term in nature. Most contracts 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 until the performance obligations are satisfied.

Engineering, Research and Development Expenses Engineering, research and development expenses are expensed as incurred.

Share-based Compensation The Company measures the cost of employee services received in exchange for the award of equity instruments based on the fair value of the award at the date of grant. Share-based compensation expense is recognized using the straight-line attribution method to recognize share-based compensation over the service period of the award, with adjustments recorded for forfeitures as they occur. Awards issued to employees who are retirement eligible or nearing retirement eligibility are expensed on an accelerated basis.

Government Grants The Company entered into certain incentive arrangements with the state of Colorado. We account for funds we receive from government grants by either reducing the costs of the assets (if the grant relates to capital expenditures) or expenses which could be Cost of goods sold, Selling, general and administrative, and Research and development expenses in the consolidated statements of income once the conditions and restrictions of the grant have been met and payment has been received. As of December 31, 2023, the Company did not record any incentives from these agreements since it had not satisfied all the conditions under the respective agreements.

Income Taxes The Company accounts for income taxes under the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the financial statements. Under this method, deferred tax assets and liabilities are determined on the basis of the differences between the financial statements and tax basis of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. The effect of a change in tax rates on deferred tax assets and liabilities is recognized in income tax expense in the period that includes the enactment date.

The Company recognizes deferred tax assets to the extent that it believes these assets are more likely than not to be realized. A valuation allowance is recorded to reduce deferred tax assets when it is more likely than not that the Company would not be able to realize all or part of its deferred tax assets. In making such a determination, the Company considers all available positive and negative evidence, including future reversals of existing temporary differences, projected future taxable income, tax-planning strategies, and results of recent operations. If the Company determines that it would be able to realize its deferred tax assets in the future in excess of their net recorded amount, the Company would make an adjustment to the deferred tax asset valuation allowance, which would reduce the provision for income taxes.

The Company's policy for recording interest and penalties associated with audits and unrecognized tax benefits is to record such items as a component of income before taxes. Penalties and interest to be paid or received are recorded in other expense (income), net, in the statement of operations.

Comprehensive Income Comprehensive income represents the change in equity resulting from items other than shareholder investments and distributions. The Company's foreign currency translation adjustments, unrealized gains and losses on available-for-sale investments, interest rate swap - cash flow hedge and minimum pension adjustments are included in accumulated other comprehensive loss. Comprehensive income and the components of accumulated other comprehensive loss are presented in the accompanying consolidated statements of comprehensive income and consolidated statements of equity.

Recent Accounting Pronouncements Adopted in 2023 The Company believes that no recently issued accounting standards will have a material impact on its Consolidated Financial statements, or apply to its operations.

Recent Accounting Pronouncements Yet to be Adopted

In November 2023, the FASB issued ASU 2023-07, "Segment Reporting (Topic 280): Improvements to Reportable Segment Disclosures", which expands annual and interim disclosure requirements for reportable segments, primarily through enhanced disclosures about significant segment expenses. The updated standard is effective for our annual periods beginning in fiscal year 2024 and interim periods beginning in the first quarter of fiscal year 2025. Early adoption is permitted. We are currently evaluating the impact that the updated standard will have on our financial statement disclosures.

In December 2023, the FASB issued ASU 2023-09, "Income Taxes (Topic 740): Improvements to Income Tax Disclosures". ASU 2023-09 is intended to enhance the transparency and decision usefulness of income tax disclosures. The amendments in ASU 2023-09 address investor requests for enhanced income tax information primarily through changes to the rate reconciliation and income taxes paid information. Early adoption is permitted. The updated standard is effective for our annual periods beginning in fiscal year 2025. The Company is currently evaluating the impact of this standard on our consolidated financial statements and related disclosures.

The Company currently has no other material recent accounting pronouncements yet to be adopted.

2. REVENUES

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

(In thousands)

	2023	2022
Balance at beginning of year	\$ 60,476	\$ 23,050
Additions due to acquisition	—	11,108
Revenue recognized that was included in the contract liability balance at the beginning of the period	(37,830)	(30,667)
Increases due to cash received, excluding amounts recognized as revenue during the period	52,720	57,490
Contract liabilities included as part of dispositions and held for sale	(6,315)	(505)
Balance at end of year	<u>\$ 69,051</u>	<u>\$ 60,476</u>

3. GOODWILL AND LONG-LIVED ASSET IMPAIRMENT

Electronic Chemicals (“EC”)

During the first quarter of 2023, while the criteria had not been met to classify the reporting unit as held for sale, the Company was exploring market interest in a potential sale of the EC reporting unit within what is now the Materials Solutions segment (the segment resulting from combining our prior Advanced Planarization Solutions and the Specialty Chemicals and Engineered Materials segments). In connection with the sale process, management determined that certain impairment indicators were present and evaluated intangible assets, long-lived assets and goodwill for impairment in connection with the quarter ending April 1, 2023.

Long-lived assets, including finite-lived intangible assets

The Company compared the estimated undiscounted future cash flows generated by the asset group to the carrying amount of the asset group for the reporting unit and determined that the undiscounted cash flows were expected to exceed the carrying value on a held and used basis, therefore no impairment was recorded on the long-lived asset or finite-lived intangible assets. The Company considered if the triggering event would cause a potential change to the useful life of the assets and determined no modification to the useful life of the assets was necessary.

Goodwill

The Company compared the reporting unit’s fair value to its carrying amount, including goodwill, as of April 1, 2023. As the reporting unit’s carrying amount, including goodwill, exceeded its fair value, the Company determined the goodwill was impaired and recorded an impairment of \$88.9 million during the three months ended April 1, 2023 and an incremental impairment charge of \$15.9 million was recorded as a result of certain purchase price adjustments during the three months ended September 30, 2023. The impairment is classified as goodwill impairment in the Company’s consolidated statement of operations. The goodwill impairment is not tax deductible. The fair value of the reporting unit was determined using a market-based approach, which was aligned to the expected selling price. We consider this a Level 3 measurement in the fair value hierarchy.

Following the end of our third quarter of fiscal year 2023, on October 2, 2023, we completed the sale of the EC reporting unit, which reported into the Materials Solutions segment. For more information, see Note 5.

Other Business

During the fourth quarter of 2023, the Company began the process to sell a small, industrial specialty chemicals business that reports within the MS segment. The related assets and liabilities of the business were classified as held-for-sale in the Company’s consolidated balance sheet at December 31, 2023. In connection with the sale process, management determined that certain impairment indicators were present and evaluated goodwill, intangible assets, and long-lived assets for impairment in connection with the quarter ending December 31, 2023.

Goodwill

The Company compared the reporting unit’s fair value to its carrying value, including goodwill, as of December 31, 2023. As the reporting unit’s carrying amount, including goodwill, exceeded its fair value, the Company determined the goodwill was impaired and recorded an impairment of \$10.4 million during the year ended December 31, 2023. The impairment is classified as goodwill impairment in the Company’s consolidated statement of operations. The goodwill impairment is not deductible for tax purposes. The fair value of the reporting unit was determined using a market and income-based approach. We consider this a Level 3 measurement in the fair value hierarchy.

Long-lived assets, including finite-lived intangible assets

The Company compared the estimated undiscounted future cash flows generated by the asset group to the carrying amount of the asset group for the reporting unit and determined that the undiscounted cash flows did not exceed the carrying value. The Company next compared the reporting unit’s fair value to its carrying amount. As the reporting unit’s carrying amount

exceeded its fair value, the Company determined long-lived assets were impaired and recorded an impairment of \$30.5 million during the year ended December 31, 2023. The impairment is classified as Selling, general and administrative expense in the Company's consolidated statement of operations. The fair value of the reporting unit was determined using a market-based approach. We consider this a Level 3 measurement in the fair value hierarchy.

4. ACQUISITION

CMC Materials, Inc.

On July 6, 2022 (the "Closing Date"), the Company completed its acquisition of CMC Materials, Inc. ("CMC Materials"), a Delaware corporation, for approximately \$6.0 billion in cash and stock (the "Acquisition") pursuant to an Agreement and Plan of Acquisition dated as of December 14, 2021 (the "Acquisition Agreement"). As a result of the Acquisition, CMC Materials became a wholly owned subsidiary of the Company. The Acquisition was accounted for under the acquisition method of accounting and the results of operations of CMC Materials are included in the Company's consolidated financial statements as of and since July 6, 2022. CMC Materials reports into the MS segment of the Company. Direct costs of \$39.5 million associated with the acquisition of CMC Materials, consisting primarily of professional and consulting fees, were expensed as incurred in the twelve months ended December 31, 2022, respectively. These costs are classified as selling, general and administrative expense in the Company's consolidated statement of operations. The amounts of net sales and net loss from CMC Materials since the acquisition date included in the consolidated statement of operations for the twelve months ended December 31, 2022 are \$581.0 million and \$75.8 million, respectively.

CMC Materials is a global supplier of consumable materials, primarily to semiconductor manufacturers. The Company's products play a critical role in the production of advanced semiconductor devices, helping to enable the manufacture of smaller, faster and more complex devices by its customers. The acquisition was executed to expand the Company's product offering base and technological base, to better serve its customers, to enhance the Company's materials and process solutions for the most advanced manufacturing environments and to help customers improve productivity, performance and total cost of ownership.

The purchase price of CMC Materials consisted of the following:

(In thousands)

Cash paid to CMC Materials' shareholders	\$	3,836,983
Stock paid to CMC Materials' shareholders		1,265,690
Repayment of CMC Materials' indebtedness		918,578
Total purchase price		6,021,251
Less cash and cash equivalents acquired		280,636
Total purchase price, net of cash acquired	\$	5,740,615

Under the terms of the Acquisition Agreement, the Company paid \$133.00 per share for all outstanding shares of CMC Materials (excluding treasury shares). In addition, the Company settled all outstanding share-based compensation awards held by CMC Materials' employees at the same per share price except for certain unvested performance units that were replaced by the Company's restricted share units. The acquisition method of accounting requires the Company to include the amount associated with pre-combination service as purchase price for the acquisition, reflected in the table immediately above.

The Acquisition was funded with existing cash balances as well as funds raised by the Company through the issuance of debt in the form of a new term loan facility in the aggregate principal amount of \$2,495.0 million, senior secured notes due 2029 in an aggregate principal amount of \$1,600.0 million, senior unsecured notes due 2030 in an aggregate principal amount of \$895.0 million, and a 364-Day Bridge Credit Facility in the aggregate principal amount of \$275.0 million (collectively "CMC Materials Acquisition Financing").

The following table summarizes the allocation of the purchase price to the fair values assigned to the assets acquired and liabilities assumed at the date of the Acquisition as originally reported and as of December 31, 2022:

<i>(In thousands)</i>	As of July 6, 2022
Cash and cash equivalents	\$ 280,636
Accounts receivable and other current assets	207,472
Inventory	256,598
Property, plant and equipment	537,387
Identifiable intangible assets	1,736,219
Other noncurrent assets	39,725
Current liabilities	(211,417)
Deferred tax liabilities and other noncurrent liabilities	(452,805)
Net assets acquired	2,393,815
Goodwill	3,627,436
Total purchase price	<u>\$ 6,021,251</u>

The final valuation of assets acquired and liabilities assumed in connection with the Acquisition was completed in the second quarter of 2023.

The fair value of acquired inventories was \$256.6 million and was valued at the estimated selling price less the cost of disposal and reasonable profit for the selling effort. The fair value write-up of acquired finished goods inventory was \$61.9 million. This amount was recorded as an incremental cost of sales charge, amortized over the expected turn of the acquired inventory, during the year ended December 31, 2022.

The fair value of acquired property, plant and equipment of \$537.4 million is valued at its fair value assuming held and used, unless market data was available supporting the fair value.

The Company recognized the following intangible assets as part of the acquisition of CMC Materials and finite lived assets will be amortized on a straight-line basis:

<i>(In thousands)</i>	Amount	Weighted average life in years
Developed technology	\$ 1,043,000	7.3
Trademarks and trade names	236,600	14.9
Customer relationships	414,300	18.3
In-process research and development ⁽¹⁾	31,400	
Other	10,919	1.2
	<u>\$ 1,736,219</u>	11.0

(1) In-process research and development assets are treated as indefinite-lived until the completion or abandonment of the associated research and development project, at which time the appropriate useful lives would be determined.

The fair value of acquired identifiable finite intangible assets was determined using an income method, which utilizes discounted cash flows to fair value each of the identifiable intangible assets. The Company normally utilizes the “income method,” which starts with a forecast of all of the expected future net cash flows attributable to the subject intangible asset. These cash flows are then adjusted to present value by applying an appropriate discount rate that reflects the risk factors associated with the cash flow streams. Depending on the asset valued, the key assumptions included one or more of the following: (1) future revenue growth rates, (2) future gross margin, (3) future selling, general and administrative expenses, (4) royalty rates, and (5) discount rates. The valuations were based on the information that was available as of the acquisition date and the expectations and assumptions that have been deemed reasonable by the Company’s management. There are inherent uncertainties and management judgment required in these determinations. The fair value measurements of the assets acquired and liabilities assumed were based on valuations involving significant unobservable inputs, or Level 3 in the fair value hierarchy.

The purchase price of CMC Materials exceeded the fair value of the net of the acquisition-date amounts of the identifiable assets acquired and the liabilities assumed by \$3,627.4 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. The purchase price also included the fair values of other assets that were not identifiable, not separately recognizable under accounting rules (e.g., assembled workforce) or of immaterial value in addition to a going-concern element that represents the Company's ability to earn a higher rate of return on the group of assets than would be expected on the separate assets as determined during the valuation process. This additional investment value resulted in goodwill. No amount of goodwill is expected to be deductible for tax purposes.

Pro Forma Results (Unaudited)

The following unaudited pro forma financial information presents the combined results of operations of the Company as if the acquisition of CMC Materials had occurred as of the beginning of the years presented. The unaudited pro forma financial information is not necessarily indicative of what the Company's consolidated results of operations would have been had the acquisition occurred at the beginning of each year. In addition, the unaudited pro forma financial information does not attempt to project the future results of operations of the combined company. The pro forma information does not include any potential revenue enhancements, cost synergies or other operating efficiencies that could result from the acquisition.

<i>(In thousands)</i>	Year Ended	
	December 31, 2022	December 31, 2021
Net sales	\$ 3,920,850	\$ 3,518,893
Net income (loss)	292,867	(145,732)
Per share amounts:		
Net income (loss) per common share - basic	\$ 1.97	\$ (0.98)
Net income (loss) per common share - diluted	\$ 1.95	\$ (0.98)

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

- The elimination of transactions between Entegris and CMC Materials, which upon completion of the Acquisition would be considered intercompany transactions. This reflects the elimination of intercompany sales and associated intercompany accounts.
- Incremental amortization and depreciation expense related to the estimated fair value of identifiable intangible assets and property, plant and equipment from the purchase price allocation.
- Interest expense on the new debt raised to fund in part the consideration paid to effect the Acquisition using the effective interest rates.
- The elimination of interest expense, net of the gain on the termination of two swap instruments which were terminated on June 24, 2022 associated with the extinguished CMC Materials' debt outstanding.
- The elimination of interest expense associated with the repayment of the \$145.0 million senior secured term loan facility due 2025.
- The amortization of deferred financing costs and original issue discount associated with the aggregate new debt facilities.
- Transaction and integration costs directly attributable to the Acquisition were reclassified as of the beginning of the comparable prior annual reporting period.
- The incremental pro forma stock-based compensation expense for accelerated vesting upon the change in control for stock options, restricted stock units, restricted stock shares, phantom units, and other deferred restricted stock units.
- The additional cost of goods sold recognized in connection with the write-up of acquired finished goods inventory of \$61.9 million. The write-up is recognized in cost of sales as the inventory is sold, which for purposes of these pro forma financial statements is assumed to occur within the first quarter after the Acquisition.
- The income tax effect of the transaction accounting adjustments related to the Acquisition calculated using a blended statutory income tax rate of 22.5%.

5. ASSETS HELD-FOR-SALE AND DIVESTITURES

Asset Held-For-Sale - PIM

On October 11, 2022, the Company announced entry into a definitive agreement to sell its Pipeline and Industrials Materials (“PIM”) business, which became part of the Company with the acquisition of CMC Materials, to Infineum USA L.P. (“Infineum”). The PIM business specializes in the manufacture and sale of drag reducing agents and a range of valve maintenance products and services, and reports into the Materials Solutions segment (the segment resulting from combining the Advanced Planarization Solutions and the Specialty Chemicals and Engineered Materials segments) of the Company. Effective February 10, 2023, the Company terminated the definitive agreement. In accordance with the terms of the agreement, the Company received a \$12.0 million termination fee from Infineum in the first quarter of 2023 and incurred a transaction adviser fee of \$1.1 million. The net amount of \$10.9 million is recorded in Other expense, net in the consolidated statement of operations.

During the fourth quarter of 2022, the related assets and liabilities were classified as held-for-sale in the Company’s consolidated balance sheet and measured at the lower of their carrying amount or fair value less cost to sell based on the held-for-sale criteria. The assets and liabilities continue to be marketed for sale and are classified as held-for-sale at December 31, 2023 based on the carrying value.

The planned disposition of the PIM business did not meet the criteria to be classified as a discontinued operation in the Company’s financial statements since the disposition did not represent a strategic shift that had, or will have, a major effect on the Company’s operations and financial results.

PIM Assets-held-for sale comprise the following as of December 31, 2023:

(In thousands)

	December 31, 2023	
Assets:		
Current assets	\$	50,975
Property, Plant and Equipment, net		115,920
Intangible assets, net		76,692
Goodwill		12,707
Other assets		1,373
Total assets-held-for sale	\$	257,667
Liabilities:		
Accounts payable	\$	8,867
Accrued expenses		7,662
Long-term liabilities		1,508
Total liabilities-held-for sale	\$	18,037

Income before income taxes attributable to the PIM business was \$45.0 million and tax expense totaled \$7.5 million for the twelve months ended December 31, 2023.

Asset Held-For-Sale - Other

During the fourth quarter of 2023, the Company began the process to sell a small, industrial specialty chemicals business that reports within the Materials Solutions segment. The related assets and liabilities of the business were classified as held-for-sale in the Company’s consolidated balance sheet and measured at the lower of their carrying amount or fair value less cost to sell.

The proposed disposition of the business did not meet the criteria to be classified as a discontinued operation in the Company’s financial statements since the disposition did not represent a strategic shift that had, or will have, a major effect on the Company’s operations and financial results.

Other Assets-held-for sale comprise the following as of December 31, 2023:

(In thousands)

		December 31, 2023
Assets:		
Current assets	\$	8,315
Property, Plant and Equipment, net		2,454
Intangible assets, net		10,317
Total assets-held-for sale	\$	21,086
Liabilities:		
Accounts payable	\$	711
Accrued expenses		475
Total liabilities-held-for sale	\$	1,186

Loss before income taxes attributable to the business was \$45.0 million and a tax benefit of \$9.2 million for the twelve months ended December 31, 2023. The loss before income taxes attributable to the business includes a goodwill impairment charge of \$10.4 million and long-lived asset impairment charge of \$30.5 million.

Divestiture - EC Business

During the second quarter of 2023, the Company announced entry into a definitive agreement to sell its EC business, which became part of the Company with the acquisition of CMC Materials, to FUJIFILM Holdings America Corporation. The EC business specializes in purification, formulation, blending, packaging and distribution of high-purity process chemicals used within the semiconductor and microelectronic manufacturing processes. The EC business was a part of what is now the Materials Solutions segment and became part of the Company with the acquisition of CMC Materials.

The Company completed the divestiture of the EC business on October 2, 2023. The Company received gross cash proceeds of \$737.1 million, or expected net proceeds of \$675.2 million, which remains subject to customary final post-closing adjustments. The following table summarizes the fair value of the sale proceeds received in connection with the divestiture, which are subject to further final post-closing adjustment:

(In thousands)

		October 2, 2023
Cash proceeds received, gross	\$	737,100
Preliminary working capital adjustment		(5,474)
Cash transferred to the buyer on the closing balance sheet		(42,845)
Direct costs to sell		(13,581)
Fair value of sale consideration	\$	675,200

The disposition of the EC business did not meet the criteria to be classified as a discontinued operation in the Company's financial statements since the disposition did not represent a strategic shift that had, or will have, a major effect on the Company's operations and financial results.

The carrying amount of net assets associated with the EC business was approximately \$681.5 million. The major classes of assets and liabilities sold consisted of the following:

(In thousands)

	October 2, 2023
Assets:	
Current assets	\$ 103,927
Property, Plant and Equipment, net	177,397
Intangible assets, net	263,686
Goodwill	250,638
Other assets	7,966
Total assets-held-for sale	<u>\$ 803,614</u>
Liabilities:	
Accounts payable	\$ 18,975
Accrued expenses	21,141
Long-term liabilities	81,963
Total liabilities-held-for sale	<u>\$ 122,079</u>

As a result of the EC business divestiture, the Company recognized a pre-tax loss of \$8.9 million, including a \$2.6 million loss reclassified from accumulated other comprehensive income for foreign currency translation and minimum pension liability, presented in selling, general and administrative expenses on the consolidated statements of operations for the twelve months ended December 31, 2023. The Company recorded an income tax benefit associated with the EC business divestiture of approximately \$63.4 million.

Divestiture - QED

During the first quarter of 2023, the Company announced entry into a definitive agreement to sell QED Technologies International, Inc. ("QED"), which offers magnetorheological finishing polishing and subaperture stitching interferometry metrology manufacturing solutions, to Quad-C Management, Inc. QED was a part of what is now the Materials Solutions segment (the segment resulting from combining the Advanced Planarization Solutions and the Specialty Chemicals and Engineered Materials segments) and became part of the Company with the acquisition of CMC Materials.

The Company completed the divestiture of QED on March 1, 2023 and received proceeds of \$134.3 million after adjustments with respect to cash, working capital, indebtedness and transaction expenses. The disposition of QED did not meet the criteria to be classified as a discontinued operation in the Company's financial statements since the disposition did not represent a strategic shift that had a major effect on the Company's operations and financial results. The following table summarizes the fair value of the sale proceeds received in connection with the divestiture:

(In thousands)

	March 1, 2023
Fair value of sale consideration	\$ 137,500
Final working capital adjustment	1,031
Cash transferred to the buyer on the closing balance sheet	(1,465)
Direct costs to sell	(2,780)
Fair value of sale consideration, net proceeds	<u>\$ 134,286</u>

The carrying amount of net assets associated with the QED business was approximately \$149.2 million. The major classes of assets and liabilities sold consisted of the following:

(In thousands)

Assets:	March 1, 2023	
Current assets	\$	19,219
Property, plant and equipment, net		2,663
Goodwill		90,005
Intangible assets, net		48,661
Other assets		841
Total assets	\$	161,390
Liabilities:		
Accounts payable	\$	1,340
Accrued expenses		8,750
Long-term liabilities		2,067
Total liabilities	\$	12,157

As a result of the QED divestiture, the Company recognized a pre-tax loss of \$14.9 million presented in selling, general and administrative expenses on the consolidated statements of operations for the twelve months ended December 31, 2023. The Company recorded an income tax expense associated with the QED divestiture of approximately \$16.9 million.

Termination - Alliance Agreement

On June 5, 2023, the Company announced the termination of the Alliance Agreement (the “Alliance Agreement”) between the Company and MacDermid Enthone Inc., a global business unit of Element Solutions Inc (“MacDermid Enthone”). Under the Alliance Agreement, Entegris had been granted the exclusive right to distribute MacDermid Enthone's Viaform products, subject to certain conditions. In connection with the termination of the Alliance Agreement, Entegris received net proceeds of \$191.2 million for the twelve months ended December 31, 2023. The Company recognized a pre-tax gain of \$184.8 million (tax expense of \$41.7 million) presented in gain on termination of the Alliance Agreement on the consolidated statements of operations for the twelve months ended December 31, 2023.

6. RESTRICTED CASH

The following table provides a reconciliation of cash, cash equivalents and restricted cash reported within the consolidated balance sheet that sum to the total of the same amounts shown in the consolidated statement of cash flows.

(In thousands)

	December 31, 2023	December 31, 2021
Cash and cash equivalents	\$ 456,929	\$ 561,559
Restricted cash	—	1,880
Total cash, cash equivalents and restricted cash	\$ 456,929	\$ 563,439

The restricted cash represents cash held in a “Rabbi” trust. CMC Materials’ change in control severance protection agreements required CMC Materials to establish a Rabbi trust prior to its acquisition by the Company and to fully fund the trust to cover all the severance benefits that would become payable under the agreements. The Company had no restricted cash as of December 31, 2023.

7. TRADE ACCOUNTS AND NOTES RECEIVABLE

Trade accounts and notes receivable from customers at December 31, 2023 and 2022 consist of the following:

<i>(In thousands)</i>	2023	2022
Accounts receivable	\$ 457,566	\$ 536,256
Notes receivable	5,898	4,672
Total trade accounts and notes receivable	463,464	540,928
Less allowance for credit losses	6,412	5,443
Trade accounts and notes receivable, net	<u>\$ 457,052</u>	<u>\$ 535,485</u>

8. INVENTORIES

Inventories at December 31, 2023 and 2022 consist of the following:

<i>(In thousands)</i>	2023	2022
Raw materials	\$ 248,656	\$ 337,576
Work-in-process	49,704	60,182
Finished goods ⁽¹⁾	308,691	415,057
Inventories, net	<u>\$ 607,051</u>	<u>\$ 812,815</u>

⁽¹⁾ Includes consignment inventories held by customers of \$20.8 million and \$46.2 million at December 31, 2023 and 2022, respectively.

9. PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment at December 31, 2023 and 2022 consists of the following:

<i>(In thousands)</i>	2023	2022	Estimated useful lives in years
Land	\$ 44,177	\$ 62,192	
Buildings and improvements	779,589	490,903	5-35
Manufacturing equipment	685,504	569,224	5-10
Canisters and cylinders	186,231	168,516	3-12
Molds	83,745	76,388	3-5
Office furniture and lab equipment	299,438	330,284	3-8
Construction in progress	297,448	465,923	
Total property, plant and equipment	2,376,132	2,163,430	
Less accumulated depreciation	908,089	770,093	
Property, plant and equipment, net	<u>\$ 1,468,043</u>	<u>\$ 1,393,337</u>	

The table below sets forth the depreciation expense for the years ended December 31, 2023, 2022 and 2021:

<i>(In thousands)</i>	2023	2022	2021
Depreciation expense	\$ 172,683	\$ 135,371	\$ 90,311

10. GOODWILL AND INTANGIBLE ASSETS

Goodwill activity for each of the Company's reportable segments, Materials Solutions ("MS"), Microcontamination Control ("MC"), and Advanced Materials Handling ("AMH"), for the years ended December 31, 2023 and 2022 is shown below:

<i>(In thousands)</i>	MS	MC	AMH	Total
December 31, 2021	\$ 470,875	\$ 248,725	\$ 74,102	\$ 793,702
Addition due to acquisitions	3,628,457	—	—	3,628,457
Purchase accounting adjustments	5	—	—	5
Goodwill included in assets held-for-sale	(8,822)	—	—	(8,822)
Foreign currency translation	1,626	(6,637)	—	(5,011)
December 31, 2022	4,092,141	242,088	74,102	4,408,331
Goodwill impairment	(115,217)	—	—	(115,217)
Disposition of businesses	(340,643)	—	—	(340,643)
Purchase accounting adjustments	(1,021)	—	—	(1,021)
Goodwill included in assets held-for-sale	(3,885)	—	—	(3,885)
Foreign currency translation	(25)	(1,680)	—	(1,705)
December 31, 2023	\$ 3,631,350	\$ 240,408	\$ 74,102	\$ 3,945,860

As of December 31, 2023, goodwill amounted to approximately \$3,945.9 million, a decrease of \$462.5 million from the balance at December 31, 2022. The decrease in goodwill in 2023 reflects (1) the goodwill impairment of our EC reporting unit of \$104.8 million and for a small, industrial specialty chemicals business of \$10.4 million, as described in Note 3, (2) the sale of the QED and EC businesses and related goodwill of the respective business of \$90.0 million and \$250.6 million respectively as described in Note 5, (3) purchase accounting adjustments recognized during the one-year measurement period of \$1.0 million, (4) goodwill reclassified to asset held-for-sale of \$3.9 million related to the PIM business as described in Note 5 and (5) foreign currency translation of \$1.7 million.

Identifiable intangible assets at December 31, 2023 and 2022 consist of the following:

2023				
<i>(In thousands)</i>	Gross carrying amount	Accumulated amortization	Net carrying value	Weighted average life in years
Developed technology	\$ 1,256,469	\$ 455,720	\$ 800,749	7.2
Trademarks and trade names	172,031	37,877	134,154	14.0
Customer relationships	630,743	293,782	336,961	14.0
In-process research and development ⁽¹⁾	7,100	—	7,100	
Other	23,924	20,919	3,005	5.6
	<u>\$ 2,090,267</u>	<u>\$ 808,298</u>	<u>\$ 1,281,969</u>	9.7
2022				
<i>(In thousands)</i>	Gross carrying amount	Accumulated amortization	Net carrying value	Weighted average life in years
Developed technology	\$ 1,302,101	\$ 313,876	\$ 988,225	7.3
Trademarks and trade names	250,473	29,565	220,908	14.3
Customer relationships	863,947	273,039	590,908	15.4
In-process research and development ⁽¹⁾	31,100	—	31,100	
Other	31,206	20,392	10,814	4.3
	<u>\$ 2,478,827</u>	<u>\$ 636,872</u>	<u>\$ 1,841,955</u>	10.8

⁽¹⁾ Intangible assets acquired in a business combination that are in-process and used in research and development activities are considered indefinite-lived until the completion or abandonment of the research and development efforts. Once the research and development efforts are completed, we determine the useful life and begin amortizing the assets.

The table below sets forth the amortization expense for finite-lived intangible assets for the years ended December 31, 2023, 2022, and 2021:

<i>(In thousands)</i>	2023	2022	2021
Amortization expense	\$ 214,477	\$ 143,953	\$ 47,856

The amortization expense for each of the five succeeding years and thereafter relating to finite-lived intangible assets currently recorded in the Company's consolidated balance sheets is estimated to be the following at December 31, 2023:

<i>(In thousands)</i>	2024	2025	2026	2027	2028	Thereafter	Total
Future amortization expense	\$ 191,213	185,102	182,265	178,479	175,983	368,927	\$ 1,281,969

11. DEBT

The Company's debt at December 31, 2023 and 2022 consists of the following:

<i>(In thousands)</i>	2023	2022
Senior secured term loan due 2029 ⁽¹⁾	\$ 1,373,774	\$ 2,495,000
Senior secured notes due 2029 at 4.75%	1,600,000	1,600,000
Senior unsecured notes due 2030 at 5.95%	895,000	895,000
Senior unsecured notes due 2029 at 3.625%	400,000	400,000
Senior unsecured notes due 2028 at 4.375%	400,000	400,000
Bridge Credit Facility due 2023	—	135,000
Revolving facility due 2027 ⁽²⁾	—	—
	<u>\$ 4,668,774</u>	<u>\$ 5,925,000</u>
Unamortized discount and debt issuance costs	91,633	140,107
Total debt, net	<u>\$ 4,577,141</u>	<u>\$ 5,784,893</u>
Less short-term debt, including current portion of long-term debt	—	151,965
Total long-term debt, net	<u>\$ 4,577,141</u>	<u>\$ 5,632,928</u>

Annual maturities of long-term debt, excluding unamortized discount and issuance costs, due as of December 31, 2023 are as follows:

<i>(In thousands)</i>	2024	2025	2026	2027	2028	Thereafter	Total
Contractual debt obligation maturities*	\$ —	—	—	—	400,000	4,268,774	\$ 4,668,774

*Subject to excess cash flow payments to the lenders.

⁽¹⁾ As of Amendment No.2 to the Credit and Guaranty Agreement on September 11, 2023, the Term Loans due 2029 bear interest at a rate per annum equal to the SOFR plus an applicable margin of 2.50%.

⁽²⁾ 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 SOFR, plus, in each case, an applicable margin.

On March 10, 2023 and September 11, 2023, the Company and certain of its subsidiaries entered into Amendment No. 1 (the "First Amendment") and Amendment No. 2 (the "Second Amendment"), respectively, with the lenders party thereto and Morgan Stanley Senior Funding, Inc., as administrative agent, which amended the Credit and Guaranty Agreement, dated as of November 6, 2018 (as amended and restated as of July 6, 2022 and as further amended, restated, amended and restated, supplemented, modified and otherwise in effect prior to the effectiveness of the First Amendment and the Second Amendment, the "Existing Credit Agreement" and, the Existing Credit Agreement as amended by the First Amendment and the Second Amendment, the "Amended Credit Agreement"), by and among the Company, as borrower, certain subsidiaries of the Company party thereto, as guarantors, the lenders party thereto and Morgan Stanley Senior Funding, Inc., as administrative agent and collateral agent.

The First Amendment provided for, among other things, the refinancing of the Company's outstanding term B loans under the Existing Credit Agreement in an aggregate principal amount of \$2.495 billion (the "Original Tranche B Term Loans") with a new tranche of term B loans under the Amended Credit Agreement in an aggregate principal amount of \$2.495 billion (the "New Tranche B Term Loans"). Under the First Amendment, the New Tranche B Term Loans bore interest at a rate per annum equal to, at the Company's option, either (i) Term SOFR plus an applicable margin of 2.75% or (ii) a base rate plus an applicable margin of 1.75%.

The Second Amendment provides for, among other things, the reduction of the applicable rate of the Company's outstanding term B loans under the Existing Credit Agreement (as amended by the First Amendment). After giving effect to the Second Amendment, such outstanding term B loans bear interest, at a rate per annum equal to, at the Company's option, either (i) Term SOFR plus an applicable margin of 2.50% or (ii) a base rate plus an applicable margin of 1.50%. Consistent with the Original Tranche B Term Loans, the new Tranche B Term Loans had a mature on July 6, 2029. Other than as described herein (and more fully described in the Second Amendment), the terms of the Amended Credit Agreement are substantially similar to the terms of the Existing Credit Agreement.

Additionally, as of December 31, 2023, during the fiscal year 2023, the Company has repaid \$1.1 billion of the outstanding borrowings under the Amended Credit Agreement. In connection with this repayment and entry into the First Amendment and the Second Amendment, the Company incurred a pre-tax loss on extinguishment and modification of debt of \$29.2 million for the twelve months ended December 31, 2023, which is included in Other expense, net on the consolidated statements of operations.

On April 20, 2023, the Company repaid the principal amount of the \$135.0 million bridge credit facility. In connection with the repayment of this debt, the Company incurred a pre-tax loss on extinguishment of debt of \$0.7 million for the twelve months ended December 31, 2023, which is included in Other expense, net on the consolidated statements of operations.

12. FAIR VALUE OF FINANCIAL INSTRUMENTS

The Company is required to record certain assets and liabilities at fair value. The valuation methods used for determining the fair value of these financial instruments by hierarchy are as follows:

Level 1 Cash and cash equivalents consist of various bank accounts used to support our operations and investments in institutional money-market funds that are traded in active markets. The restricted cash represents cash held in a "Rabbi" trust, further described in Note 6.

Level 2 Derivative financial instruments include an interest rate swap contract and foreign exchange contracts. The fair value of our derivative instruments is estimated using standard valuation models and market-based observable inputs over the contractual term, including the prevailing SOFR based yield curves for the interest rate swap, and forward rates and/or the Overnight Index Swap curve for forward foreign exchange contracts, among others. The fair value of our debt is estimated based on independent broker/dealer bids or by comparison to other debt securities having similar durations, yields and credit ratings.

Level 3 No Level 3 financial instruments

The following table presents financial instruments that we measure at fair value on a recurring basis:

<i>(In thousands)</i>	Fair Value Measurements at Reporting Date Using							
	Level 1		Level 2		Level 3		Total	
	2023	2022	2023	2022	2023	2022	2023	2022
Assets:								
Cash and cash equivalents	\$ 456,929	\$ 561,559	\$ —	\$ —	\$ —	\$ —	\$ 456,929	\$ 561,559
Restricted cash	—	1,880	—	—	—	—	—	1,880
Derivative financial instruments - Interest rate swap - cash flow hedge	—	—	24,069	46,589	—	—	24,069	46,589
Derivative financial instruments -Forward exchange contracts	—	—	—	726	—	—	—	726
Total Assets	\$ 456,929	\$ 563,439	\$ 24,069	\$ 47,315	\$ —	\$ —	\$ 480,998	\$ 610,754
Liabilities:								
Derivative financial instruments - Forward exchange contracts	\$ —	\$ —	\$ —	\$ 193	\$ —	\$ —	\$ —	\$ 193
Total Liabilities	\$ —	\$ —	\$ —	\$ 193	\$ —	\$ —	\$ —	\$ 193

Other Fair Value Disclosures

The fair value of our debt is considered Level 2. The estimated fair value and carrying value of our debt as of December 31, 2023 and 2022 were as follows:

(In thousands)	December 31, 2023		December 31, 2022	
	Carrying Value	Fair Value	Carrying Value	Fair Value
Total debt, net	\$ 4,577,141	\$ 4,536,238	\$ 5,784,893	\$ 5,428,900

13. DERIVATIVE INSTRUMENTS

The Company is exposed to various market risks, including risks associated with interest rates and foreign currency exchange rates. One objective of the Company's risk management program is to mitigate these risks using derivative instruments.

Cash Flow Hedges - Interest Rate Swap Contract

In July 2022, the Company entered into a floating-to-fixed swap agreement on its variable rate debt under the Term Loan Facility. The interest rate swap was designated specifically to the Term Loan Facility, is highly effective and qualifies as a cash flow hedge. The notional amount is scheduled to decrease quarterly and will expire on December 30, 2025. As cash flow hedges, unrealized gains are recognized as assets and unrealized losses are recognized as liabilities. Unrealized gains and losses are designated as effective or ineffective based on a comparison of the changes in fair value of the interest rate swaps and changes in fair value of the underlying exposures being hedged. The effective portion is recorded as a component of accumulated other comprehensive income (loss) and will be reflected in earnings during the period the hedged transaction affects earnings, while the ineffective portion is recorded as a component of interest expense.

Foreign Currency Contracts Not Designated as Hedges

The Company enters into foreign exchange contracts in an effort to mitigate the risks associated with currency fluctuations on certain foreign currency balance sheet exposures. These foreign exchange contracts do not qualify for hedge accounting. The Company recognizes the change in fair value of its foreign currency forward contracts in the consolidated statement of operations.

The notional amounts of our derivative instruments are as follows:

(In thousands)	December 31, 2023		December 31, 2022	
Derivatives designated as hedging instruments:				
Interest rate swap contract - Cash flow hedge	\$	1,350,000	\$	1,950,000
Derivatives not designated as hedging instruments:				
Foreign exchange contracts to purchase U.S. dollars	\$	—	\$	3,995
Foreign exchange contracts to sell U.S. dollars		—		26,255

The fair values of our derivative instruments included in the consolidated balance sheets are as follows:

<i>(In thousands)</i>	Derivative Assets		Derivative Liabilities	
Consolidated Balance Sheet Location	December 31, 2023	December 31, 2022	December 31, 2023	December 31, 2022
Derivatives designated as hedging instruments - Interest rate swap contract -cash flow hedge				
Other current assets	\$ 21,451	\$ 32,481	\$ —	\$ —
Other assets - long-term	2,618	14,108	—	—
Derivatives not designated as hedging instruments - Foreign exchange contracts				
Other current assets	\$ —	726	\$ —	\$ —
Other accrued liabilities	—	—	—	193

The following table summarizes the effects of our derivative instruments on our consolidated statements of operations for the years ended December 31, 2023, 2022 and 2021:

<i>(In thousands)</i>	Consolidated Statements of Operations Location	(Gain) Loss Recognized in Condensed Consolidated Statements of Income		
Derivatives designated as hedging instruments:		2023	2022	2021
Interest rate swap contract-cash flow hedge	Interest expense, net	\$ (37,220)	\$ —	\$ —
Derivatives not designated as hedging instruments:		2023	2022	2021
Foreign exchange contracts	Other expense, net	\$ (374)	\$ (3,435)	\$ —

The following table summarizes the effects of our derivative instruments on Accumulated Other Comprehensive (Loss) Income for the years ended December 31, 2023, 2022 and 2021:

<i>(In thousands)</i>	Gain (Loss) recognized in Other Comprehensive Income (Loss)		
	2023	2022	2021
Derivatives designated as hedging instruments:			
Interest rate swap contract - Cash flow hedge	\$ (17,435)	\$ 36,069	\$ —

We expect approximately \$21.5 million to be reclassified from Accumulated other comprehensive (loss) income into Interest expense, net during the next twelve months related to our interest rate swap based on projected rates of the SOFR forward curve as of December 31, 2023.

14. OTHER EXPENSE, NET

The table below sets forth the Other expense, net for the years ended December 31, 2023, 2022 and 2021:

<i>(In thousands)</i>	2023	2022	2021
Infineum termination fee, net	\$ (10,876)	\$ —	\$ —
Loss on foreign currency remeasurement	5,718	23,034	7,857
Loss on extinguishment of debt and modification	29,896	3,287	23,338
Other, net	629	(2,395)	500
Other expense, net	<u>\$ 25,367</u>	<u>\$ 23,926</u>	<u>\$ 31,695</u>

Infineum termination fee, net

On October 11, 2022, the Company and Infineum entered into a definitive agreement for the sale of the Company's PIM business. On February 10, 2023, the Company terminated the definitive agreement. In accordance with the terms of the definitive agreement, the Company received a \$12.0 million termination fee from Infineum in the first quarter of 2023 and incurred a transaction fee of \$1.1 million to the third-party financial adviser it had engaged to assist with the transaction.

15. LEASES

As of December 31, 2023, the Company was obligated under operating and finance lease agreements for certain office space and manufacturing facilities, manufacturing equipment, vehicles, information technology equipment and warehouse space. Our leases have remaining lease terms of 1 year to 30 years, some of which may include options to extend the lease for up to 10 years, and some of which may include options to terminate the leases within 1 year.

As of December 31, 2023 and 2022, the Company's operating and financing lease components with initial or remaining terms in excess of one year were classified on the consolidated balance sheets as follows, together with certain supplemental balance sheet information:

<i>(In thousands)</i>	Classification	2023	2022
Assets			
Right-of-use assets:			
Operating lease	Right-of-use assets	57,990	79,228
Finance lease	Right-of-use assets	22,409	15,712
Total right-of-use assets		<u>\$ 80,399</u>	<u>\$ 94,940</u>
Liabilities			
Short-term lease liability:			
Operating lease	Other accrued liabilities	14,475	18,013
Finance lease	Other accrued liabilities	1,880	1,012
Total short-term lease liability		<u>\$ 16,355</u>	<u>\$ 19,025</u>
Long-term lease liability:			
Operating leases	Long-term lease liability	49,719	68,091
Finance leases	Long-term lease liability	19,267	12,625
Total long-term lease liability		<u>\$ 68,986</u>	<u>\$ 80,716</u>
Total lease liabilities		<u>\$ 85,341</u>	<u>\$ 99,741</u>
Lease Term and Discount Rate			
Weighted average remaining lease term (years) - Operating leases		6.9	7.2
Weighted average remaining lease term (years) - Finance leases		14.7	11.3
Weighted average discount rate - Operating leases		4.2 %	4.1 %
Weighted average discount rate - Finance leases		5.0 %	4.4 %

Expense for leases less than 12 months for the year ended December 31, 2023, 2022 and 2021 were not material. The components of lease expense for the year ended December 31, 2023, 2022 and 2021 are as follows:

<i>(In thousands)</i>	2023	2022	2021
Operating lease cost	\$ 18,107	\$ 17,997	\$ 13,127
Finance lease cost :			
Amortization of ROU assets	1,841	1,213	408
Interest on lease liabilities	821	401	155

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 Statement of Cash Flows. Other information related to the Company's operating leases for the year ended December 31, 2023, 2022 and 2021 are as follows:

<i>(In thousands)</i>	2023	2022	2021
Cash paid for amounts included in the measurement of lease liabilities:			
Cash flows - Operating leases	\$ 18,528	\$ 14,916	\$ 11,009
Cash flows - Finance leases	2,164	1,300	502
Right-of-use assets obtained in exchange for lease obligations:			
Operating leases	\$ 6,155	\$ 16,241	\$ 31,492
Finance leases	8,806	7,357	—

Future minimum lease payments for noncancellable leases as of December 31, 2023, were as follows:

<i>(In thousands)</i>	Operating leases	Finance leases
One Year	\$ 17,624	\$ 2,719
Two Years	13,507	2,325
Three Years	9,662	2,214
Four Years	7,753	2,209
Five Years	5,907	2,244
Beyond Five Years	20,406	19,271
Total minimum lease payments	\$ 74,859	\$ 30,982
Less: Interest	10,665	9,835
Present value of lease liabilities	\$ 64,194	\$ 21,147

16. ASSET RETIREMENT OBLIGATIONS

The Company has asset retirement obligations (“AROs”) related to environmental disposal obligations associated with cylinders used to supply customers with gas products, and certain restoration obligations associated with certain of its leased facilities.

Changes in the carrying amounts of the Company’s AROs for the years ended December 31, 2023 and 2022 are shown below:

<i>(In thousands)</i>	2023	2022
Balance at beginning of year	\$ 28,035	\$ 17,494
Liabilities assumed in acquisitions	—	12,531
Liabilities settled	(7,254)	(453)
Liabilities incurred	2,869	788
Accretion expense	139	213
Disposition	—	(2,815)
Revision of estimate	(2,074)	277
Balance at end of year	\$ 21,715	\$ 28,035

ARO liabilities expected to be settled within twelve months are included in the consolidated balance sheets in Other accrued liabilities, while all other ARO liabilities are included in Pension benefit obligations and other liabilities in the consolidated balance sheets.

17. INCOME TAXES

Income before income taxes for the years ended December 31, 2023, 2022 and 2021 was derived from the following sources:

<i>(In thousands)</i>	2023	2022	2021
Domestic	\$ (457,888)	\$ (272,365)	\$ 137,145
Foreign	630,558	519,445	341,931
Income before income tax expense	\$ 172,670	\$ 247,080	\$ 479,076

Income tax (benefit) expense for the years ended December 31, 2023, 2022 and 2021 is summarized as follows:

<i>(In thousands)</i>	2023	2022	2021
Current:			
Federal	\$ 10,835	\$ 39,216	\$ 9,187
State	1,267	4,077	2,939
Foreign	125,091	97,611	76,257
	<u>137,193</u>	<u>140,904</u>	<u>88,383</u>
Deferred (net of valuation allowance):			
Federal	(135,408)	(90,238)	(11,726)
State	(5,829)	(5,749)	(498)
Foreign	(4,369)	(6,757)	(6,209)
	<u>(145,606)</u>	<u>(102,744)</u>	<u>(18,433)</u>
Income tax (benefit) expense	<u>\$ (8,413)</u>	<u>\$ 38,160</u>	<u>\$ 69,950</u>

Income tax (benefit) expense differs from the expected amounts based upon the statutory federal tax rates for the years ended December 31, 2023, 2022 and 2021 as follows:

<i>(In thousands)</i>	2023	2022	2021
Expected federal income tax at statutory rate	\$ 36,261	\$ 51,887	\$ 100,606
State income taxes before valuation allowance, net of federal tax effect	(9,374)	(5,907)	(1,333)
Effect of foreign source income	(18,383)	(7,607)	(15,862)
Tax contingencies	11,048	5,762	4,696
Valuation allowance	9,032	8,052	9,984
U.S. federal research credit	(18,679)	(13,525)	(8,469)
Equity compensation	7,431	5,290	(8,899)
Foreign derived intangible income	(5,144)	(15,265)	(6,496)
Legal entity restructuring capital loss	—	—	(5,079)
Acquisition related retention, severance, and transaction costs	—	8,924	—
Legal entity divestiture activity	(20,311)	—	—
Other items, net	(294)	549	802
Income tax (benefit) expense	<u>\$ (8,413)</u>	<u>\$ 38,160</u>	<u>\$ 69,950</u>

The Company has made employment and spending commitments to Singapore. In return for those commitments, the Company was granted a partial tax holiday for eight years starting in 2013. During 2017, this agreement was extended to 2027 in exchange for revised employment and spending commitments. The income tax benefits attributable to the tax status are \$19.7 million (\$0.13 per diluted share), \$24.8 million (\$0.17 per diluted share) and \$13.9 million (\$0.10 per diluted share) for the years ending December 31, 2023, 2022 and 2021, respectively. The 2023, 2022 and 2021 effective tax rates include additional benefits of \$12.1 million, \$14.2 million and \$8 million because the corporate tax rate in Singapore is lower than the U.S. rate.

At December 31, 2023, there were approximately \$136.0 million of accumulated undistributed earnings of subsidiaries outside of the United States, all of which are considered to be indefinitely reinvested. Management estimates that approximately \$16.1 million of withholding taxes would be incurred if these undistributed earnings were distributed.

The significant components of the Company's deferred tax assets and deferred tax liabilities at December 31, 2023 and 2022 are as follows:

<i>(In thousands)</i>	2023	2022
Deferred tax assets attributable to:		
Accounts receivable	\$ 1,304	\$ 1,239
Inventory	12,456	14,862
Accruals not currently deductible for tax purposes	16,341	25,787
Net operating loss and credit carryforwards	55,685	57,760
Capital loss carryforward	5,281	895
Equity compensation	11,382	15,249
Interest expense limitations	37,691	8,067
Capitalization of ER&D expense	100,832	53,179
Other, net	15,064	—
Gross deferred tax assets	256,036	177,038
Valuation allowance	(60,330)	(48,047)
Total deferred tax assets	195,706	128,991
Deferred tax liabilities attributable to:		
Purchased intangible assets	(230,550)	(364,979)
Other, net	—	(2,397)
Depreciation and Amortization	(44,007)	(55,898)
Total deferred tax liabilities	(274,557)	(423,274)
Net deferred tax liabilities	\$ (78,851)	\$ (294,283)

Deferred tax assets are generally required to be reduced by a valuation allowance if it is more likely than not that some portion or all of the deferred tax assets will not be realized.

As of December 31, 2023 and 2022, the Company had net U.S. deferred tax liabilities of \$76.7 million and deferred tax assets of \$298.5 million, respectively, which are composed of temporary differences and various tax credit carryforwards. The Company had state operating loss and credit carryforwards of approximately \$23.3 million, which begin to expire in 2024. Management believes that it is more likely than not that the benefit from certain state net operating loss carryforwards, state credit carryforwards, capital loss carryforwards and certain federal foreign tax credit carryforwards will not be realized. In recognition of this risk, management has provided valuation allowances of \$29.7 million and \$18.5 million as of December 31, 2023 and 2022, respectively, on the related deferred tax assets. If the assumptions change and management determines the assets will be realized, the tax benefits relating to any reversal of the valuation allowance on deferred tax assets at December 31, 2023 will be recognized as a reduction of income tax expense.

As of December 31, 2023 and 2022, the Company had net non-U.S. deferred tax assets of \$58.2 million and \$52.3 million, respectively, for which management determined based upon the available evidence a valuation allowance of \$30.6 million and \$29.5 million as of December 31, 2023 and 2022, respectively, was required against the non-U.S. gross deferred tax assets. For other non-U.S. jurisdictions, management relies upon projections of future taxable income to utilize deferred tax assets.

At December 31, 2023, the Company had foreign operating loss carryforwards of \$60.8 million, which begin to expire in 2024.

Benefits from tax positions should be recognized in the financial statements only when it is more likely than not that the tax positions will be sustained upon examination by the appropriate taxing authority that would have full knowledge of all relevant information. A tax position that meets the more-likely-than-not recognition threshold is measured at the largest amount of benefit that is greater than fifty percent likely of being realized upon ultimate settlement. Tax positions that fail to meet the more-likely-than-not recognition threshold should be recognized in the first subsequent financial reporting period in which that threshold is met. Previously recognized tax positions that no longer meet the more-likely-than-not recognition threshold should be derecognized in the first subsequent financial reporting period in which that threshold is no longer met. The provisions also provide guidance on the accounting for and disclosure of unrecognized tax benefits, interest and penalties.

Reconciliations of the beginning and ending balances of the total amounts of gross unrecognized tax benefits for the years ended December 31, 2023 and 2022 are as follows:

<i>(In thousands)</i>	2023	2022
Gross unrecognized tax benefits at beginning of year	\$ 53,478	\$ 23,789
Increase from acquisition	—	24,452
Increase in tax positions from prior years	242	175
Decrease in tax positions from prior years	—	(248)
Increases in tax positions for current year	17,111	13,577
Settlement of tax positions for current year	—	(6,395)
Lapse in statute of limitations	(3,114)	(1,872)
Gross unrecognized tax benefits at end of year	<u>\$ 67,717</u>	<u>\$ 53,478</u>

The total amount of net unrecognized tax benefits that, if recognized, would affect the effective tax rate was \$53.4 million at December 31, 2023.

Penalties and interest paid or received are recorded in other income, net in the consolidated statements of operations. As of December 31, 2023 and 2022, the Company had accrued interest and penalties related to unrecognized tax benefits of \$6.6 million and \$4.2 million, respectively. Expenses of \$2.5 million, \$2.0 million and \$1.0 million were recognized as interest and penalties in the consolidated statements of operations for the years ended December 31, 2023, 2022 and 2021, respectively.

The Company files income tax returns in the U.S. and in various state, local and foreign jurisdictions. The statutes of limitations related to both the consolidated federal income tax return and state returns are closed for all years up to and including 2019 and 2019, respectively. With respect to foreign jurisdictions, the statute of limitations varies from country to country, with the earliest open year for the Company's major foreign subsidiaries being 2017.

Due to the expiration of various statutes of limitations and settlements of audits, it is reasonably possible that the Company's gross unrecognized tax benefit balance may decrease within the next twelve months by approximately \$1.9 million.

The Organization Economic Co-operation and Development ("OECD") introduced Base Erosion and Profit Shifting ("BEPS") Pillar 2 rules that impose a global minimum tax rate of 15%. Numerous countries, including European Union member states, have enacted or are expected to enact legislation to be effective as early as January 1, 2024, with general implementation of a global minimum tax by January 1, 2025. We are currently evaluating the potential impact on our consolidated financial statements and related disclosures.

18. EQUITY

Dividends

Holders of the Company's common stock are entitled to receive dividends when and if they are declared by the Company's board of directors. The Company's board of directors declared quarterly cash dividends of \$0.10 per share during 2023, payments for which totaled \$60.3 million. The Company's board of directors declared quarterly cash dividends of \$0.10 per share during 2022, payments for which totaled \$57.3 million. During 2021, the Company's board of directors declared quarterly cash dividends of \$0.08 per share, payments for which totaled \$43.6 million.

On January 17, 2024, the Company's board of directors declared a quarterly cash dividend of \$0.10 per share to be paid on February 21, 2024 to shareholders of record as of January 31, 2024.

Future dividend declarations, if any, as well as the record and payment dates for such dividends, are subject to the final determination of the Company's board of directors.

Share Repurchase Program

On December 14, 2020, the Company's board of directors authorized a repurchase program, effective February 16, 2021, covering the repurchase of up to an aggregate of \$125.0 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 expired pursuant to its terms on February 15, 2022. In anticipation of its acquisition of CMC Materials, the Company suspended its previously announced share repurchase program in the fourth quarter of 2021. The Company did not repurchase any of its common stock in 2023 under a Board-authorized common stock repurchase plan.

The Company did not repurchase any shares for the years ended December 31, 2023 and 2022, respectively, and repurchased \$67.1 million of shares for the year ended December 31, 2021.

The credit agreement governing the New Credit Facilities contains restrictions that may limit the Company's ability to continue to repurchase shares in the future.

2020 Stock Plan

In 2020, the Company's board of directors and stockholders approved the Entegris, Inc. 2020 Stock Plan (the "2020 Stock Plan"). The 2020 Stock Plan replaced the Entegris, Inc. 2010 Stock Plan for future stock awards and stock option grants. The 2020 Stock Plan has a term of ten years and provides for the issuance of stock options and other share-based awards to selected employees, directors, and other individuals or entities that provide services to the Company or its affiliates. Under the 2020 Stock Plan, the board of directors or a committee selected by the board of directors will determine for each award, the term, price, number of shares, rate at which each award is exercisable and whether restrictions are imposed on the shares subject to the awards. The exercise price for option awards generally may not be less than the fair market value per share of the underlying common stock on the date granted. The 2020 Stock Plan provides that after December 31, 2019, any shares subject to stock awards that were awarded from the Company's expired plans and that are forfeited, expired or otherwise terminated without issuance of shares will again be available for issuance under the 2020 Stock Plan.

Stock Plan assumed from CMC Materials

Subsequent to the acquisition of CMC Materials, the Company's Board of Directors approved the absorption of the CMC Materials 2021 Omnibus Incentive Plan (the "OIP") into the Company's 2020 Stock Plan for the remainder of the term of the OIP Plan. The 2021 OIP provides for grants of equity awards in the form of stock options, restricted stock, restricted stock units, stock appreciation rights, performance-based awards, other stock-based awards such as substitute awards in connection with an acquisition, and cash incentive awards. 3.9 million additional shares became available for grant by the Company upon absorption of the OIP Plan.

Each outstanding option to purchase shares of CMC Materials common stock under CMC Materials' stock plan became an option to acquire, on the same terms and condition as were applicable under the CMC Materials stock plan, the Company's common stock, with the number of shares and exercise prices thereof adjusted for the exchange ratio of 1.82. Accordingly, options to purchase 0.6 million shares of CMC Materials common stock were exchanged for options to purchase 1.2 million shares of the Company's common stock.

Each outstanding performance-based restricted stock unit of CMC Materials under CMC Materials' stock plan became a time-based restricted stock unit with the same terms and conditions as were applicable under the CMC Materials stock plan, the Company's common stock, with the number of shares and exercise price thereof adjusted for the exchange ratio of 1.82. Accordingly, 0.1 million shares of performance-based restricted stock units of CMC Materials common stock were exchanged for restricted stock units of 0.2 million shares of the Company's common stock.

For all plans, exclusive of the employee stock purchase plan, the Company had shares available for future grants of 10.2 million, 10.9 million, and 8.7 million shares at December 31, 2023, 2022 and 2021, respectively.

Stock Options

Stock option activity for the years ended December 31, 2023, 2022 and 2021 is summarized as follows:

	2023		2022		2021	
	Number of shares	Weighted average exercise price	Number of shares	Weighted average exercise price	Number of shares	Weighted average exercise price
<i>(Shares in thousands)</i>						
Options outstanding, beginning of year	1,839	\$ 62.59	657	\$ 55.32	1,082	\$ 33.38
Granted	232	81.79	146	128.44	167	98.11
Assumed in CMC acquisition	—	—	1,178	55.8	—	—
Exercised	(715)	51.04	(141)	40.00	(592)	27.32
Cancelled or forfeited	(42)	76.02	(1)	61.42	—	—
Options outstanding, end of year	1,314	\$ 71.83	1,839	\$ 62.59	657	\$ 55.32
Options exercisable, end of year	900	\$ 63.08	1,386	\$ 54.53	111	\$ 34.54

Options outstanding under the Company's stock plans at December 31, 2023 are summarized as follows:

(Shares in thousands)

Range of exercise prices	Options outstanding			Options exercisable	
	Number outstanding	Weighted average remaining life in years	Weighted-average exercise price	Number exercisable	Weighted average exercise price
\$0.00 to \$31.10	99	1.5 years	\$ 27.45	99	\$ 27.45
\$31.11 to \$43.47	164	2.4 years	33.54	164	33.54
\$43.48 to \$55.72	200	3.3 years	54.33	153	53.91
\$55.73 to \$80.00	303	5.4 years	69.47	303	69.47
\$80.01 to \$128.44	548	5.1 years	98.90	181	106.16
	<u>1,314</u>	4.3 years	\$ 71.83	<u>900</u>	\$ 63.08

The weighted average remaining contractual term for options outstanding and options exercisable for all plans at December 31, 2023 was 4.3 years and 3.9 years, respectively.

Under the stock plans, the total pre-tax intrinsic value of stock options exercised during the years ended December 31, 2023 and 2022 was \$29.2 million and \$11.4 million, respectively. The aggregate intrinsic value, which represents the total pre-tax intrinsic value based on the Company's closing stock price of \$119.82 at December 31, 2023, which theoretically could have been received by the option holders had all option holders exercised their options as of that date, was \$64.3 million and \$51.6 million for options outstanding and options exercisable, respectively.

Share-based payment awards in the form of stock option awards for 0.2 million, 0.1 million and 0.2 million shares were granted to employees during the years ended December 31, 2023, 2022 and 2021, respectively. Compensation expense is based on the grant date fair value. The awards vest annually over a period of four years and have a contractual term of 7 years. The Company estimates the fair value of stock options using the Black-Scholes valuation model. Key inputs and assumptions used to estimate the fair value of stock options include the grant price of the award, the expected option term, volatility of the Company's stock, the risk-free rate and the Company's dividend yield. Estimates of fair value are not intended to predict actual future events or the value ultimately realized by employees who receive equity awards, and subsequent events are not indicative of reasonableness of the original estimates of fair value made by the Company.

The fair value of each stock option grant was estimated at the date of grant using a Black-Scholes option pricing model. The following table presents the weighted-average assumptions used in the valuation and the resulting weighted-average fair value per option granted for the years ended December 31, 2023, 2022 and 2021:

Employee stock options:

	2023	2022	2021
Volatility	46.5 %	40.9 %	38.0 %
Risk-free interest rate	3.7 %	1.5 %	0.4 %
Dividend yield	0.5 %	0.3 %	0.3 %
Expected life (years)	4.7	4.2	4.6
Weighted average fair value per option	\$ 34.40	\$ 43.47	\$ 30.69

A historical daily measurement of volatility is determined based on the expected life of the option granted. The risk-free interest rate is determined by reference to the yield on an outstanding U.S. Treasury note with a term equal to the expected life of the option granted. Expected life is determined by reference to the Company's historical experience. The Company determines the dividend yield by dividing the expected annual dividend on the Company's stock by the option exercise price.

Employee Stock Purchase Plan

The Company maintains the Entegris, Inc. Amended and Restated Employee Stock Purchase Plan ("ESPP"). The ESPP allows employees to elect, at six-month intervals, to contribute up to 10% of their compensation, subject to certain limitations, to purchase shares of the Company's common stock at a discount of 15% from the fair market value on the first day or last day of each six-month period. The Company treats the ESPP as a compensatory plan. At December 31, 2023, 1.1 million shares remained available for issuance under the ESPP. Employees purchased 0.2 million, 0.2 million and 0.1 million shares, at a weighted-average price of \$68.87, \$65.25, and \$90.89 during the years ended December 31, 2023, 2022 and 2021, respectively.

Restricted Stock Units

Restricted stock units are awards of common stock made under the Stock Plans that are subject to a risk of forfeiture if the awardee terminates employment with the Company prior to the lapse of the restrictions. The value of such restricted stock units is determined using the market price on the grant date. Compensation expense for restricted stock units is generally recognized using the straight-line single-option method. A summary of the Company's restricted stock unit activity for the years ended December 31, 2023, 2022 and 2021 is presented in the following table:

	2023		2022		2021	
<i>(Shares in thousands)</i>	Number of shares	Weighted average grant date fair value	Number of shares	Weighted average grant date fair value	Number of shares	Weighted average grant date fair value
Unvested, beginning of year	844	\$ 90.37	897	\$ 62.69	1,083	\$ 41.31
Granted	640	80.45	366	117.82	293	101.04
Assumed in CMC acquisition	—	—	155	92.96	—	—
Vested	(389)	78.17	(523)	64.77	(439)	35.58
Forfeited	(90)	89.23	(51)	85.16	(40)	57.39
Unvested, end of year	<u>1,005</u>	89.08	<u>844</u>	90.37	<u>897</u>	62.69

During the years ended December 31, 2023, 2022 and 2021, the Company awarded performance-based restricted stock units for up to 0.2 million, 0.1 million and 0.1 million shares of common stock, respectively, to be issued upon the achievement of performance conditions under the Company's stock plans to certain officers. Compensation expense is based on the grant date fair value. The awards vest on the third anniversary of the award date if the performance conditions have been satisfied. The Company estimates the fair value of the performance shares using a Monte Carlo simulation process.

As of December 31, 2023, the total compensation cost related to unvested stock options, performance-based restricted stock units and restricted stock unit awards not yet recognized was \$3.7 million, \$3.1 million and \$46.9 million, respectively, and is expected to be recognized over the next 2.5 years on a weighted-average basis.

Modifications

During the year ended December 31, 2022, the Company modified all employee awards of restricted share units, options, and performance-based restricted share units that were granted in the 2022 fiscal year to provide that the awards will generally vest in connection with the grantee's qualifying retirement. The Company accounted for this as a modification of awards and recognized incremental compensation cost of \$15.3 million. The incremental compensation cost was measured as the accelerated expense over the requisite service period. The fair-value-based measure of the modified awards was the same as the fair-value based measure of the original award immediately before modification because the modification only affects the service period of the award.

During the years ended December 31, 2023 and 2022, the Company modified restricted share units, options, and performance-based restricted share units granted prior to the 2022 fiscal year for certain employees to accelerate the unvested awards upon their respective retirements from the Company. The Company accounted for this as a modification of awards and recognized incremental compensation cost of \$0.7 million and \$6.2 million for the years ended December 31, 2023 and 2022, respectively. The incremental compensation cost is measured as the excess of the fair value of the modified award over the fair value of the original award immediately before its terms modified and recognized as compensation cost on the date of the modification for the vested awards.

Valuation and Expense Information

The Company recognizes compensation expense for all share-based payment awards made to employees and directors based on their estimated fair values on the date of grant. Compensation expense is recognized using the straight-line attribution method to recognize share-based compensation over the service period of the award, with adjustments recorded for forfeitures as they occur. Awards issued to employees who are retirement eligible or nearing retirement eligibility are expensed on an accelerated basis. The following table summarizes the allocation of share-based compensation expense related to employee stock options, restricted stock awards, performance-based restricted stock awards and grants under the employee stock purchase plan for the

years ended December 31, 2023, 2022 and 2021:

<i>(In thousands)</i>	2023	2022	2021
Cost of sales	\$ 8,896	\$ 5,780	\$ 3,844
Engineering, research and development expenses	7,999	4,596	3,504
Selling, general and administrative expenses	44,476	56,201	22,536
Share-based compensation expense	\$ 61,371	\$ 66,577	\$ 29,884
Tax benefit	12,472	13,977	5,488
Share-based compensation expense, net of tax	<u>\$ 48,899</u>	<u>\$ 52,600</u>	<u>\$ 24,396</u>

19. BENEFIT PLANS

401(k) Plan

The Company maintains 401(k) defined contribution plans covering employees in the U.S. The related expense totaled \$25.4 million, \$21.9 million and \$10.1 million in the fiscal years ended December 31, 2023, 2022 and 2021, respectively. During the year ended December 31, 2023, the Company matched employees' contributions to a maximum of 5% of the employee's eligible wages for legacy and new Entegris employees. During the year ended December 31, 2023, the Company matched legacy CMC Materials employees' contributions to a maximum of 6% of each such employee's eligible wages and those employees were also eligible to receive a 3% non-elective contribution. The Company's United Kingdom, Singapore and South Korea subsidiaries also make immaterial contributions to retirement plans that function as defined contribution retirement plans.

Defined Benefit Plans

The employees of the Company's subsidiaries in Japan, Taiwan, South Korea, France and Germany are covered in defined benefit pension plans. The benefit obligation was reduced by \$1.4 million due to the EC disposition in the year ended December 31, 2023. On December 31, 2023, the Company converted its South Korea defined pension plans to defined contribution plans. As a result of this conversion, the Company settled and paid out to beneficiaries an amount of \$2.3 million on January 2, 2024. The Company uses a December 31 measurement date for its pension plans. A summary of these combined plans are:

<i>(In thousands)</i>	2023	2022
Projected benefit obligation	\$ 12,618	\$ 15,253
Fair value of plan assets	1,407	1,014
Plan assets less benefit obligation - net amount recognized	(11,211)	(14,239)
Accumulated benefit obligation	10,375	12,151

Cash Flows

Benefits for the combined plans were \$1.0 million, \$0.7 million and \$0.1 million in fiscal years 2023, 2022 and 2021, respectively, consisting primarily of service costs. Net service costs are included in Cost of sales and Operating expenses, and all other costs are recorded in Other expense, net in our Consolidated Statements of Operations. The Company expects to make the following benefit payments:

<i>(In thousands)</i>	Payments
2024	\$ 700
2025	976
2026	404
2027	453
2028	641
Years 2029-2033	3,029

20. EARNINGS PER SHARE ("EPS")

Basic EPS is computed by dividing net income by the weighted average number of shares of common stock outstanding during each period. The following table presents a reconciliation of the share amounts used in the computation of basic and diluted

earnings per share:

<i>(In thousands)</i>	2023	2022	2021
Basic earnings per share—Weighted common shares outstanding	149,900	142,294	135,411
Weighted common shares assumed upon exercise of options and vesting of restricted stock units	1,045	852	1,163
Diluted earnings per share—Weighted common shares outstanding	150,945	143,146	136,574

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 years ended December 31, 2023, 2022 and 2021:

<i>(In thousands)</i>	2023	2022	2021
Shares excluded from calculations of diluted EPS	657	447	136

21. SEGMENT INFORMATION

In the third quarter of 2023, the Company realigned its segments into three reportable segments discussed below, which align with the key elements of the advanced semiconductor manufacturing ecosystem. The current annual and succeeding annual periods will disclose the reportable segments with prior periods recast to reflect the change.

- **Materials Solutions:** MS provides materials-based solutions, such as chemical mechanical planarization (“CMP”) slurries and pads, deposition materials, process chemistries and gases, formulated cleans, etchants and other specialty materials that enable our customers to achieve better device performance and faster time to yield, while providing for lower total cost of ownership.
- **Microcontamination Control:** MC offers advanced solutions that improve customers’ yield, device reliability and cost by filtering and purifying critical liquid chemistries and gases used in semiconductor manufacturing processes and other high-technology industries.
- **Advanced Materials Handling:** AMH develops solutions that improve customers’ yields by protecting critical materials during manufacturing, transportation, and storage, including products that monitor, protect, transport and deliver critical liquid chemistries, wafers, and other substrates for a broad set of applications in the semiconductor, life sciences and other high-technology industries.

These segments share common business systems and processes, technology centers and technology roadmaps. With the complementary capabilities across these segments, we believe we are uniquely positioned to create new, co-optimized and increasingly integrated solutions for our customers, which should translate into improved device performance, lower cost of ownership and faster time to market. This capability has been further enhanced with the acquisition of CMC Materials. For example, we can now develop and provide complementary offerings solving customers’ complex manufacturing challenges across the deposition, CMP process and post-CMP modules with co-optimized products from each of our divisions, such as advanced deposition materials, CMP slurries, pads and post-CMP cleaning chemistries from our MS segment, CMP slurry filters from our MC segment, and CMP slurry high-purity packaging and fluid monitoring systems from our AMH segment.

Segment profit is defined as net sales less direct and indirect segment operating expenses, including certain general and administrative costs for the Company’s human resources, finance and information technology functions. The Company generally accounts for inter-segment sales and transfers as if the sales or transfers were to third parties, that is, at approximate market prices. Inter-segment sales are presented as an elimination below. The remaining unallocated expenses consist mainly of the Company’s corporate functions as well as interest expense, interest income, amortization of intangible assets and income tax expense.

Corporate assets consist primarily of cash and cash equivalents, property, plant and equipment, deferred tax assets and deferred tax charges.

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

<i>(In thousands)</i>	2023	2022	2021
Net sales:			
MS	1,689,467	1,380,208	711,291
MC	1,127,555	1,105,996	919,363
AMH	758,648	846,492	704,946
Inter-segment elimination	(51,744)	(50,663)	(36,707)
Total net sales	<u>\$ 3,523,926</u>	<u>\$ 3,282,033</u>	<u>\$ 2,298,893</u>
<i>(In thousands)</i>	2023	2022	2021
Segment profit:			
MS	296,375	219,189	167,807
MC	395,348	411,475	321,300
AMH	136,100	183,738	159,995
Total segment profit	<u>\$ 827,823</u>	<u>\$ 814,402</u>	<u>\$ 649,102</u>
<i>(In thousands)</i>	2023	2022	2021
Total assets:			
MS	6,405,693	7,535,706	1,191,465
MC	1,157,414	1,161,636	946,336
AMH	697,243	801,591	598,547
Corporate	552,241	639,924	455,548
Total assets	<u>\$ 8,812,591</u>	<u>\$ 10,138,857</u>	<u>\$ 3,191,896</u>
<i>(In thousands)</i>	2023	2022	2021
Depreciation and amortization:			
MS	286,632	203,320	66,983
MC	57,432	42,514	41,536
AMH	43,096	33,490	29,648
Total depreciation and amortization	<u>\$ 387,160</u>	<u>\$ 279,324</u>	<u>\$ 138,167</u>
<i>(In thousands)</i>	2023	2022	2021
Capital expenditures:			
MS	141,851	151,331	74,410
MC	227,996	178,800	69,120
AMH	87,000	136,061	67,096
Total capital expenditures	<u>\$ 456,847</u>	<u>\$ 466,192</u>	<u>\$ 210,626</u>

The following table reconciles total segment profit to income before income taxes and equity in net loss of affiliate:

<i>(In thousands)</i>	2023	2022	2021
Total segment profit	\$ 827,823	\$ 814,402	\$ 649,102
Less:			
Amortization of intangibles	214,477	143,953	47,856
Unallocated general and administrative expenses	114,188	190,468	49,478
Operating income	\$ 499,158	\$ 479,981	551,768
Interest expense	312,378	212,669	41,240
Interest income	(11,257)	(3,694)	(243)
Other expense, net	25,367	23,926	31,695
Income before income tax (benefit) expense	\$ 172,670	\$ 247,080	\$ 479,076

In the following tables, revenue is disaggregated by country or region based on the ship to location of the customer for the years ended December 31, 2023, 2022 and 2021:

	2023				
<i>(In thousands)</i>	MS	MC	AMH	Inter-segment	Total
North America	\$ 540,347	\$ 170,816	\$ 231,833	\$ (51,744)	\$ 891,252
Taiwan	231,982	234,078	124,573	—	590,633
South Korea	218,192	120,036	104,957	—	443,185
Japan	104,977	219,340	42,991	—	367,308
China	196,970	229,689	140,245	—	566,904
Europe	229,368	93,059	79,923	—	402,350
Southeast Asia	167,631	60,537	34,126	—	262,294
	<u>\$ 1,689,467</u>	<u>\$ 1,127,555</u>	<u>\$ 758,648</u>	<u>\$ (51,744)</u>	<u>\$ 3,523,926</u>

	2022				
<i>(In thousands)</i>	MS	MC	AMH	Inter-segment	Total
North America	\$ 422,185	\$ 158,627	\$ 265,510	\$ (50,663)	\$ 795,659
Taiwan	202,565	305,899	151,663	—	660,127
South Korea	162,601	129,750	121,726	—	414,077
Japan	107,239	183,485	59,278	—	350,002
China	198,022	184,609	119,325	—	501,956
Europe	150,914	85,696	88,405	—	325,015
Southeast Asia	136,682	57,930	40,585	—	235,197
	<u>\$ 1,380,208</u>	<u>\$ 1,105,996</u>	<u>\$ 846,492</u>	<u>\$ (50,663)</u>	<u>\$ 3,282,033</u>

	2021				
<i>(In thousands)</i>	MS	MC	AMH	Inter-segment	Total
North America	\$ 208,997	\$ 133,653	\$ 219,853	\$ (36,707)	\$ 525,796
Taiwan	117,056	225,086	111,968	—	454,110
South Korea	97,568	114,211	105,493	—	317,272
Japan	89,767	161,569	51,267	—	302,603
China	102,791	164,471	97,157	—	364,419
Europe	50,136	70,011	89,121	—	209,268
Southeast Asia	44,976	50,362	30,087	—	125,425
	<u>\$ 711,291</u>	<u>\$ 919,363</u>	<u>\$ 704,946</u>	<u>\$ (36,707)</u>	<u>\$ 2,298,893</u>

The following table summarizes property, plant and equipment, net, attributed to significant countries for the years ended December 31, 2023, 2022 and 2021:

<i>(In thousands)</i>	2023	2022	2021
Property, plant and equipment, net:			
North America	\$ 747,823	\$ 776,913	\$ 417,549
South Korea	101,107	84,253	58,725
Japan	118,872	104,282	56,357
Malaysia	50,183	46,703	29,443
China	32,884	31,592	32,133
Taiwan	412,346	253,285	58,444
Other	4,828	96,309	1,447
	<u>\$ 1,468,043</u>	<u>\$ 1,393,337</u>	<u>\$ 654,098</u>

The Company reported net sales of 10 percent or more for one customer in the amount of \$382.9 million, \$408.6 million and \$271.9 million for the years ended December 31, 2023, 2022 and 2021, respectively, all of which include sales from all the Company's segments.

22. COMMITMENTS AND CONTINGENT LIABILITIES

We are, from time-to-time, involved in various claims, proceedings and lawsuits relating to our business, employees, intellectual property and other matters. The outcomes of these legal actions are not within our complete control and may not be known for prolonged periods of time. In some actions, the claimants seek damages, as well as other relief, that could require significant expenditures or result in lost revenues. We record a liability for these legal actions when a loss is known or considered probable and the amount can be reasonably estimated. If the reasonable estimate of a known or probable loss is a range, and no amount within the range is a better estimate than any other, the minimum amount of the range is accrued. There is judgment required in the determination of the likelihood of outcome, and if necessary determination of the estimate or range of potential outcomes. Based on the current information, the Company does not believe any known matters have a reasonable possibility of a material amount for litigation or other contingencies related to legal proceedings.

23. QUARTERLY INFORMATION-UNAUDITED

<i>(In thousands, except per share data)</i>	Fiscal quarter ended			
	April 1, 2023	July 1, 2023	September 30, 2023	December 31, 2023
Net sales	\$ 922,396	\$ 901,000	\$ 888,239	\$ 812,291
Gross profit	401,685	384,166	367,074	344,680
Net (loss) income	(88,166)	197,646	33,212	37,977
Basic net (loss) income per common share	(0.59)	1.32	0.22	0.25
Diluted net (loss) income per common share	(0.59)	1.31	0.22	0.25

<i>(In thousands, except per share data)</i>	Fiscal quarter ended			
	April 2, 2022	July 2, 2022	October 1, 2022	December 31, 2022
Net sales	\$ 649,646	\$ 692,489	\$ 993,828	\$ 946,070
Gross profit	309,820	310,397	371,671	404,525
Net income (loss)	125,705	99,491	(73,703)	57,427
Basic net income (loss) per common share	0.93	0.73	(0.50)	0.39
Diluted net income (loss) per common share	0.92	0.73	(0.50)	0.38

24. SUBSEQUENT EVENTS

The Company has evaluated subsequent events to the date of the issuance of the consolidated financial statements. The Company has determined that there are no events occurring in this period that require disclosure or adjustment, except as disclosed above.

